

Dall's Sheep

Dall's sheep were the second most common animal for which stops were made along the Denali road. Stops to observe Dall's sheep made up 25% to 50% of all records during any one month (Fig. 64). From 1988 through 1991, 30%-35% of all stops were to observe Dall's sheep (Fig. 64).

The percentage of passengers who observed Dall's sheep varied from 72% during September 1991 to 100% during May 1989 (tour passengers) and 100% during September 1989 (shuttle passengers) (Table 30). Two to 3 percent more tour passengers observed Dall's sheep on an annual basis than did shuttle passengers (Table 30). The total percentage of passengers who observed Dall's sheep declined from 91% in 1988 and 92% in 1989 to 87% in 1990 and 82% in 1991 (Table 30).

Fig.64. Percent of total observations of caribou, Dall's sheep, grizzly bears, moose, and wolves that were of Dall's sheep by month and year.

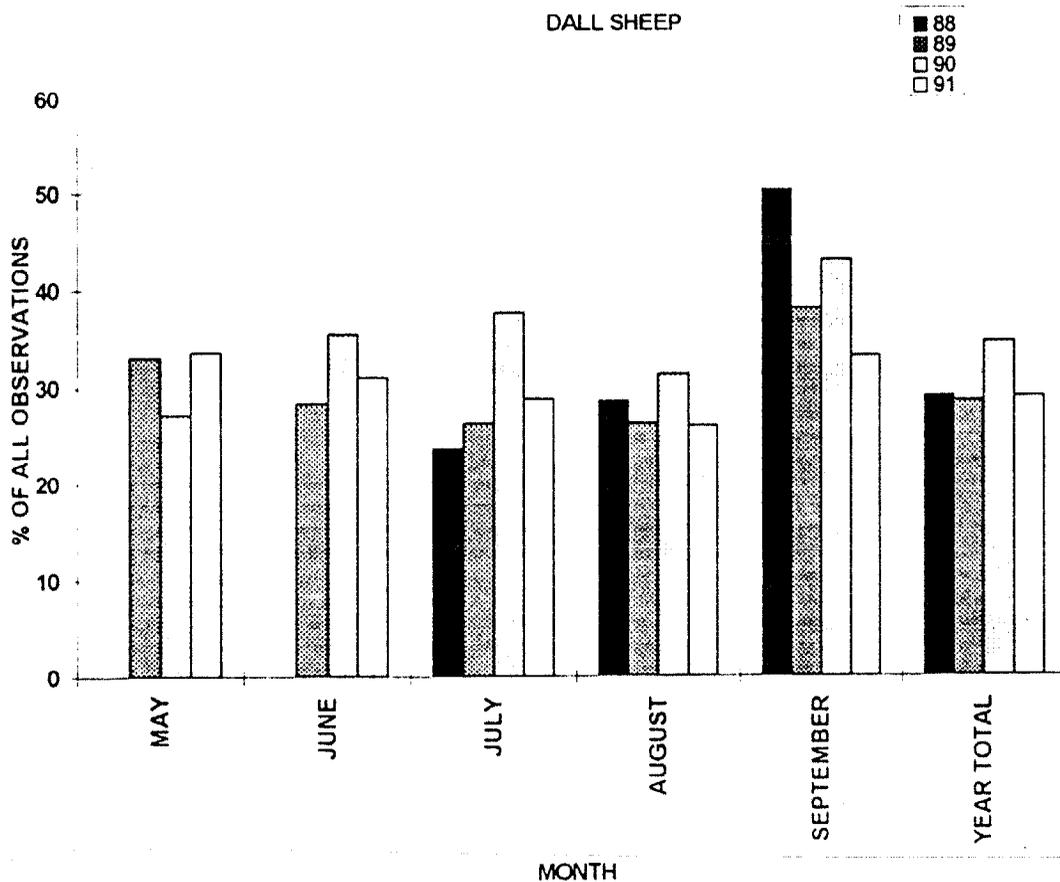


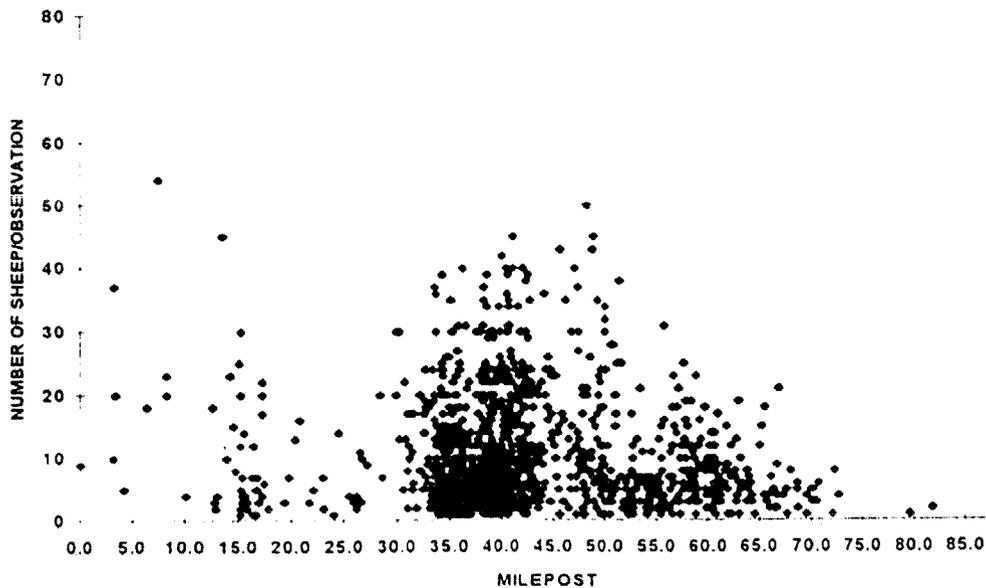
Table 30. Percentage of passengers who observed Dall's sheep by month and year.

SPECIES	YEAR	MONTH	PASSENGER OBSERVERS	TOTAL PASSENGERS	PERCENTAGE WHO OBSERVED	
DALL'S SHEEP	1988 SHUTTLE	JULY	2508	2781	90.18	
		AUGUST	2185	2469	88.50	
		SEPTEMBER	980	1045	93.78	
		TOTAL	5673	6295	90.12	
	TOUR	JULY	4964	5494	90.35	
		AUGUST	4909	5250	93.50	
		SEPTEMBER	1347	1496	90.04	
		TOTAL	11220	12240	91.67	
	TOTAL	JULY	7472	8275	90.30	
		AUGUST	7094	7719	91.90	
		SEPTEMBER	2327	2541	91.58	
		TOTAL	16893	18535	91.14	
					
		1989 SHUTTLE	MAY	406	439	92.48
			JUNE	2033	2224	91.41
			JULY	1559	1807	86.28
			AUGUST	1636	1886	86.74
			SEPTEMBER	433	433	100.00
TOTAL			6067	6789	89.40	
TOUR		MAY	414	414	100.00	
		JUNE	2630	2705	97.23	
		JULY	2991	3568	83.83	
		AUGUST	3300	3393	97.26	
		SEPTEMBER	1462	1548	94.44	
		TOTAL	10797	11628	93.30	
TOTAL		MAY	820	853	96.13	
		JUNE	4663	4929	94.60	
		JULY	4550	5375	84.03	
		AUGUST	4936	5279	93.50	
		SEPTEMBER	1895	1981	95.66	
		TOTAL	16864	18417	91.57	
.....						

Table 30. Concluded.

1990	MAY	675	715	94.41
	JUNE	2789	3231	86.32
	JULY	3267	3691	88.51
	AUGUST	2858	3508	81.47
	SEPTEMBER	1021	1108	92.15
	TOTAL	10610	12253	86.59
.....				
1991	MAY	583	688	84.74
	JUNE	2307	2576	89.56
	JULY	3281	4025	81.52
	AUGUST	2836	3534	80.25
	SEPTEMBER	613	849	72.20
	TOTAL	9620	11672	82.42

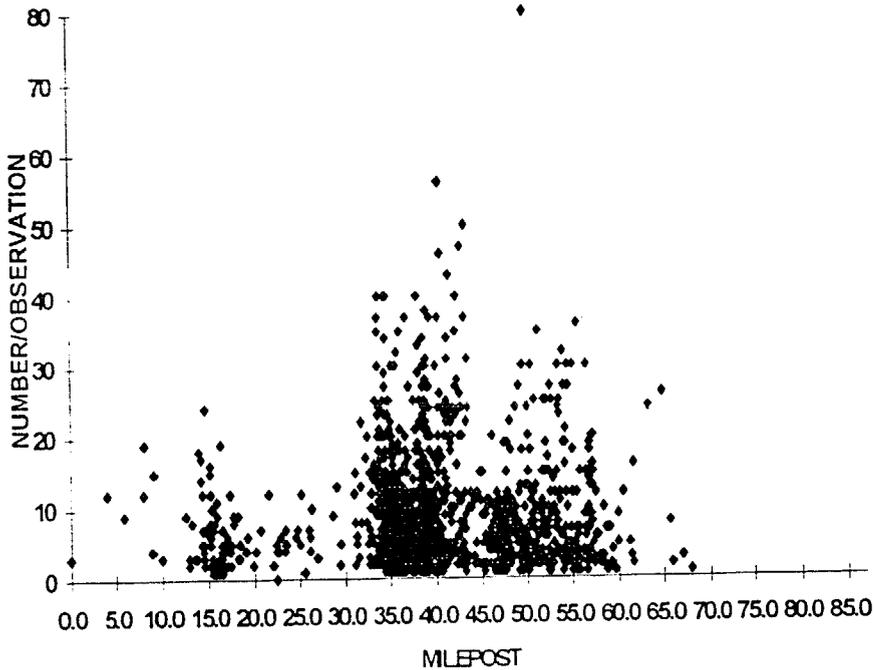
FIG. 65. LOCATION AND NUMBER OF DALL'S SHEEP PER OBSERVATION, 1988



Locations of Dall's sheep observations were similar in 1988 and 1989 (Figs. 65 & 66). Locations were not plotted for 1990 and 1991. Small numbers of observations occurred from milepost 0 to the Igloo Creek area at milepost 35. Sheep were most frequently observed from that point to milepost 42. A secondary

concentration of observations was from milepost 48 to milepost 70 (Figs. 65 & 66).

FIG. 66. LOCATION AND NUMBER OF DALL'S SHEEP PER OBSERVATION AT EACH MILEPOST, 1989



The mean number of Dall's sheep observed per milepost per bus trip was calculated for each month and for the season of 1989 (Figs. 67-72). This shows the relative usage of areas by Dall's sheep throughout the season.

During the 1989 season, few Dall's sheep were observed from mileposts 0-14 and from 16-30 (Fig. 72). Rock cliff habitat near the Savage River bridge resulted in a mean number of 0.5 animals per milepost at that location. Mileposts 31-43 were areas where highest numbers of sheep were observed, with mileposts 46-57 being secondary in importance (Fig. 72). No Dall's sheep were recorded from mileposts 70-87 during 1989. Fewer sheep per observation were recorded during May, August, and September (Figs. 67, 70, and 71) than during June and July (Figs. 68 & 69).

FIG. 67. MEAN NUMBER OF DALL'S SHEEP PER MILEPOST PER BUS TRIP, MAY, 1989

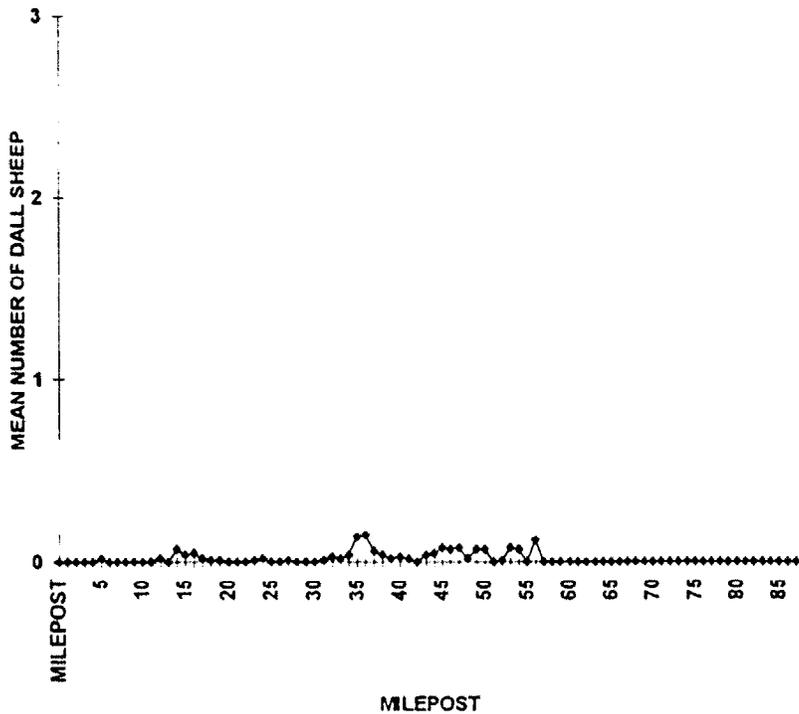


FIG. 68. MEAN NUMBER OF DALL'S SHEEP PER MILEPOST PER BUS TRIP, JUNE, 1989

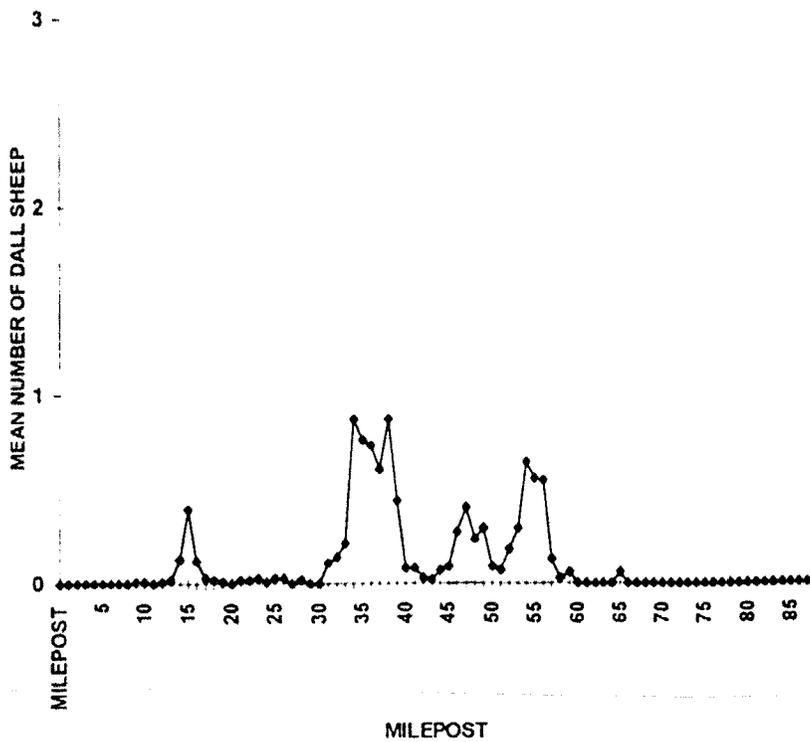


FIG. 69. MEAN NUMBER OF DALL'S SHEEP PER MILEPOST PER BUS TRIP, JULY, 1989

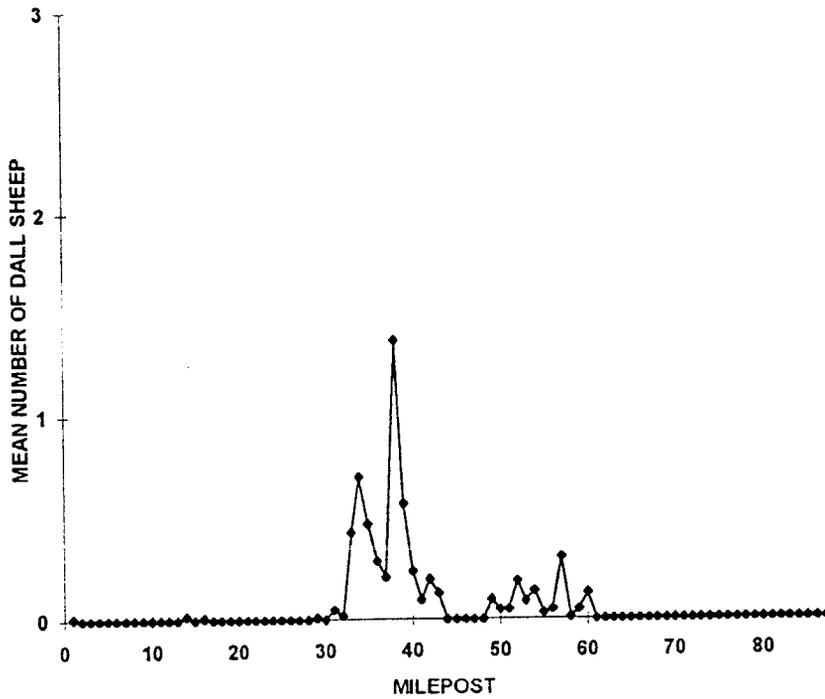


FIG. 70. MEAN NUMBER OF DALL'S SHEEP PER MILEPOST PER BUS TRIP, AUGUST, 1989

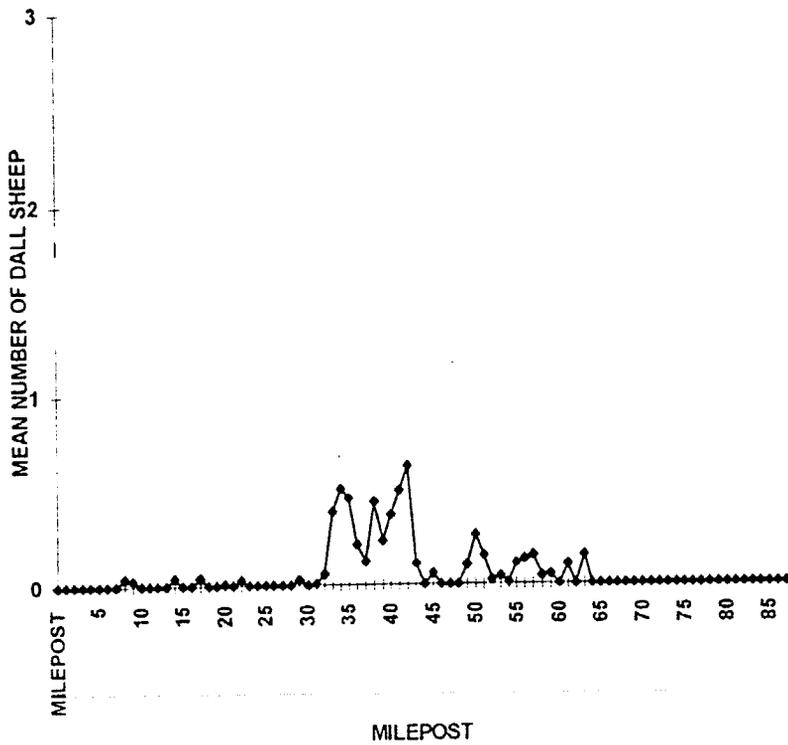


FIG. 71. MEAN NUMBER OF DALL'S SHEEP PER MILEPOST PER BUS TRIP, SEPTEMBER, 1989

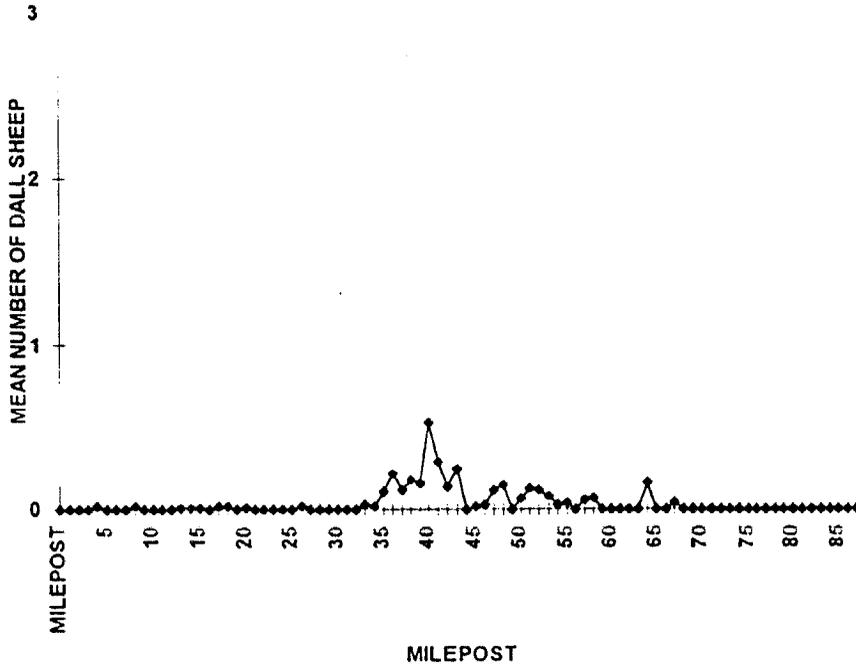
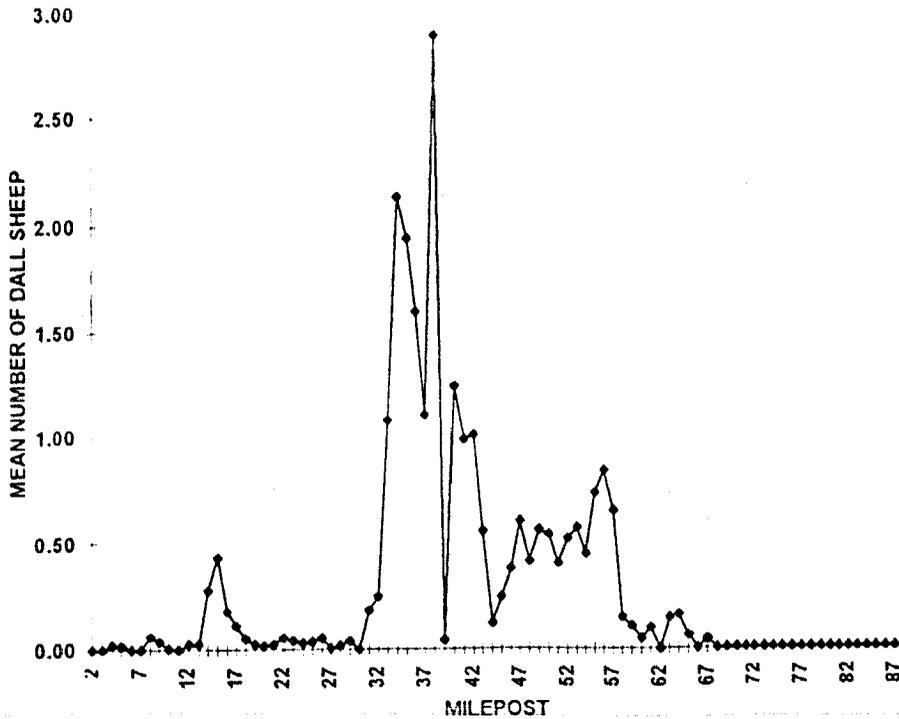


FIG. 72. MEAN NUMBER OF DALL'S SHEEP PER MILEPOST PER BUS TRIP, 1989 SEASON



The number of Dall's sheep observed by date for 1988 and 1989 was plotted to determine if there was a seasonally related change in the observations. No trend could be detected from the graphs (Figs. 73 & 74). Average number of sheep per observation was from 9.3 to 9.6 animals for 1988 (Figs. 73A). In 1989, the average number varied from 6.8 in May to 9.3 during July (Fig. 74A).

The number of Dall's sheep observed in relation to the time observation buses left for the day was plotted to determine if there was a change in sheep observations with increasing hour. No relationship could be detected, indicating passengers observed as many sheep on early morning departures as on those later in the day (Figs. 75 & 76).

FIG. 73. NUMBER OF DALL'S SHEEP OBSERVED BY JULIAN DATE, 1988

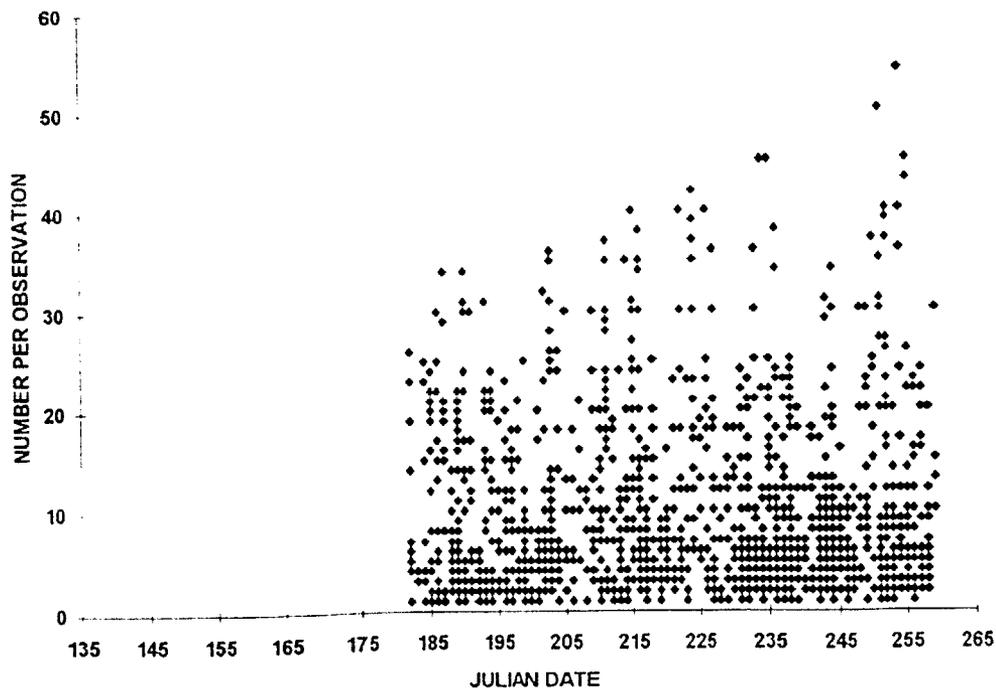


FIG. 73A. MEAN NUMBER OF DALL'S SHEEP BY MONTH

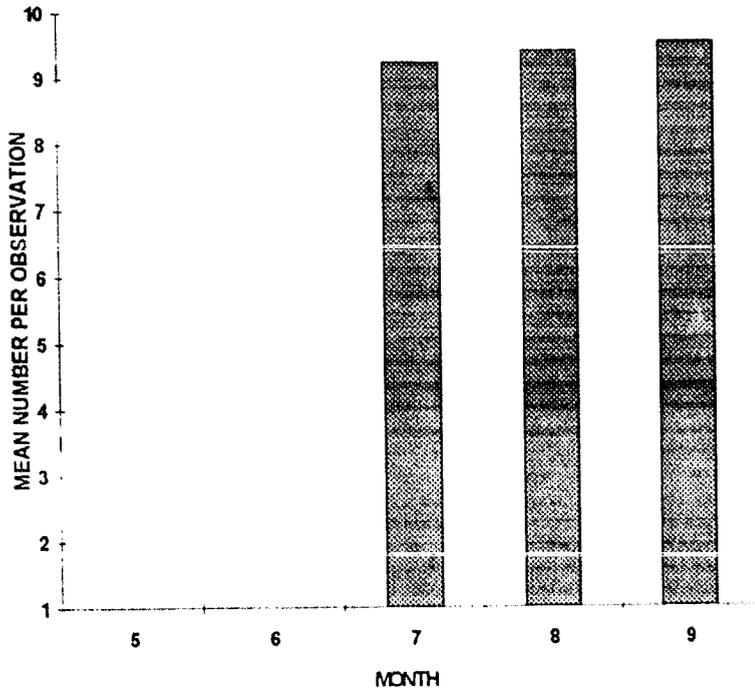


FIG. 74. NUMBER OF DALL'S SHEEP PER OBSERVATION BY JULIAN DATE, 1989

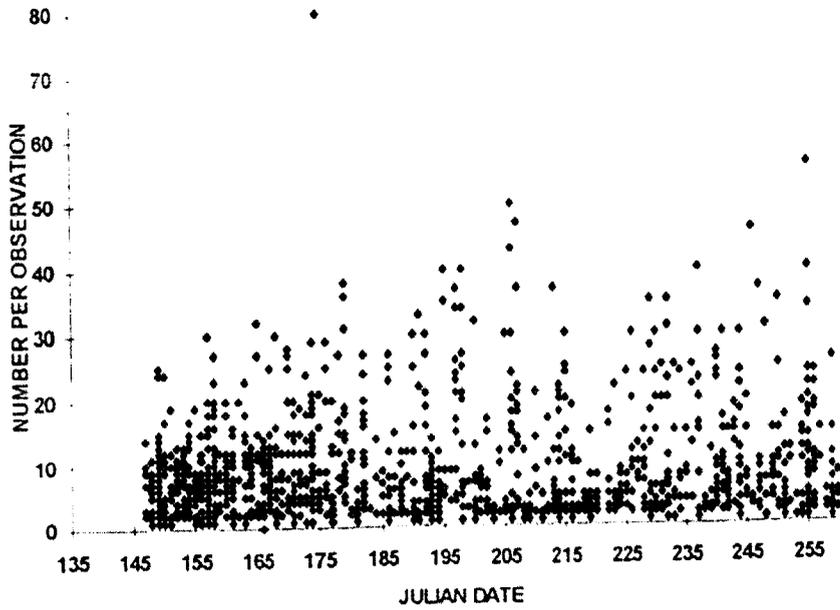


FIG. 74A. MEAN NUMBER OF DALL'S SHEEP PER OBSERVATION BY MONTH, 1989

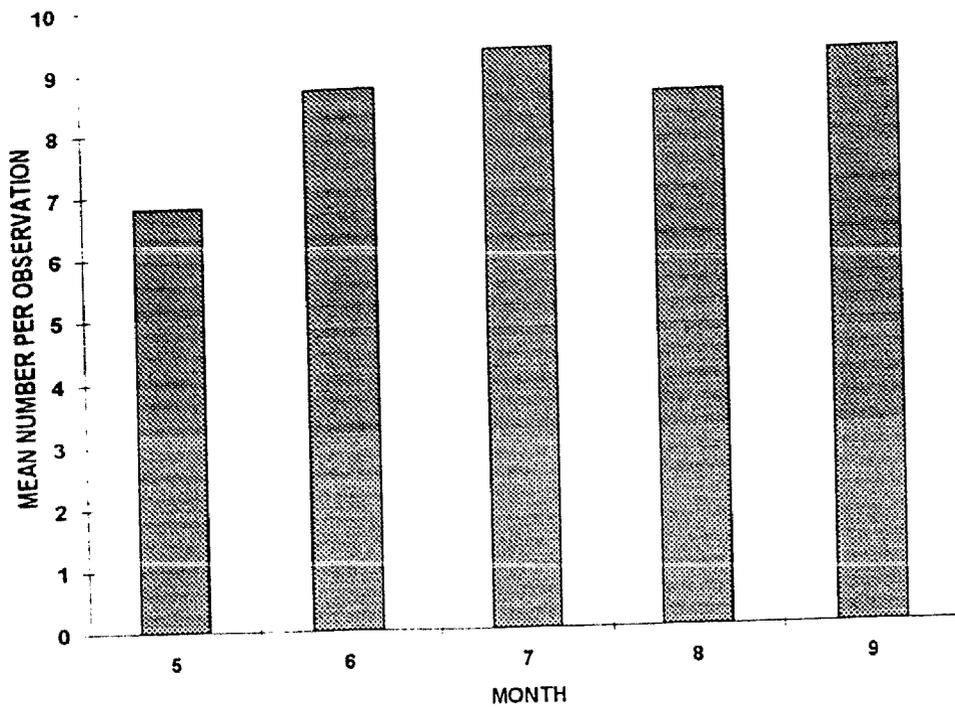


FIG. 75. NUMBER OF DALL'S SHEEP PER OBSERVATION BY TIME OF DAY BUS DEPARTED, 1988

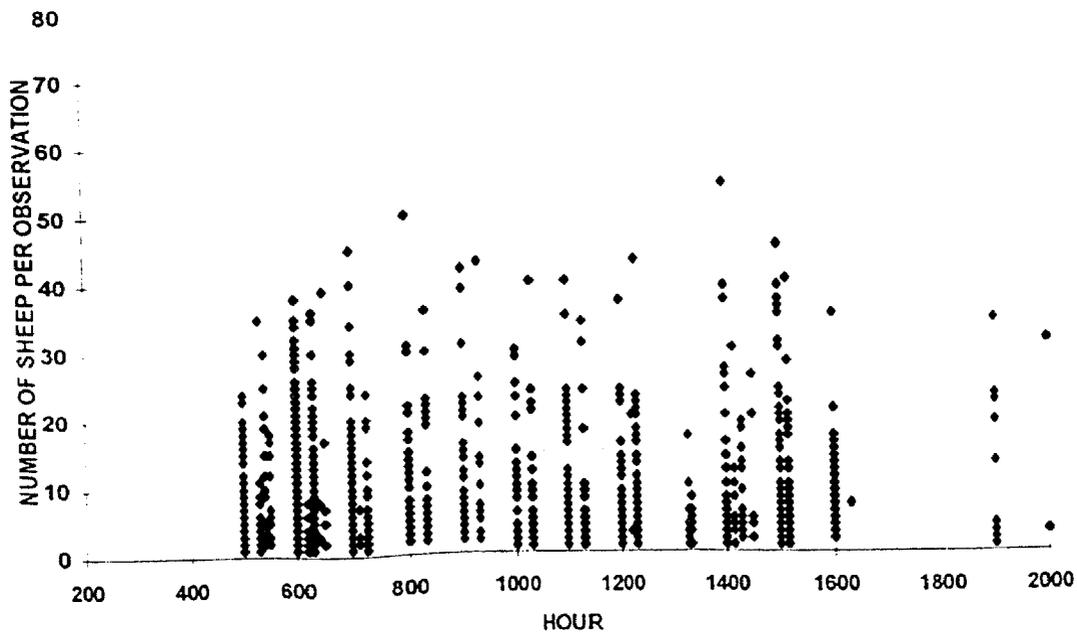


FIG. 75A. MEAN NUMBER OF DALL'S SHEEP PER OBSERVATION BY HOUR BUS DEPARTED, 1988

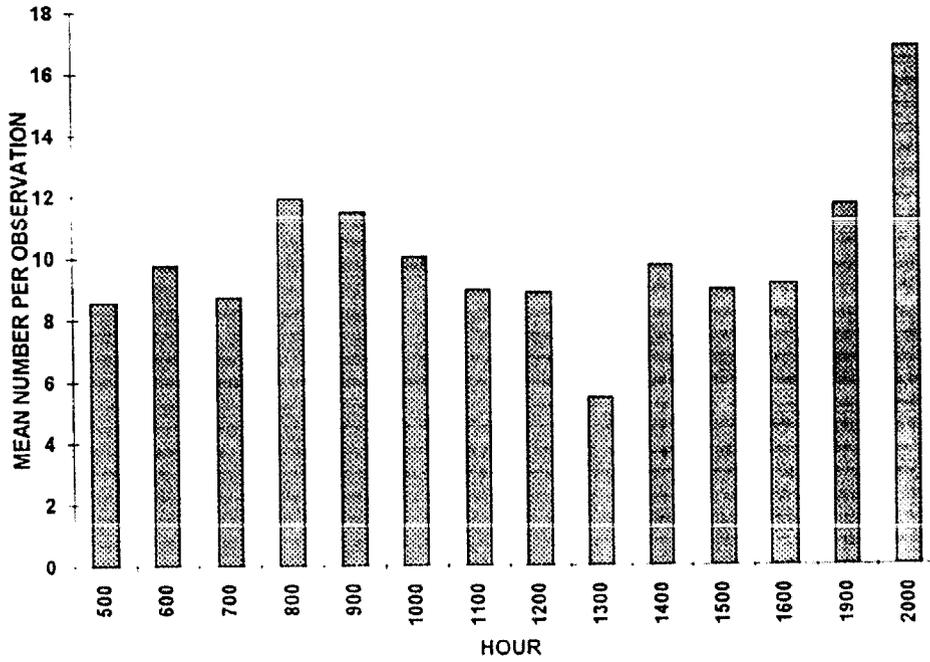


FIG. 76. NUMBER OF DALL'S SHEEP OBSERVED BY HOUR OF BUS DEPARTURE, 1989

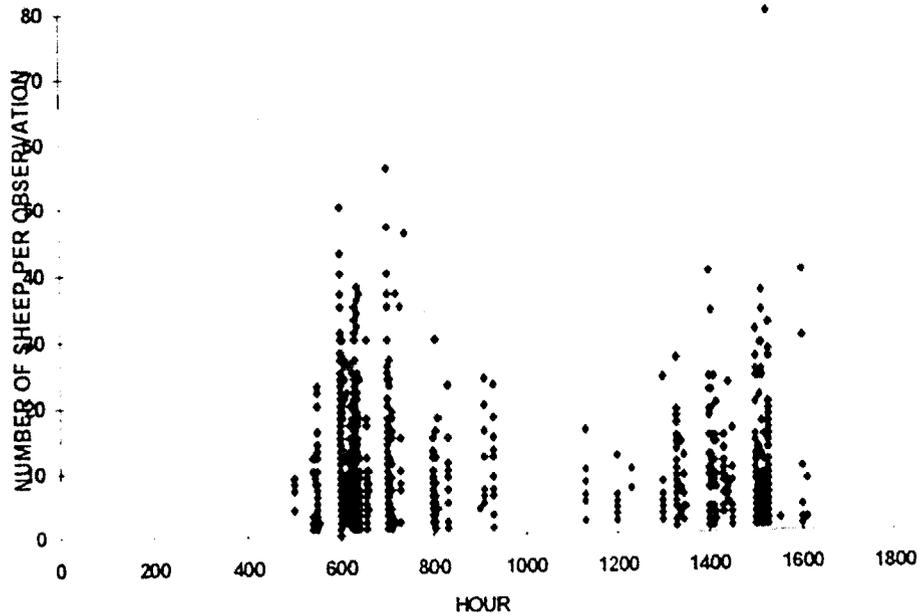
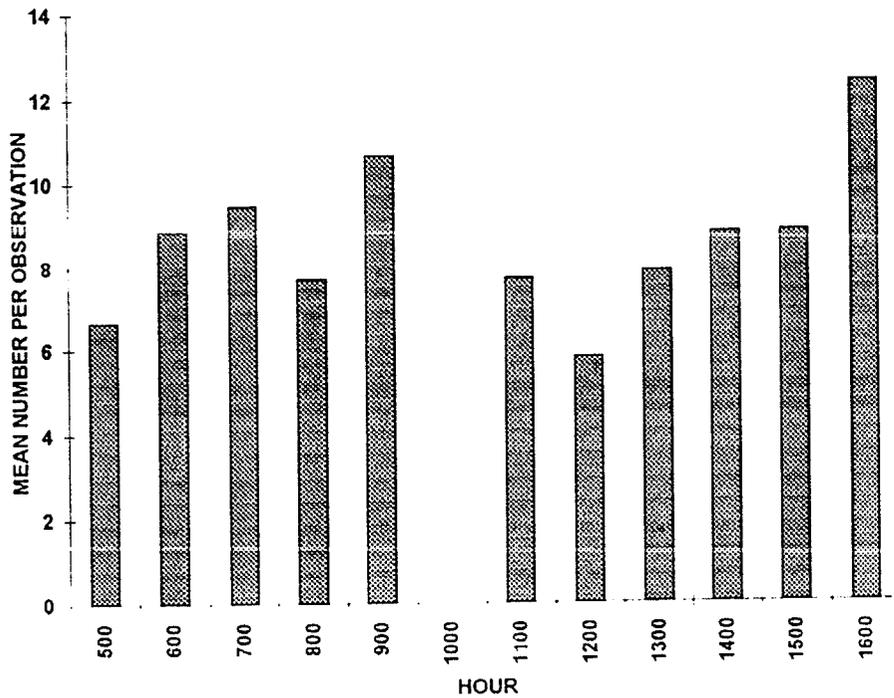


FIG. 76A. MEAN NUMBER OF DALL'S SHEEP OBSERVED BY HOUR OF BUS DEPARTURE.
Blank spaces indicate lack of data.



The number of stops to view sheep varied by month and year (Tables 31-48 and Figs. 77-80). The largest groups observed any one year were 54 in September, 1988, 80 in June, 1989, 41 in August, 1990, and 69 in June, 1991. These data indicate there is no one month when animals are in their largest groups along the park road.

No one group size was consistently predominant. Group size of 2-5 was the one with highest percent of stops. Groups of 2 animals made up 19.2% of stops during July, 1990, and groups of 4 made 19.4% of all stops during September 1991. Group size of ≤ 20 made up approximately 90% of all observations during any one month.

Table 31. Group size, number and percentage of stops for of Dall's sheep, July, 1988.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	1665	76.3%	other animals
1	41	1.9%	7.9%
2	53	2.4%	10.2%
3	55	2.5%	10.6%
4	40	1.8%	7.7%
5	45	2.1%	8.7%
6	35	1.6%	6.8%
7	27	1.2%	5.2%
8	29	1.3%	5.6%
9	8	0.4%	1.5%
10	17	0.8%	3.3%
11	8	0.4%	1.5%
12	21	1.0%	4.1%
13	9	0.4%	1.7%
14	13	0.6%	2.5%
15	10	0.5%	1.9%
16	9	0.4%	1.7%
17	7	0.3%	1.4%
18	10	0.5%	1.9%
19	7	0.3%	1.4%
20	12	0.5%	2.3%
21	8	0.4%	1.5%
22	9	0.4%	1.7%
23	5	0.2%	1.0%
24	10	0.5%	1.9%
25	4	0.2%	0.8%
26	4	0.2%	0.8%
27	0	0.0%	0.0%
28	2	0.1%	0.4%
29	2	0.1%	0.4%
30	7	0.3%	1.4%
31	4	0.2%	0.8%
32	1	0.0%	0.2%
33	0	0.0%	0.0%
34	2	0.1%	0.4%
35	2	0.1%	0.4%
36	1	0.0%	0.2%
37	1	0.0%	0.2%
TOTALS	2183	100%	100%

Table 32. Group size, number and percentage of stops for of Dall's sheep, August, 1988.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	1642	71.3%	other animals
1	21	0.9%	3.2%
2	64	2.8%	9.7%
3	65	2.8%	9.8%
4	78	3.4%	11.8%
5	54	2.3%	8.2%
6	39	1.7%	5.9%
7	45	2.0%	6.8%
8	38	1.7%	5.8%
9	21	0.9%	3.2%
10	23	1.0%	3.5%
11	15	0.7%	2.3%
12	35	1.5%	5.3%
13	20	0.9%	3.0%
14	9	0.4%	1.4%
15	15	0.7%	2.3%
16	5	0.2%	0.8%
17	12	0.5%	1.8%
18	15	0.7%	2.3%
19	7	0.3%	1.1%
20	14	0.6%	2.1%
21	7	0.3%	1.1%
22	6	0.3%	0.9%
23	9	0.4%	1.4%
24	8	0.3%	1.2%
25	6	0.3%	0.9%
26	0	0.0%	0.0%
27	1	0.0%	0.2%
28	0	0.0%	0.0%
29	1	0.0%	0.2%
30	7	0.3%	1.1%
31	2	0.1%	0.3%
32	0	0.0%	0.0%
33	0	0.0%	0.0%
34	2	0.1%	0.3%
35	3	0.1%	0.5%
36	2	0.1%	0.3%
37	1	0.0%	0.2%
38	2	0.1%	0.3%
39	2	0.1%	0.3%
40	3	0.1%	0.5%
42	1	0.0%	0.2%
45	2	0.1%	0.3%
TOTALS	2302	100%	100.0%

Table 33. Group size, number and percentage of stops for of Dall's sheep, September, 1988.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	305	49.6%	other animals
1	9	1.5%	2.9%
2	48	7.8%	15.5%
3	33	5.4%	10.6%
4	33	5.4%	10.6%
5	24	3.9%	7.7%
6	15	2.4%	4.8%
7	14	2.3%	4.5%
8	14	2.3%	4.5%
9	16	2.6%	5.2%
10	17	2.8%	5.5%
11	5	0.8%	1.6%
12	15	2.4%	4.8%
13	2	0.3%	0.6%
14	4	0.7%	1.3%
15	3	0.5%	1.0%
16	4	0.7%	1.3%
17	3	0.5%	1.0%
18	3	0.5%	1.0%
19	1	0.2%	0.3%
20	8	1.3%	2.6%
21	2	0.3%	0.6%
22	4	0.7%	1.3%
23	3	0.5%	1.0%
24	5	0.8%	1.6%
25	1	0.2%	0.3%
26	2	0.3%	0.6%
27	2	0.3%	0.6%
28	0	0.0%	0.0%
29	0	0.0%	0.0%
30	5	0.8%	1.6%
31	1	0.2%	0.3%
32	0	0.0%	0.0%
33	0	0.0%	0.0%
34	1	0.2%	0.3%
35	1	0.2%	0.3%
36	1	0.2%	0.3%
37	2	0.3%	0.6%
38	0	0.0%	0.0%
39	2	0.3%	0.6%
40	2	0.3%	0.6%
43	2	0.3%	0.6%
45	1	0.2%	0.3%
50	1	0.2%	0.3%
54	1	0.2%	0.3%
TOTALS	615	100%	100.0%

FIG. 77. GROUP SIZE OF DALL'S SHEEP AT STOPS FOR OBSERVATION, 1988 SEASON.

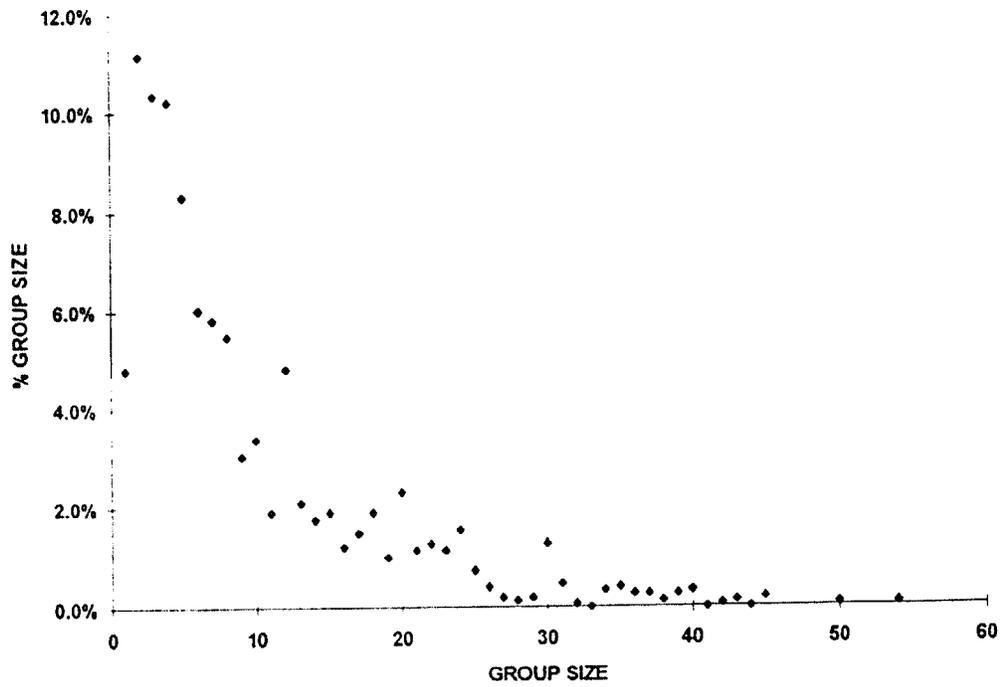


Table 34. Group size, number and percentage of stops for observation of Dall's sheep, May, 1989.

MAY			
Group Size	Number of Stops	% Stops	% Observations by Group Size
0	226	66.9	other animals
1	5	1.5	4.5
2	19	5.6	17.0
3	10	3.0	8.9
4	8	2.4	7.1
5	11	3.3	9.8
6	10	3.0	8.9
7	6	1.8	5.4
8	5	1.5	4.5
9	11	3.3	9.8
10	8	2.4	7.1
11	5	1.5	4.5
12	4	1.2	3.6
13	2	0.6	1.8
14	1	0.3	0.9
15	2	0.6	1.8
17	1	0.3	0.9
19	1	0.6	0.9
24	2	0.6	1.8
25	1	0.3	0.9
Totals	338	100	99.3

338-226=112 stops to observe sheep during May, 1989.

Table 35. Group size, number and percentage of stops for observation of Dall's sheep, June, 1989.

Group Size	June		
	Number of Stops	% Stops	% Observations by Group Size
0	1307	71.5	other animals
1	21	1.1	4.0
2	59	3.2	11.32
3	37	2.0	7.1
4	43	2.4	8.3
5	34	1.9	6.5
6	37	2.0	7.1
7	42	2.3	8.1
8	37	2.0	7.1
9	34	1.9	6.5
10	23	1.3	4.4
11	19	1.0	3.6
12	32	1.8	6.1
13	15	0.8	2.9
14	10	0.5	1.9
15	20	1.1	3.8
16	5	0.3	1.0
17	2	0.1	0.4
18	10	0.5	1.9
19	5	0.3	1.0
20	12	0.7	2.3
21	2	0.1	0.4
23	2	0.1	0.4
24	1	0.1	0.2
25	3	0.2	0.6
27	5	0.3	1.0
28	1	0.1	0.2
29	2	0.1	0.4
30	3	0.2	0.6
31	1	0.1	0.2
32	1	0.1	0.2
36	1	0.1	0.2
38	1	0.1	0.2
80	1	0.1	0.2
Totals	1828	100	100.1
1828-1307=521 stops to observe Dall's sheep during June, 1989.			

Table 36. Group size, number and percentage of stops for observation of Dall's sheep, July, 1989.

Group Size	Number of Stops	% Stops	% Observations by Group Size
0	818	73.6	other animals
1	16	1.4	5.4
2	40	3.6	13.6
3	38	3.4	12.9
4	27	2.4	9.2
5	22	2.0	7.5
6	17	1.5	5.8
7	16	1.4	5.4
8	10	0.9	3.4
9	12	1.1	4.1
10	6	0.5	2.0
11	3	0.3	1.0
12	13	1.2	4.4
13	3	0.3	1.0
14	4	0.4	1.4
15	5	0.4	1.7
16	6	0.5	2.0
17	3	0.3	1.0
18	5	0.4	1.7
19	2	0.2	0.7
20	4	0.4	1.4
21	5	0.4	1.7
22	1	0.1	0.3
23	3	0.1	1.0
24	2	0.2	0.7
25	4	0.4	1.4
26	1	0.1	0.3
27	4	0.4	1.4
29	1	0.1	0.3
30	5	0.4	1.7
32	1	0.1	0.3
33	2	0.2	0.7
34	2	0.2	0.7
35	1	0.1	0.3
37	3	0.3	1.0
40	3	0.3	1.0
41	1	0.1	1.0
43	1	0.1	1.0
47	1	0.1	0.3
50	1	0.1	0.3
Total	1112	100	99.0

Table 37. Group size, number and percentage of stops for observation of Dall's sheep, August, 1989.

AUGUST			
Group Size	Number of Stops	% Stops	% Observations by Group Size
0	851	73.6	other animals
1	5	0.4	1.6
2	47	4.1	15.4
3	38	3.3	12.4
4	40	3.5	13.1
5	32	2.8	10.5
6	17	1.5	5.6
7	12	1.0	3.9
8	12	1.0	3.9
9	7	0.6	2.3
10	13	1.1	4.2
11	7	0.6	2.3
12	7	0.6	2.3
13	5	0.4	1.6
14	1	0.1	0.3
15	11	1.0	3.6
16	3	0.3	1.0
17	3	0.3	1.0
18	3	0.3	1.0
19	2	0.2	0.7
20	7	0.6	2.3
21	1	0.1	0.3
22	3	0.3	1.0
23	4	0.3	1.3
24	7	0.6	2.3
25	4	0.3	1.3
26	2	0.2	0.7
27	1	0.1	0.3
28	1	0.1	0.3
30	5	0.4	1.6
31	1	0.1	0.3
35	2	0.2	0.7
37	2	0.2	0.7
40	1	0.1	0.3
Totals	1157	100	100.1
1157-851=306 stops to observe Dall's sheep during August 1989.			

Table 38. Group size, number and percentage of stops for observation of Dall's sheep, September, 1989.

SEPTEMBER			
Group Size	Number of Stops	% Stops	% Observations by Group Size
0	275	61.8	other animals
1	6	1.3	3.5
2	17	3.8	10.0
3	19	4.3	11.2
4	26	5.8	15.3
5	13	2.9	7.6
6	6	1.3	3.5
7	10	2.2	5.9
8	7	1.6	4.1
9	11	2.5	6.5
10	11	2.5	6.5
11	5	1.1	2.9
12	5	1.1	2.9
14	2	0.4	1.2
15	6	1.3	3.5
17	2	0.4	1.2
18	3	0.7	1.8
19	2	0.4	1.2
20	2	0.4	1.2
22	3	0.7	1.8
24	4	0.9	2.4
25	1	0.2	0.6
26	1	0.2	0.6
30	1	0.2	0.6
31	1	0.2	0.6
34	1	0.2	0.6
35	1	0.2	0.6
37	1	0.2	0.6
40	1	0.2	0.6
46	1	0.2	0.6
56	1	0.2	0.6
Totals	445	100	100.2

445-275=170 stops to observe Dall's sheep during September, 1989.

FIG. 78. GROUP SIZE OF DALL'S SHEEP AT STOPS FOR OBSERVATION DURING THE 1989 SEASON.

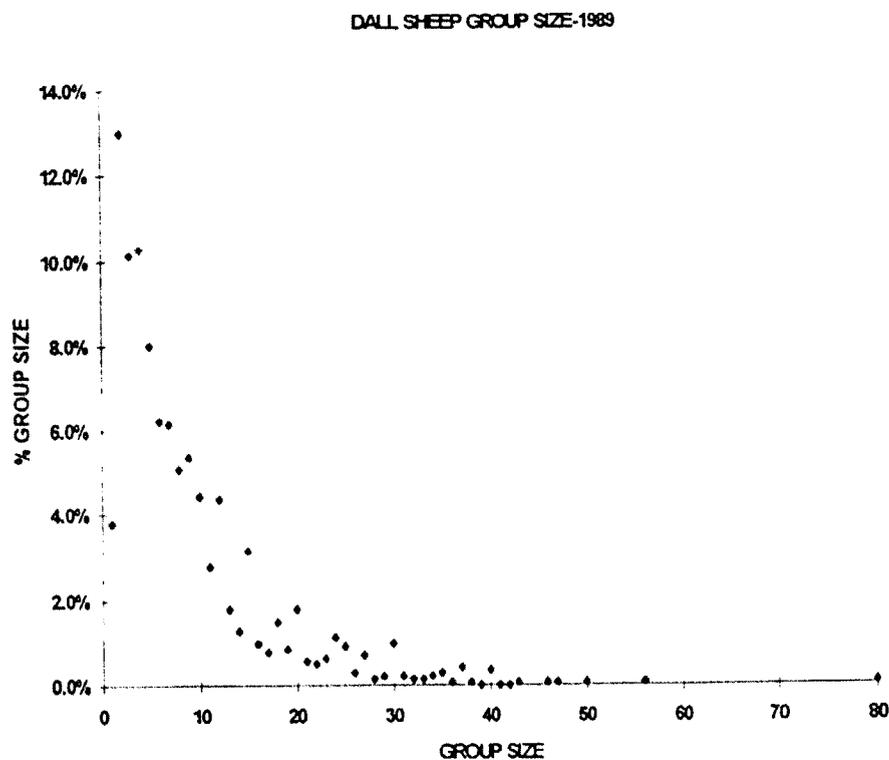


Table 39. Group size, number and percentage of stops for Dall's sheep, May, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	110	72.8%	other animals
1	3	2.0%	7.3%
2	6	4.0%	14.6%
3	6	4.0%	14.6%
4	3	2.0%	7.3%
5	5	3.3%	12.2%
6	10	6.6%	24.4%
7	1	0.7%	2.4%
8	2	1.3%	4.9%
9	1	0.7%	2.4%
10	1	0.7%	2.4%
13	1	0.7%	2.4%
14	1	0.7%	2.4%
15	1	0.7%	2.4%
TOTAL	151	100.0%	100.0%

Table 40. Group size, number and percent age of stops for Dall's sheep, June, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE other animals
0	393	64.5%	
1	18	3.0%	8.3%
2	25	4.1%	11.6%
3	24	3.9%	11.1%
4	15	2.5%	6.9%
5	18	3.0%	8.3%
6	11	1.8%	5.1%
7	20	3.3%	9.3%
8	6	1.0%	2.8%
9	5	0.8%	2.3%
10	13	2.1%	6.0%
11	5	0.8%	2.3%
12	15	2.5%	6.9%
13	2	0.3%	0.9%
14	3	0.5%	1.4%
15	9	1.5%	4.2%
16	3	0.5%	1.4%
17	3	0.5%	1.4%
18	3	0.5%	1.4%
19	1	0.2%	0.5%
20	3	0.5%	1.4%
21	1	0.2%	0.5%
23	3	0.5%	1.4%
24	2	0.3%	0.9%
25	1	0.2%	0.5%
27	3	0.5%	1.4%
30	2	0.3%	0.9%
33	1	0.2%	0.5%
37	1	0.2%	0.5%
TOTALS	609	100.0%	100.0%

Table 41. Group size, number and percentage of stops for Dall's sheep, July, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	327	62.3%	other animals
1	21	4.0%	10.6%
2	38	7.2%	19.2%
3	27	5.1%	13.6%
4	17	3.2%	8.6%
5	15	2.9%	7.6%
6	8	1.5%	4.0%
7	14	2.7%	7.1%
8	9	1.7%	4.5%
9	7	1.3%	3.5%
10	3	0.6%	1.5%
11	3	0.6%	1.5%
12	10	1.9%	5.1%
14	1	0.2%	0.5%
15	3	0.6%	1.5%
16	2	0.4%	1.0%
18	2	0.4%	1.0%
19	2	0.4%	1.0%
20	2	0.4%	1.0%
22	3	0.6%	1.5%
25	1	0.2%	0.5%
26	1	0.2%	0.5%
27	4	0.8%	2.0%
29	1	0.2%	0.5%
32	1	0.2%	0.5%
33	2	0.4%	1.0%
35	1	0.2%	0.5%
TOTALS	525	100.0%	100.0%

Table 42. Group size, number and percentage of stops for Dall's sheep, August, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	405	68.6%	other animals
1	19	3.2%	10.3%
2	17	2.9%	9.2%
3	11	1.9%	5.9%
4	14	2.4%	7.6%
5	16	2.7%	8.6%
6	8	1.4%	4.3%
7	10	1.7%	5.4%
8	7	1.2%	3.8%
9	10	1.7%	5.4%
10	9	1.5%	4.9%
11	3	0.5%	1.6%
12	8	1.4%	4.3%
13	8	1.4%	4.3%
14	7	1.2%	3.8%
15	7	1.2%	3.8%
16	2	0.3%	1.1%
17	12	2.0%	6.5%
18	2	0.3%	1.1%
19	1	0.2%	0.5%
20	1	0.2%	0.5%
22	2	0.3%	1.1%
23	2	0.3%	1.1%
25	1	0.2%	0.5%
27	2	0.3%	1.1%
29	2	0.3%	1.1%
31	1	0.2%	0.5%
33	1	0.2%	0.5%
34	1	0.2%	0.5%
41	1	0.2%	0.5%
TOTALS	590	100.0%	100.0%

Table 43. Group size, number and percentage of stops for Dall's sheep, September, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	84	56.8%	other animals
1	5	3.4%	7.8%
2	4	2.7%	6.3%
3	7	4.7%	10.9%
4	11	7.4%	17.2%
5	6	4.1%	9.4%
6	4	2.7%	6.3%
7	1	0.7%	1.6%
8	3	2.0%	4.7%
9	4	2.7%	6.3%
11	2	1.4%	3.1%
12	3	2.0%	4.7%
15	4	2.7%	6.3%
16	3	2.0%	4.7%
23	1	0.7%	1.6%
26	1	0.7%	1.6%
27	1	0.7%	1.6%
31	1	0.7%	1.6%
33	1	0.7%	1.6%
35	2	1.4%	3.1%
TOTALS	148	100.0%	100.0%

FIG. 79. GROUP SIZE OF DALL'S SHEEP AT STOPS FOR OBSERVATION DURING THE 1990 SEASON.

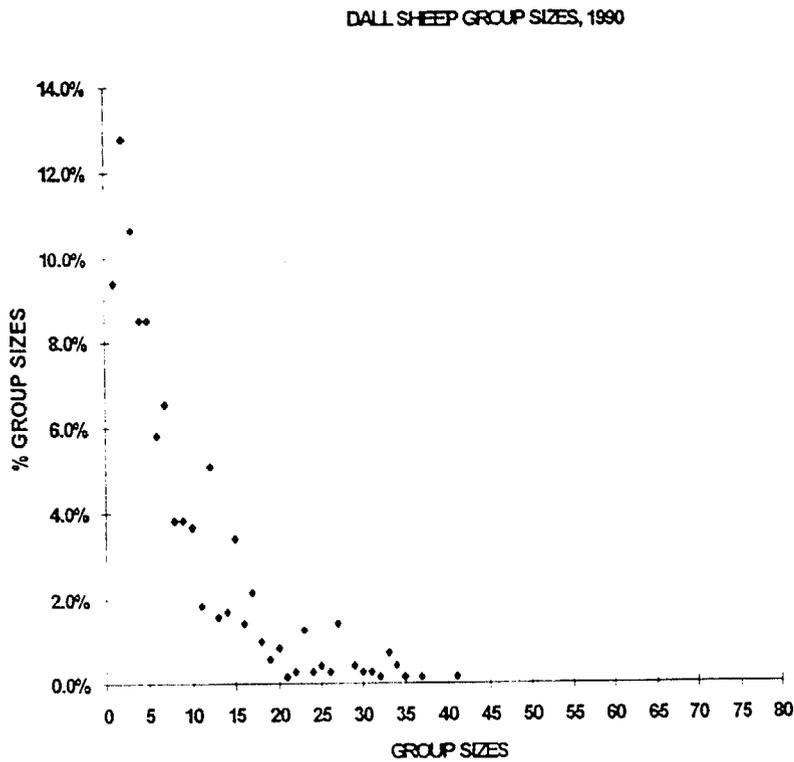


Table 44. Group size, number and percentage of stops for Dall's sheep, May, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	91	66.4%	other animals
1	2	1.5%	4.3%
2	6	4.4%	13.0%
3	8	5.8%	17.4%
4	7	5.1%	15.2%
5	8	5.8%	17.4%
6	5	3.6%	10.9%
7	5	3.6%	10.9%
8	1	0.7%	2.2%
13	1	0.7%	2.2%
16	1	0.7%	2.2%
17	2	1.5%	4.3%
TOTAL	137	100.0%	100.0%

Table 45 . Group size, number and percentage of stops for Dall's sheep, June, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	477	68.9%	other animals
1	21	3.0%	9.8%
2	20	2.9%	9.3%
3	18	2.6%	8.4%
4	21	3.0%	9.8%
5	25	3.6%	11.6%
6	17	2.5%	7.9%
7	18	2.6%	8.4%
8	12	1.7%	5.6%
9	10	1.4%	4.7%
10	3	0.4%	1.4%
11	10	1.4%	4.7%
12	4	0.6%	1.9%
13	3	0.4%	1.4%
14	8	1.2%	3.7%
15	4	0.6%	1.9%
16	7	1.0%	3.3%
17	1	0.1%	0.5%
19	1	0.1%	0.5%
21	1	0.1%	0.5%
22	1	0.1%	0.5%
24	2	0.3%	0.9%
27	4	0.6%	1.9%
30	1	0.1%	0.5%
35	1	0.1%	0.5%
36	1	0.1%	0.5%
69	1	0.1%	0.5%
TOTALS	692	100.0%	100.0%

Table 46. Group size, number and percentage of stops for Dall's sheep, July, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	592	71.1%	other animals
1	5	0.6%	2.1%
2	16	1.9%	6.6%
3	20	2.4%	8.3%
4	19	2.3%	7.9%
5	19	2.3%	7.9%
6	19	2.3%	7.9%
7	11	1.3%	4.6%
8	14	1.7%	5.8%
9	12	1.4%	5.0%
10	8	1.0%	3.3%
11	6	0.7%	2.5%
12	12	1.4%	5.0%
13	3	0.4%	1.2%
14	4	0.5%	1.7%
15	6	0.7%	2.5%
16	2	0.2%	0.8%
17	6	0.7%	2.5%
18	4	0.5%	1.7%
19	4	0.5%	1.7%
20	4	0.5%	1.7%
21	1	0.1%	0.4%
22	3	0.4%	1.2%
23	2	0.2%	0.8%
24	2	0.2%	0.8%
25	5	0.6%	2.1%
27	8	1.0%	3.3%
28	3	0.4%	1.2%
29	5	0.6%	2.1%
30	3	0.4%	1.2%
31	2	0.2%	0.8%
32	3	0.4%	1.2%
33	2	0.2%	0.8%
34	3	0.4%	1.2%
35	1	0.1%	0.4%
36	1	0.1%	0.4%
39	1	0.1%	0.4%
40	1	0.1%	0.4%
41	1	0.1%	0.4%
TOTAL	833	100.0%	100.0%

Table 47. Group size, number and percentage of stops for Dall's sheep, August, 1991.

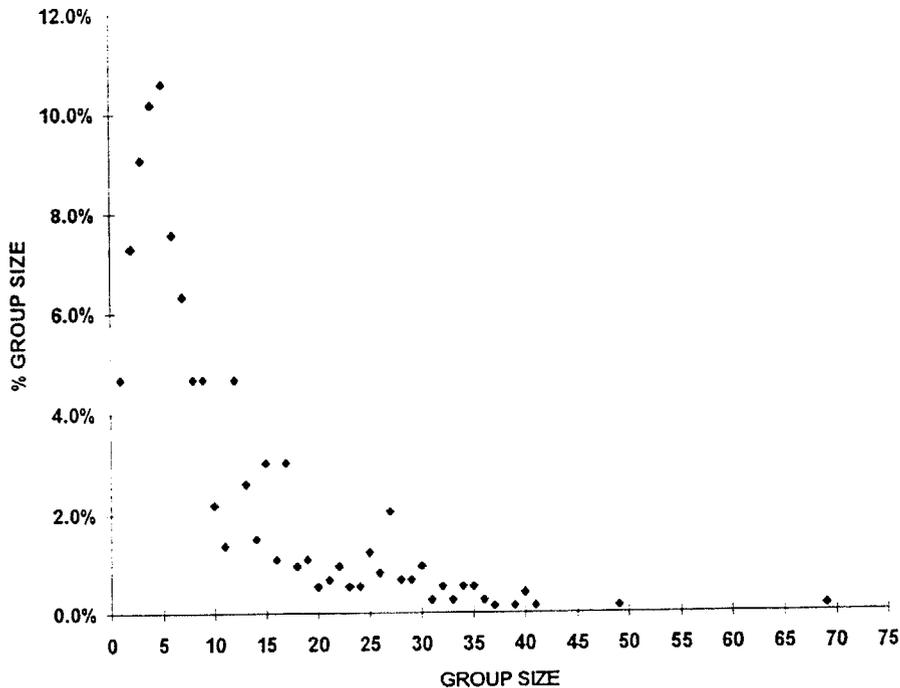
GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	535	73.9%	other animals
1	3	0.4%	1.6%
2	10	1.4%	5.3%
3	17	2.3%	9.0%
4	20	2.8%	10.6%
5	21	2.9%	11.1%
6	11	1.5%	5.8%
7	13	1.8%	6.9%
8	7	1.0%	3.7%
9	10	1.4%	5.3%
10	4	0.6%	2.1%
11	3	0.4%	1.6%
12	10	1.4%	5.3%
13	9	1.2%	4.8%
14	4	0.6%	2.1%
15	7	1.0%	3.7%
16	1	0.1%	0.5%
17	5	0.7%	2.6%
18	3	0.4%	1.6%
19	3	0.4%	1.6%
21	3	0.4%	1.6%
22	2	0.3%	1.1%
23	2	0.3%	1.1%
24	1	0.1%	0.5%
25	3	0.4%	1.6%
26	3	0.4%	1.6%
27	2	0.3%	1.1%
28	2	0.3%	1.1%
30	3	0.4%	1.6%
32	1	0.1%	0.5%
35	2	0.3%	1.1%
37	1	0.1%	0.5%
40	2	0.3%	1.1%
49	1	0.1%	0.5%
TOTAL	724	100.0%	100.0%

Table 48. Group size, number and percentage of stops for Dall's sheep, September, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	72	66.7%	other animals
1	3	2.8%	8.3%
2	1	0.9%	2.8%
3	3	2.8%	8.3%
4	7	6.5%	19.4%
5	4	3.7%	11.1%
6	3	2.8%	8.3%
9	2	1.9%	5.6%
10	1	0.9%	2.8%
11	1	0.9%	2.8%
12	2	1.9%	5.6%
13	2	1.9%	5.6%
15	1	0.9%	2.8%
17	2	1.9%	5.6%
22	1	0.9%	2.8%
25	1	0.9%	2.8%
26	1	0.9%	2.8%
27	1	0.9%	2.8%
TOTAL	108	100.0%	100.0%

FIG. 80. GROUP SIZE OF DALL'S SHEEP AT STOPS FOR OBSERVATION DURING THE 1991 SEASON.

SHEEP GROUP SIZE-1991 SEASON



A plot of lamb observations by date shows no change in relative number of young sheep observed throughout the seasons of 1988 and 1989 (Figs. 81 and 82). Summer survival was relatively constant for the two years, indicating that regardless of the time of visit to the park, as many lambs will be seen late in the season as early in the season.

The number of lambs observed by hour does not change through the day (Figs. 83 and 84). Groups with as many young sheep were observed in late afternoon as in early morning (Figs. 83 & 84).

Milepost locations of young sheep mirrors that of adults shown in Figs. 65 & 66 (pages 83 & 84). Locations of lambs were similar between 1988 and 1989 (Figs. 85 & 86). Number of young in any one observation varied only slightly between years. One group with 35 young was observed in 1989 (Fig. 86). Groups with 6 to 17 young were common in both years (Figs. 85 & 86).

FIG. 81. NUMBER OF YOUNG DALL'S SHEEP OBSERVED BY JULIAN DATE, 1988

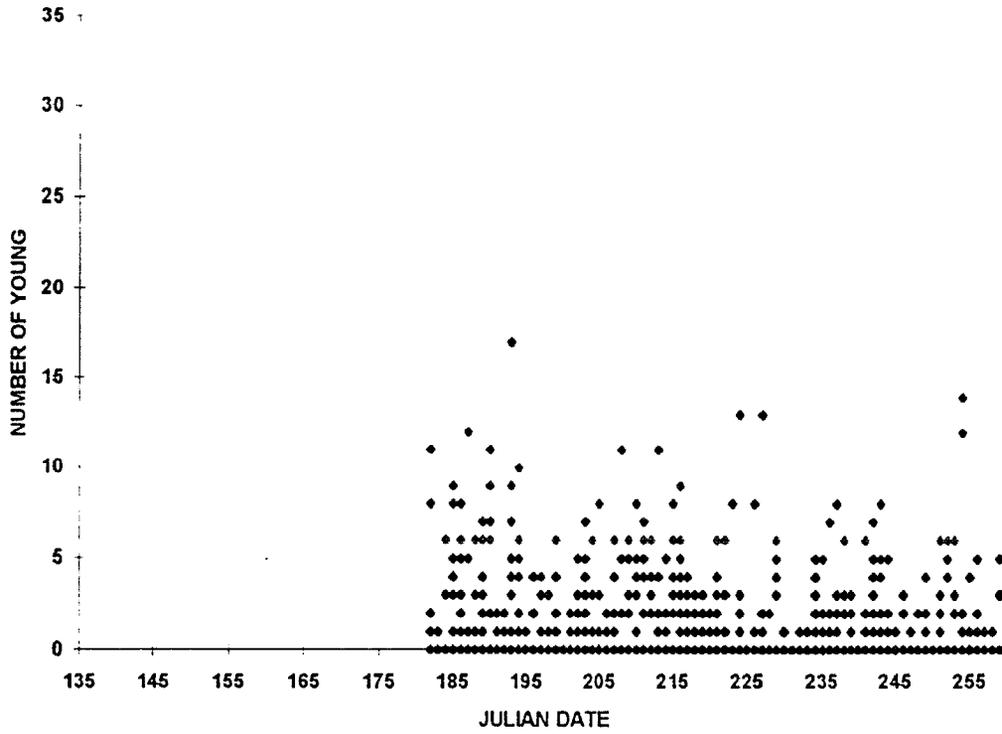


FIG. 82. NUMBER OF YOUNG DALL'S SHEEP PER OBSERVATION BY JULIAN DATE, 1989

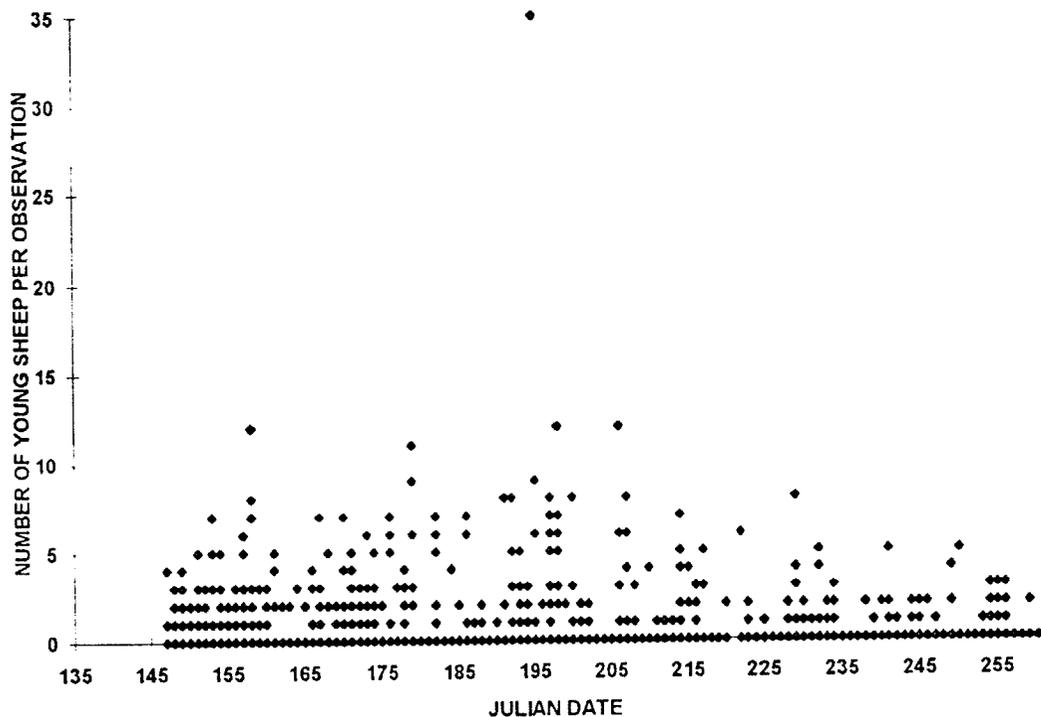


FIG. 83. NUMBER OF YOUNG DALL'S SHEEP PER OBSERVATION BY HOUR OF BUS DEPARTURE, 1988

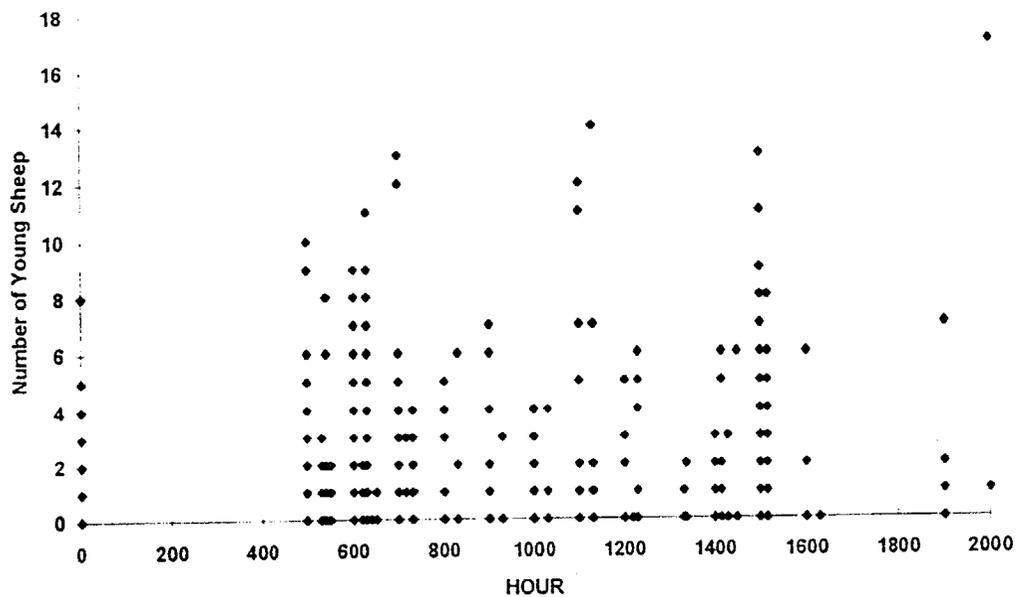


FIG. 84. NUMBER OF YOUNG DALL'S SHEEP OBSERVED BY HOUR OF BUS DEPARTURE, 1989

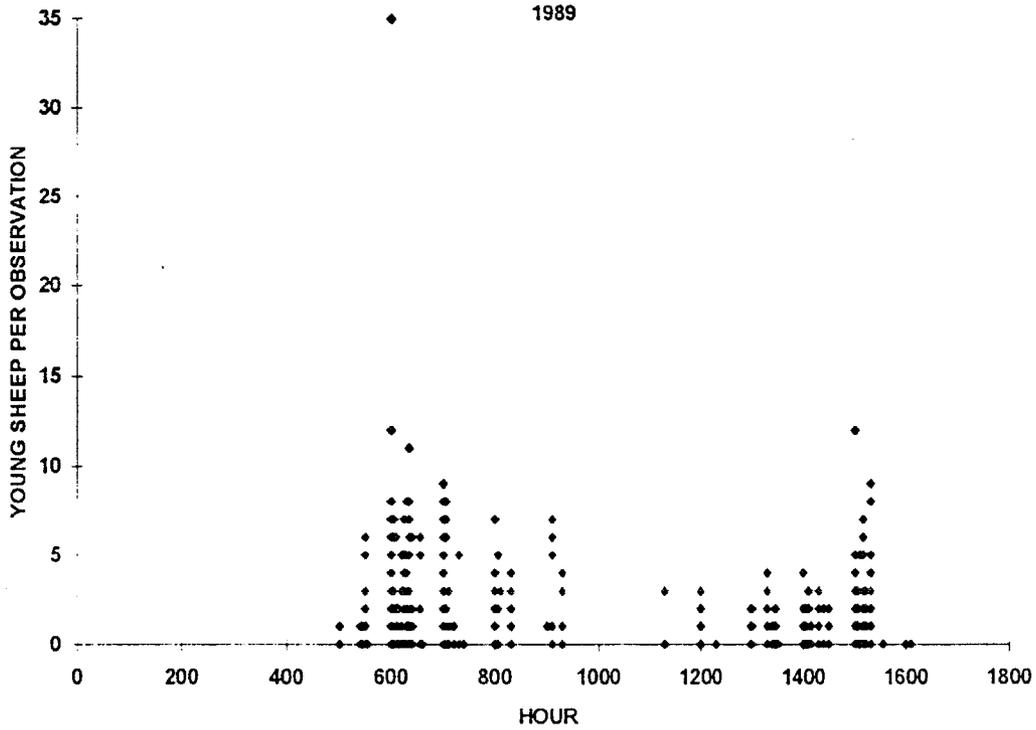


FIG. 85. NUMBER OF YOUNG DALL'S SHEEP PER OBSERVATION BY MILEPOST, 1988

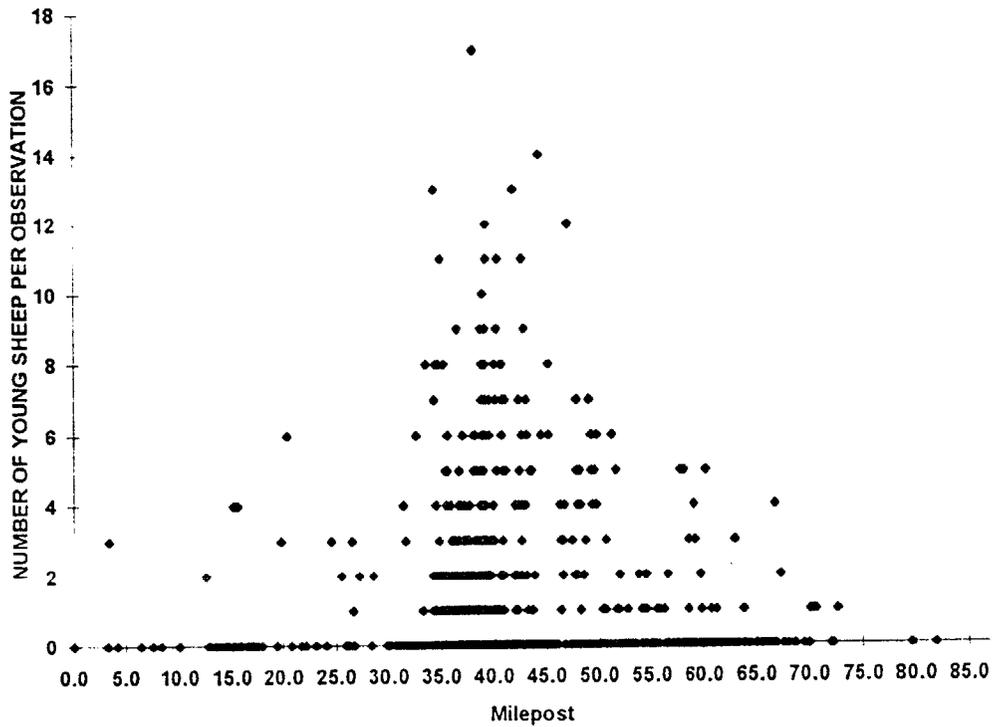
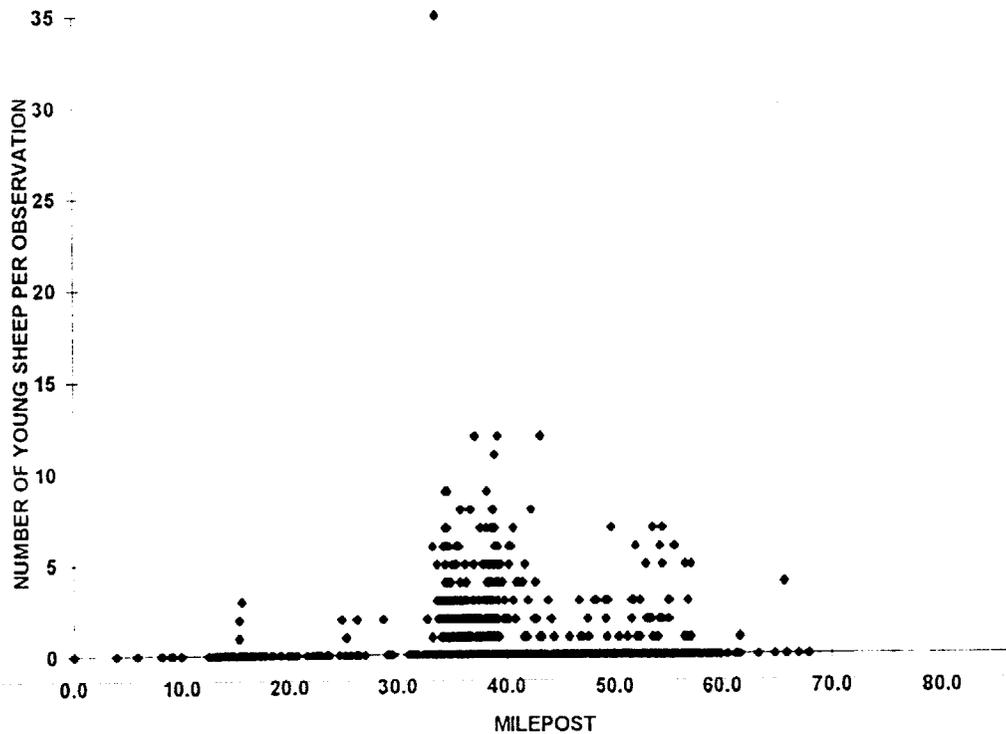
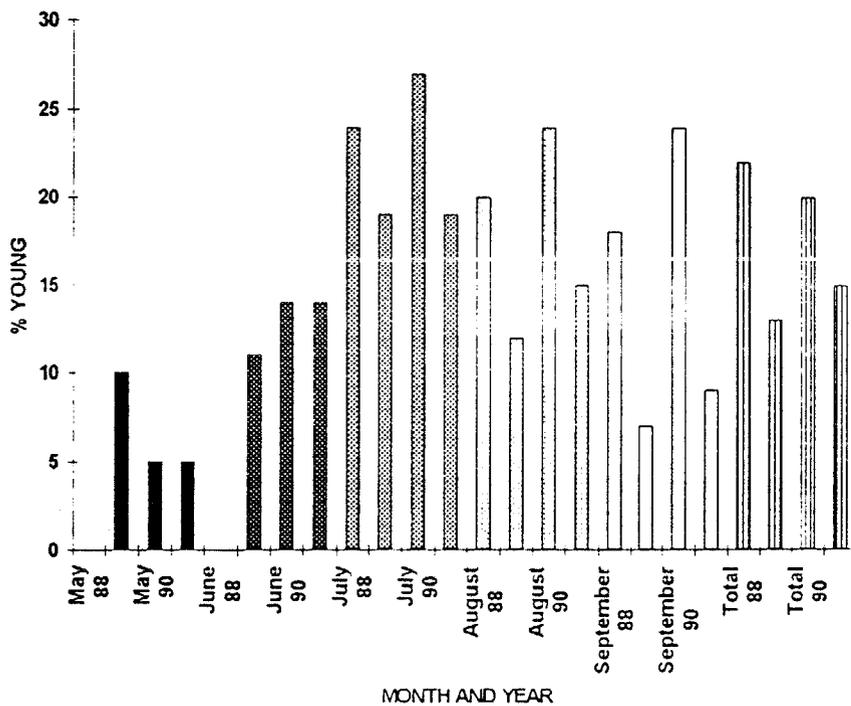


FIG. 86. NUMBER OF YOUNG DALL'S SHEEP PER OBSERVATION BY MILEPOST, 1989



The percentage of young in groups increased from May through July, then, depending upon the year, dropped to lower levels during September (Fig. 87). The percentage of young in groups for any one month was most variable during September, ranging from second highest levels in 1990 to fourth lowest levels in September 1989. The annual variability of percentage of young ranged from 13% to 22% (Fig. 87).

FIG. 87. % YOUNG DALL'S SHEEP BY MONTH AND YEAR



The distances Dall's sheep were observed from the road changed little throughout the day (Figs. 88 & 89). Sheep typically were observed at distance categories 11 through 14 (>100 m through >400 m), but some sheep were on the road (category 0) to within 100 m of the road (categories 1-10). No pattern of being close to the road during part of the day and being farther away at other parts of the day was evident.

FIG. 88. DALL'S SHEEP OBSERVATIONS AT DISTANCE CATEGORIES BY HOUR OF BUS DEPARTURE, 1988

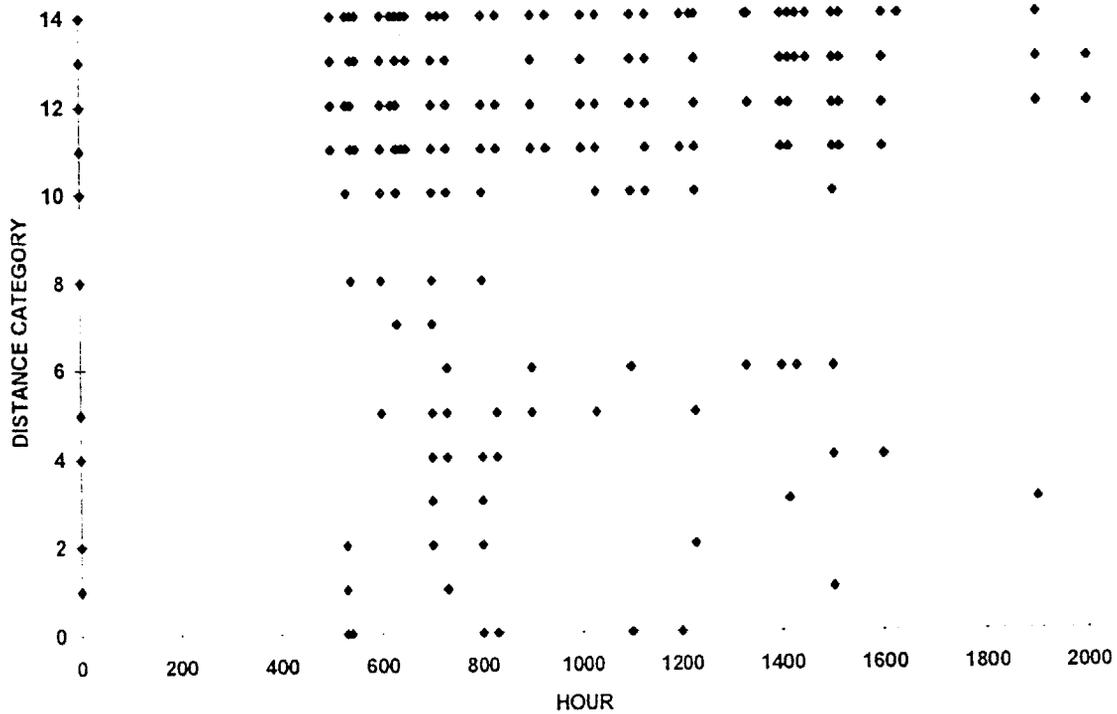
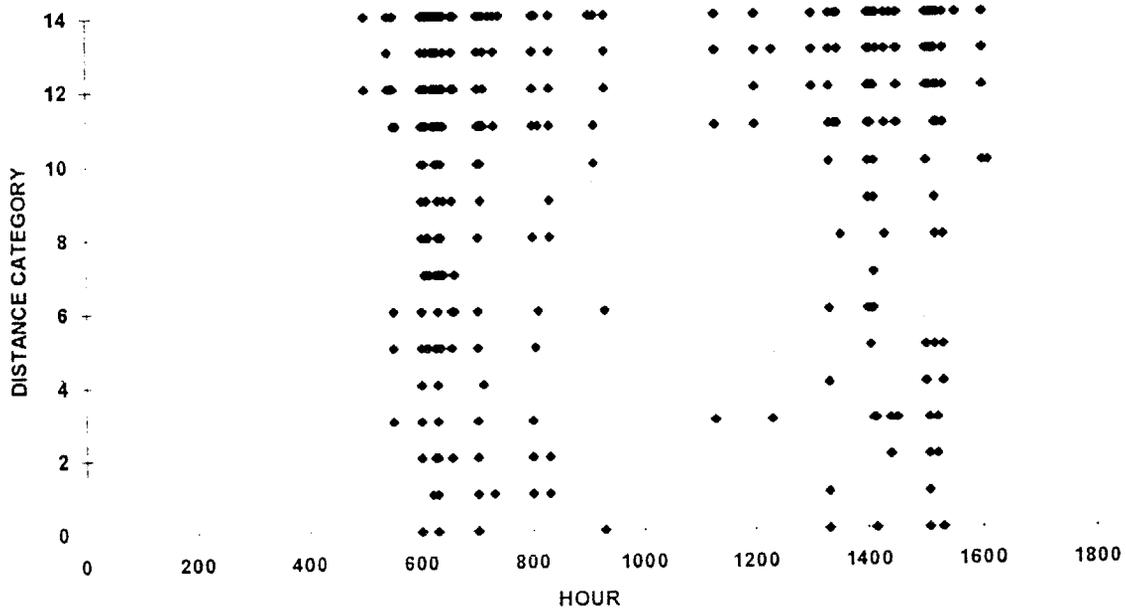


FIG. 89. DALL'S SHEEP OBSERVATIONS BY DISTANCE CATEGORY AND HOUR OF BUS DEPARTURE, 1989



The most frequent distance category for sheep observations was category 14 (>400 m from the road) all 4 years (Figs. 90-93). An apparent two-phase shift in distances of sheep from the road occurred during the season as the animals moved to and from winter and summer pastures. This movement was especially evident in 1989 (Fig.91). The data indicate spring migration occurs from late May to mid-June each year. This is followed by most sheep being at distance categories 11-14 for most of the

FIG. 90. DALL'S SHEEP OBSERVATIONS BY DISTANCE CATEGORY BY JULIAN DATE, 1988

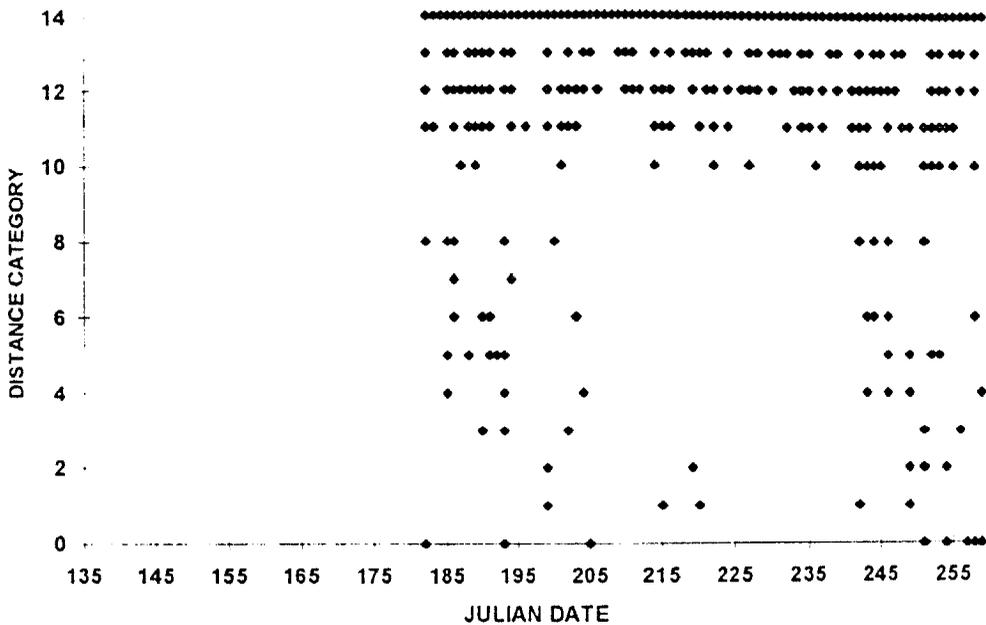
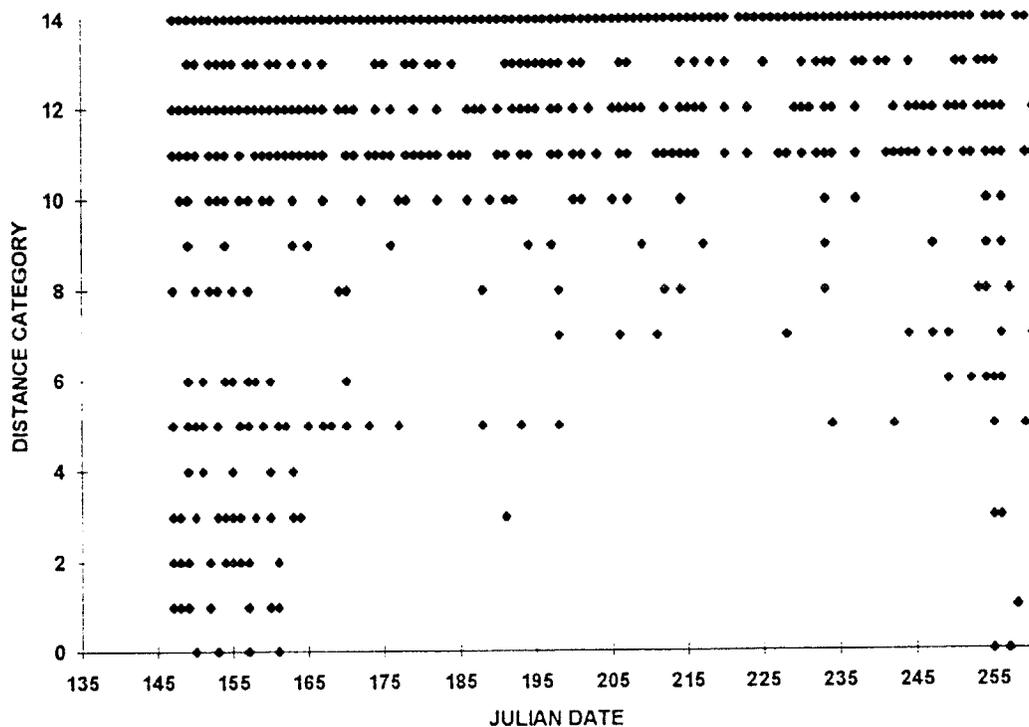


FIG. 91. DALL'S SHEEP OBSERVATIONS BY DISTANCE CATEGORY BY JULIAN DATE, 1989



season. A few sheep were observed within the 100 m (categories 0-10) range as they moved within their territories during the summer. Fall migration begins about September 8-10, and ends after we stopped collecting data.

FIG. 92. Dall's SHEEP OBSERVATIONS BY DISTANCE CATEGORY BY DATE, 1990.

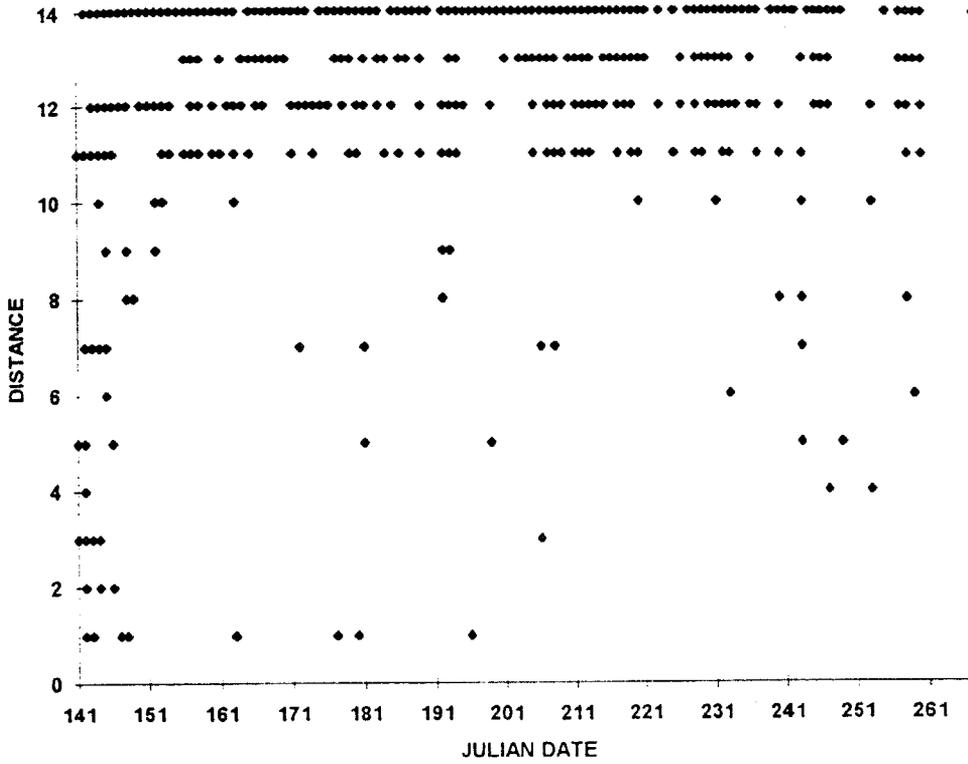
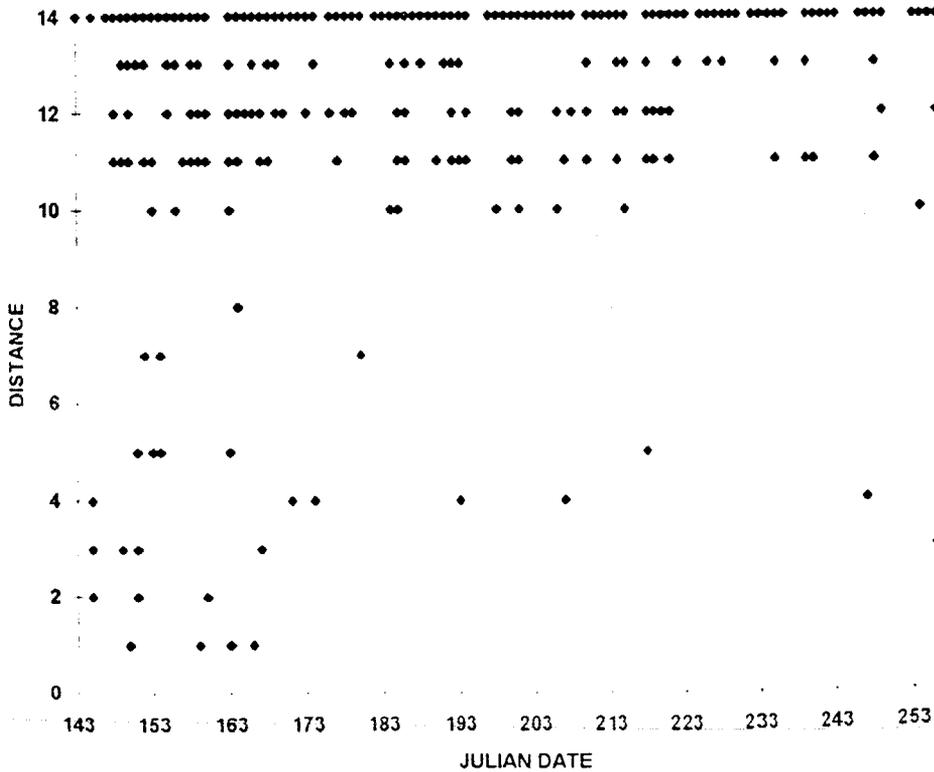


FIG. 93. Dall's SHEEP OBSERVATIONS BY DISTANCE CATEGORY BY DATE, 1991.



Vehicle traffic interfering with sheep migration is a NPS management concern (Dalle-Molle and Van Horn, 1991). These data provide dates when decisions can be made about vehicle traffic stopping in certain sections, such as mileposts where sheep occur in spring, or dates for the fall vehicle lottery. Each fall, beginning about September 15, the park road is opened to private vehicles for winners of a lottery system. This is a time of sheep migration. Changing the date of fall public access to earlier (later could result in weather problems) in September may alleviate some interference to migration.

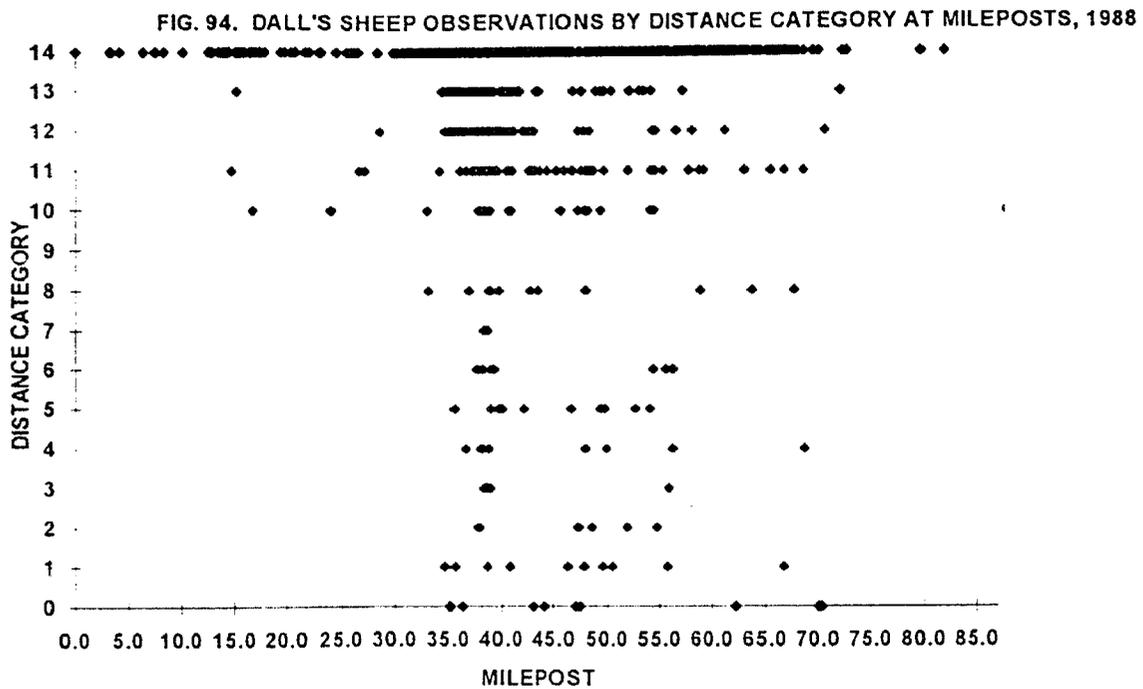
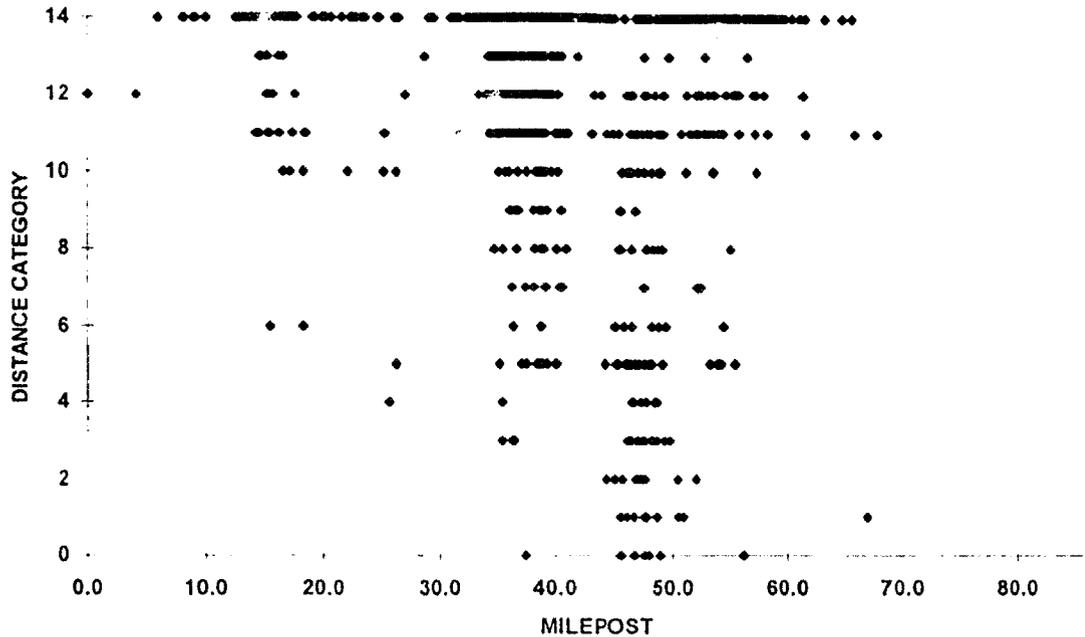


FIG. 95. DALL'S SHEEP OBSERVATIONS BY DISTANCE CATEGORY AND MILEPOST, 1989



As noted above, Dall's sheep were observed at distance category 14 (>400 m) most of the time. Observations at distances 0-4 (on the road to 40 m) occurred almost exclusively at mileposts 35 to 48 (Figs.94-97), the Dall's sheep exhibit at the Polychrome Pass area. A few observations occurred at mileposts 50-55 (Figs.94-96) and at mileposts 62-72 (Fig.94). These locations of sheep near the road, combined with dates of occurrences (Figs.90-93) delineate Dall's sheep migration corridors. The data support notations on the map "North Slope Wildlife Issues," which shows Dall's sheep migration in the Igloo Creek Segment (milepost 39-43 and in the Toklat River Segment (milepost 48-59) (NPS, 1994).

FIG. 96. DALL'S SHEEP OBSERVATIONS BY DISTANCE CATEGORY AND MILEPOST, 1990

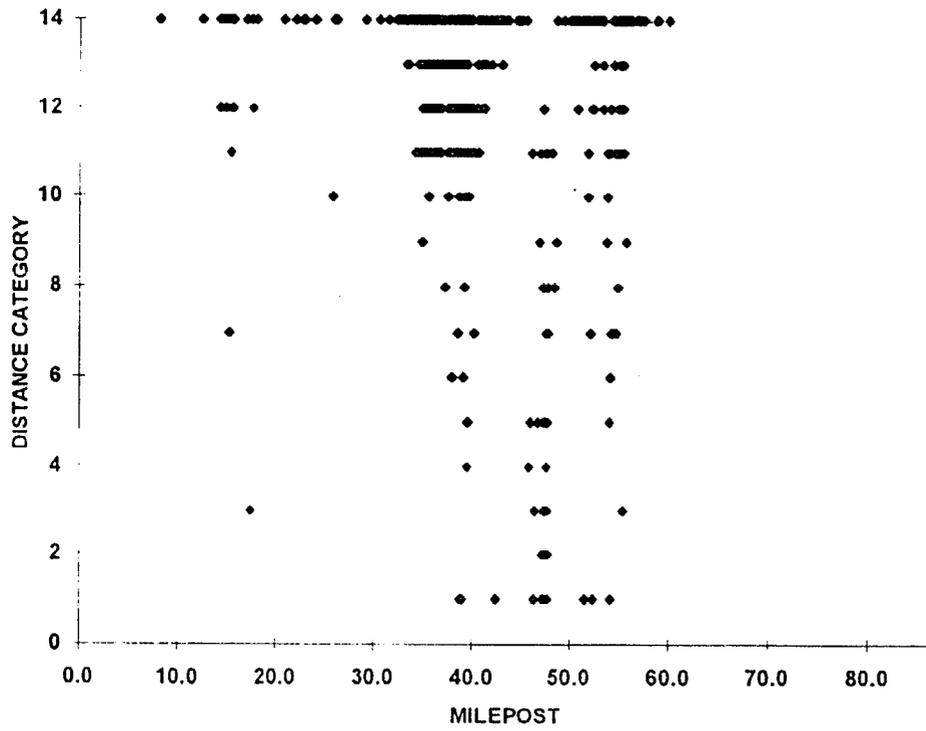
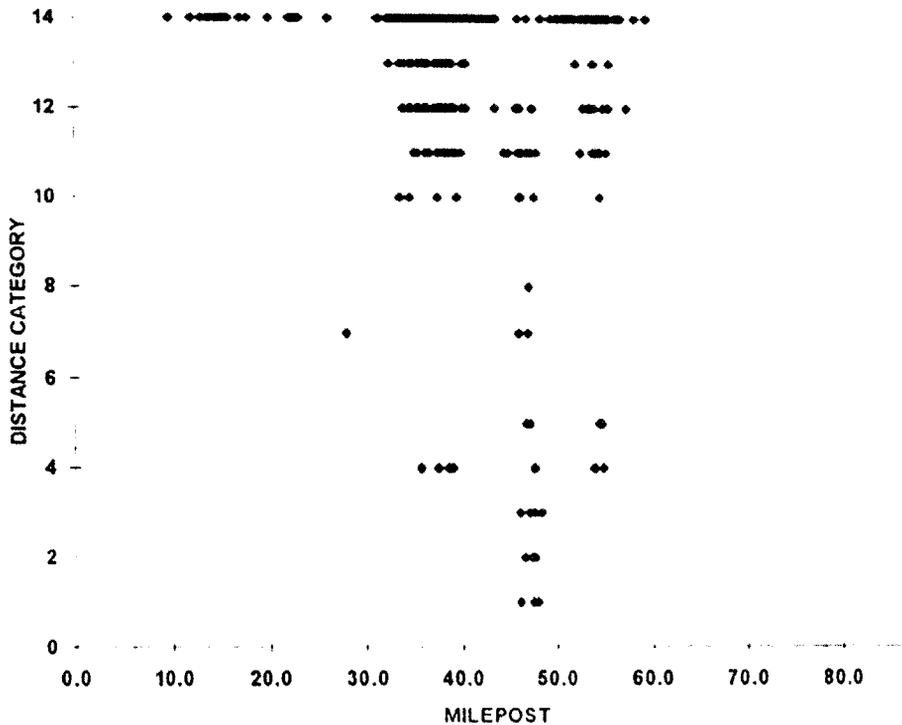


FIG. 97. DALL'S SHEEP OBSERVATIONS BY DISTANCE CATEGORY AND MILEPOST, 1991



As with caribou, there was a remarkable similarity of percentage of observations by distance category from year to year (Figs.98-101). Categories 0 to 10, on the road to within 100 m of the road, varied less than 3% between years (Note: Category 0 was not recorded during the 1990 and 1991 seasons). Category 14 (>400 m) showed the greatest variation with 55% of the observations in 1990 (Fig.100) and 75% in 1988 and 1991 (Fig.98 & 101). Categories 11,12, and 13 varied only slightly by year. These data, as with those for caribou, suggest a relative stability of where Dall's sheep are found along the DENA road.

FIG. 98. % OCCURRENCE OF DALL'S SHEEP OBSERVATIONS BY DISTANCE CATEGORY,
1988

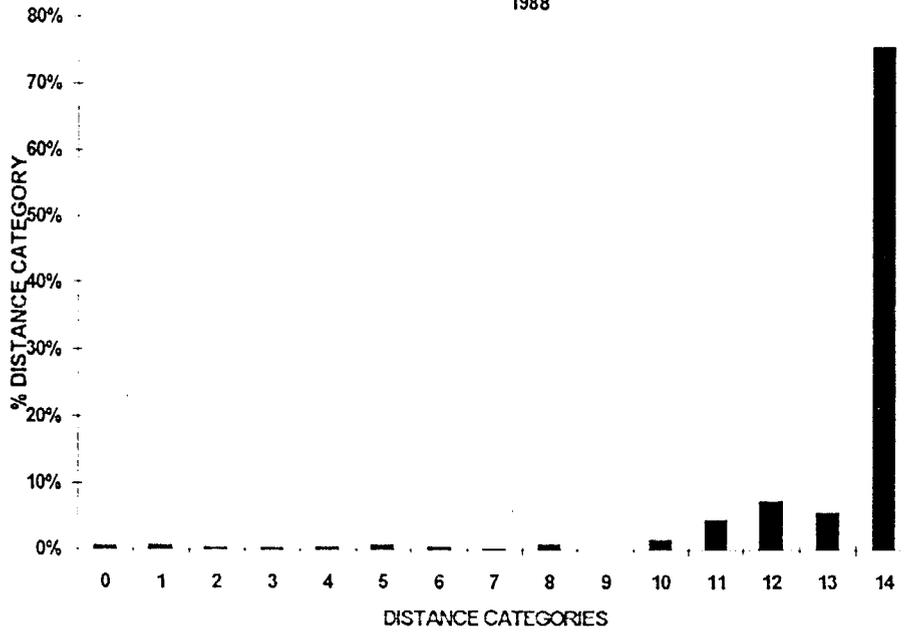


FIG. 99. % OCCURRENCE OF DALL'S SHEEP OBSERVATIONS BY DISTANCE CATEGORIES,
1989

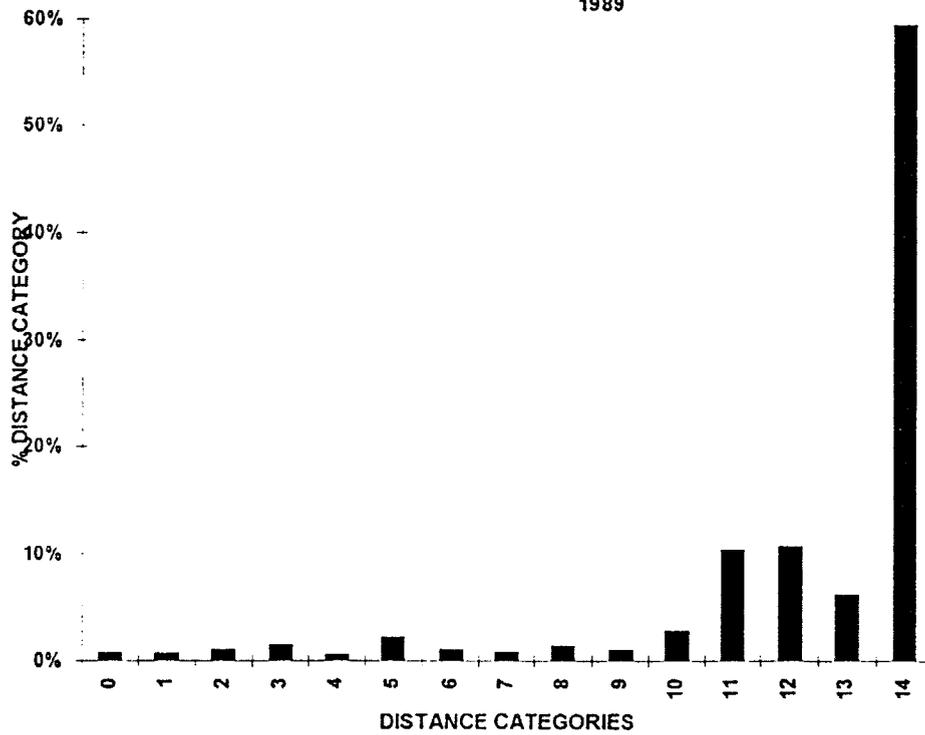


FIG. 100. % OCCURRENCE OF DALL'S SHEEP OBSERVATIONS BY DISTANCE CATEGORIES, 1990

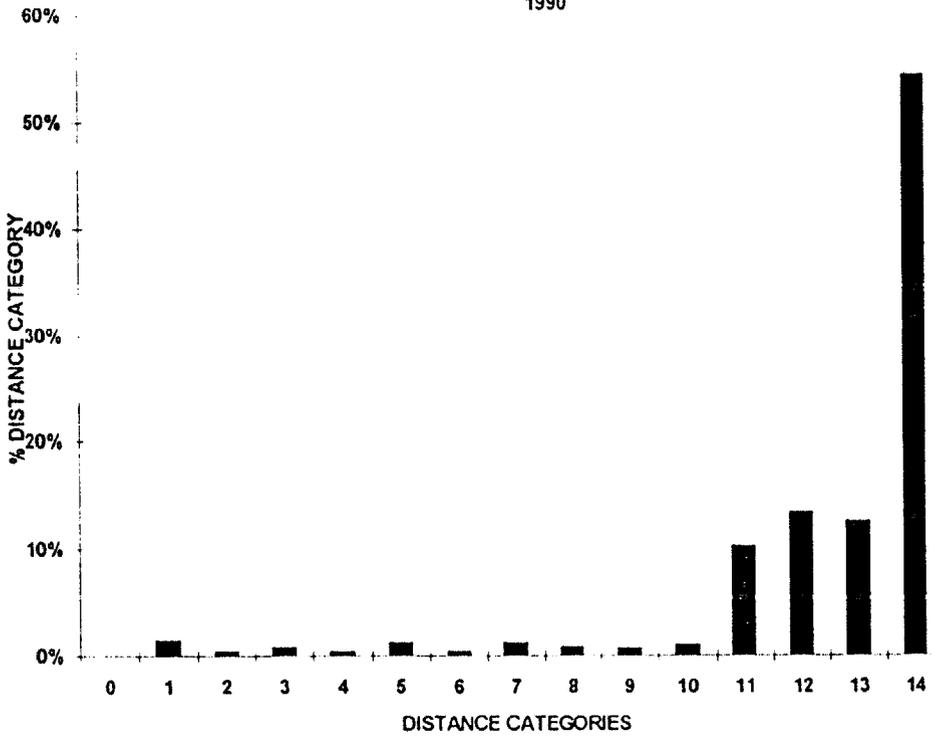
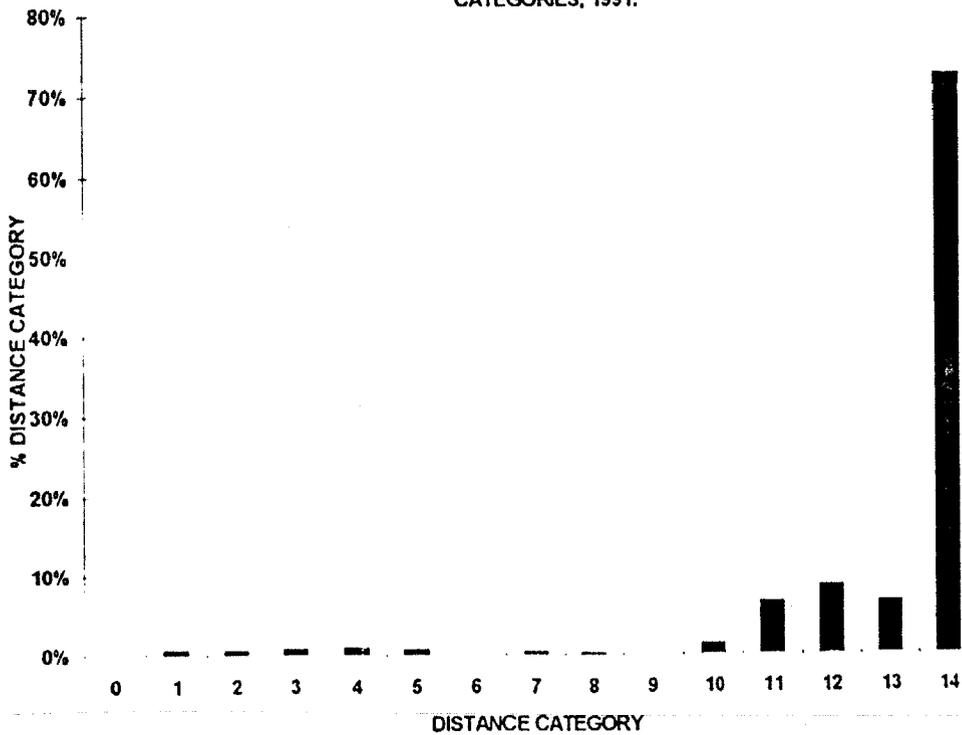


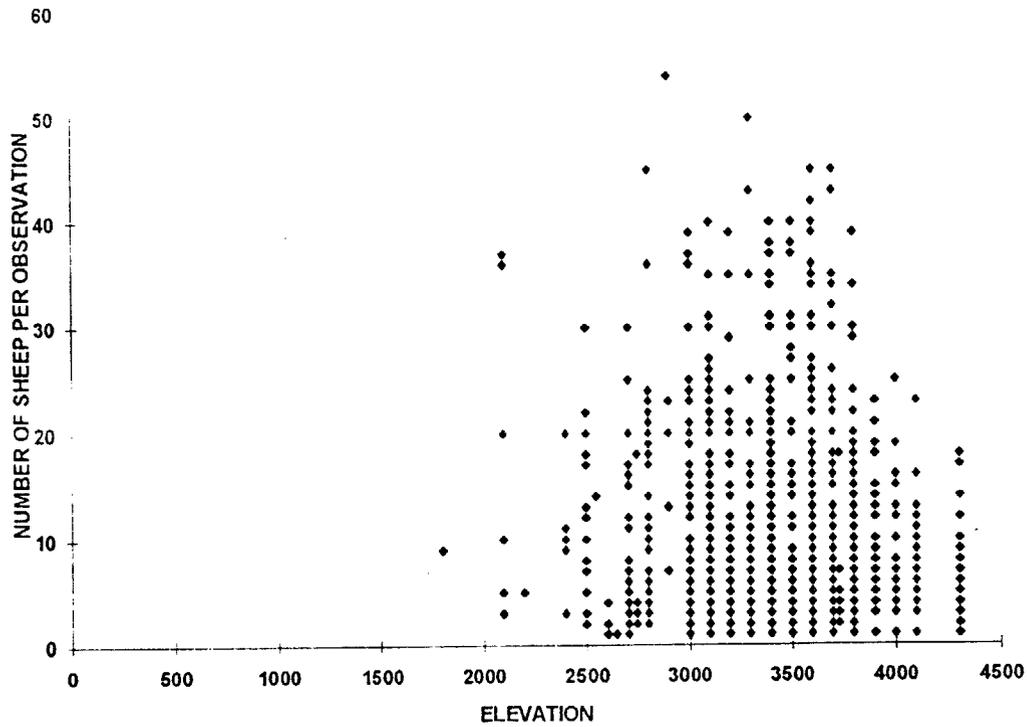
FIG. 101. % OCCURRENCE OF DALL'S SHEEP OBSERVATIONS BY DISTANCE CATEGORIES, 1991.



Dall's sheep occurrence, recorded from specific mileposts along the road, reflects elevation at that point, and not necessarily the elevation of the sheep. Typically, sheep were at a distance from the road (Figs. 98-101), and above the road.

Dall's sheep were recorded at elevations ranging from 1800 to 4300 feet (Fig. 102). Largest groups occurred between 2300 ft and 3700 ft elevation.

FIG. 102. NUMBER OF DALL'S SHEEP PER OBSERVATION AT ELEVATION LEVELS, 1988



GRIZZLY BEARS

A comparison of percent stops for grizzly bears with that of caribou, Dall's sheep, moose, and wolves is shown in Fig. 103. Grizzly bears were observed at 10% to 24 % of all stops during any one month. On an annual basis, percentage of stops to observe grizzly bears varied from 16% to 18% (Fig. 103).

The percentage of passengers who observed grizzly bears varied between months and years, and by type of bus the passenger was riding (Table 49). Passenger success at observing grizzly bears varied from 50% in September, 1990, to 100% of those on tour buses during May, 1989. On a monthly basis, variation in results precluded conclusion as to whether passengers on shuttle or tour buses routinely observed more grizzly bears.

Annually, 64% to 86% of all passengers observed grizzly bears (Table 49). A higher percentage of total passengers on shuttle buses observed grizzly bears during 1988 and 1989 than did those on tour buses.

The drop by 20% in passengers observations of grizzly bears in 1990 and 1991 compared to 1988 and 1989 should be a management concern. Reduced number of shuttle trips (Table 3), reduced number of observers (Table 49), and a family group being located in one spot for several days in succession some years may be a partial explanation for the lowered success in observing bears in other years. The observation warrants further examination.

Grizzly bears were observed nearly every day of the season in 1988, 1989, and 1991 (Figs.104,105,105B), and at approximately the same levels each month (Figs.104A & 105 A). From 1 to as many as 9 animals were recorded per observation. Original records from drivers show the high numbers, such as 9 bears per observation, were of 2 or more family groups observed from one spot.

Number of bears per observation remained relatively constant throughout the season for the 3 years illustrated (Figs.104, 105, 105B).

Table 49. Percentage of passengers who observed grizzly bears by month and year.

SPECIES	YEAR	MONTH	PASSENGER OBSERVERS	TOTAL PASSENGERS	PERCENT WHO OBSERVED	
GRIZZLY BEAR	1988 SHUTTLE	JULY	2647	2781	95.18	
		AUGUST	2073	2469	83.96	
		SEPTEMBER	1013	1045	96.94	
		TOTAL	5733	6295	91.07	
	TOUR	JULY	4595	5494	83.64	
		AUGUST	4595	5250	87.52	
		SEPTEMBER	1094	1496	73.13	
		TOTAL	10284	12240	84.02	
	TOTAL	JULY	7242	8275	87.70	
		AUGUST	6668	7719	86.20	
		SEPTEMBER	2107	2541	82.90	
		TOTAL	16017	18535	86.42	
					
		1989 SHUTTLE	MAY	327	439	74.49
			JUNE	2088	2224	93.88
			JULY	1638	1807	90.65
			AUGUST	1411	1886	74.81
			SEPTEMBER	330	433	76.21
			TOTAL	5794	6789	85.30
		TOUR	MAY	414	414	100.00
JUNE			2355	2705	87.06	
JULY			2853	3568	79.96	
AUGUST			2789	3393	82.20	
SEPTEMBER			1155	1548	74.61	
TOTAL			9566	11628	82.30	
TOTAL		MAY	741	853	86.87	
		JUNE	4443	4929	90.14	
		JULY	4491	5375	83.55	
		AUGUST	4200	5279	79.56	
		SEPTEMBER	1485	1981	74.96	
		TOTAL	15360	18417	83.40	
.....						
1990	MAY	417	715	58.32		
	JUNE	2101	3231	65.03		
	JULY	2478	3691	67.14		
	AUGUST	2296	3508	65.45		
	SEPTEMBER	552	1108	49.82		
	TOTAL	7844	12253	64.01		

Table 49. Concluded.

1991				
	MAY	353	688	51.31
	JUNE	1999	2576	77.60
	JULY	2846	4025	70.71
	AUGUST	1918	3534	54.27
	SEPTEMBER	518	849	61.01
	TOTAL	7634	11672	65.40

FIG. 103. Percentage of total observations of caribou, Dall's sheep, grizzly bears, moose, and wolves that were of grizzly bears during four years.

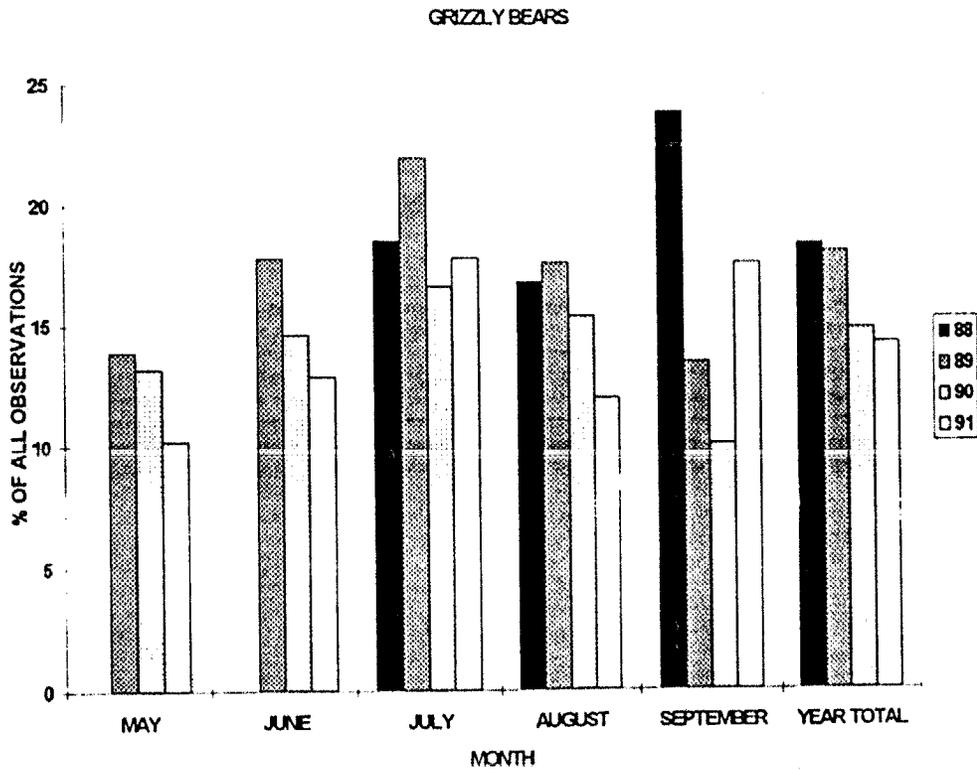


FIG. 104. NUMBER OF GRIZZLY BEARS PER OBSERVATION BY JULIAN DATE, 1988

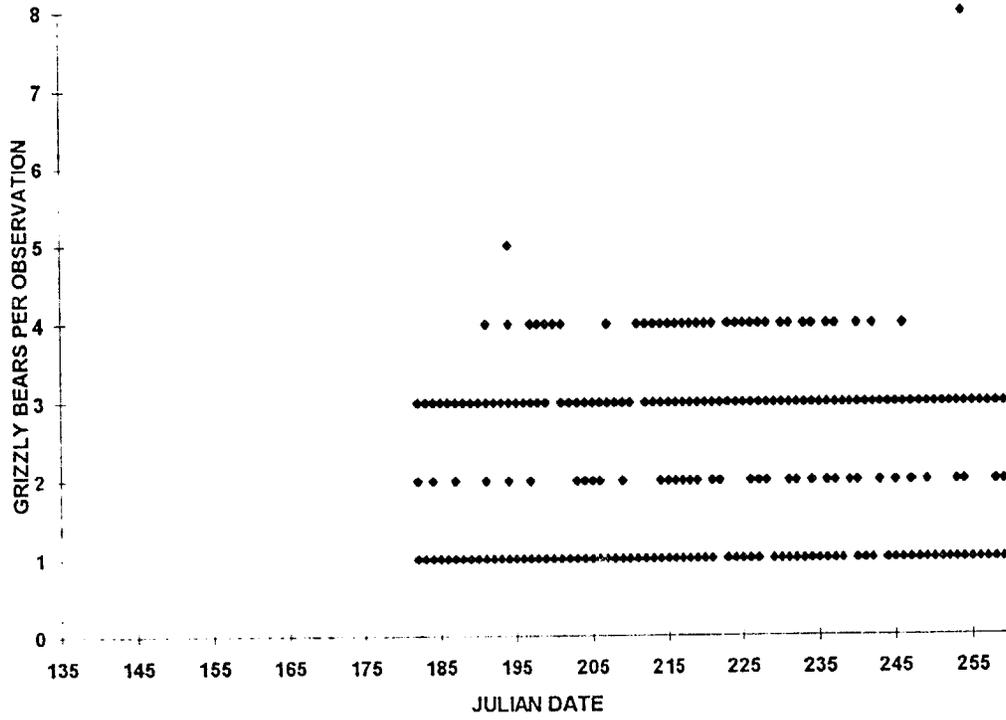


FIG. 104A. MEAN NUMBER OF GRIZZLY BEARS PER OBSERVATION BY MONTH, 1988

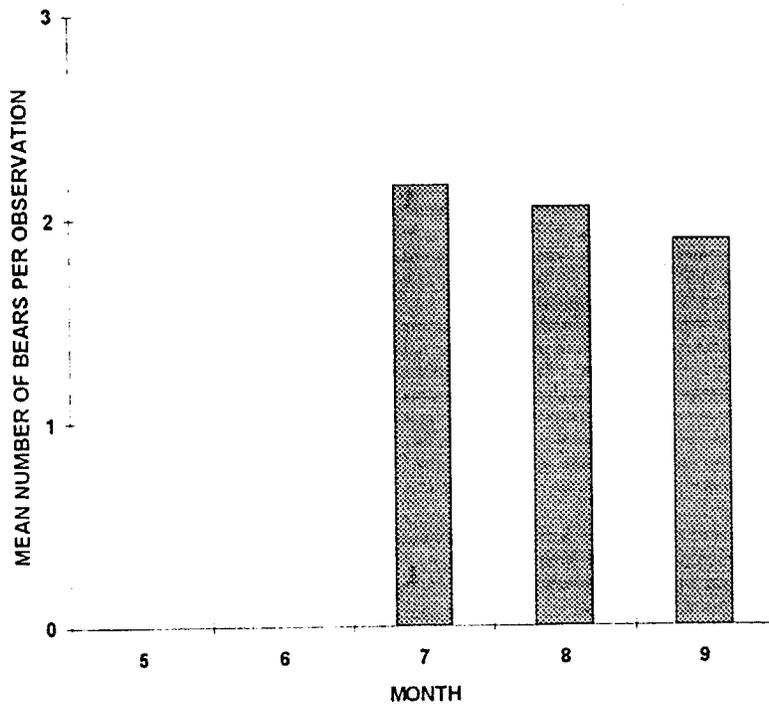


FIG. 105. NUMBER OF GRIZZLY BEARS PER OBSERVATION BY JULIAN DATE, 1989

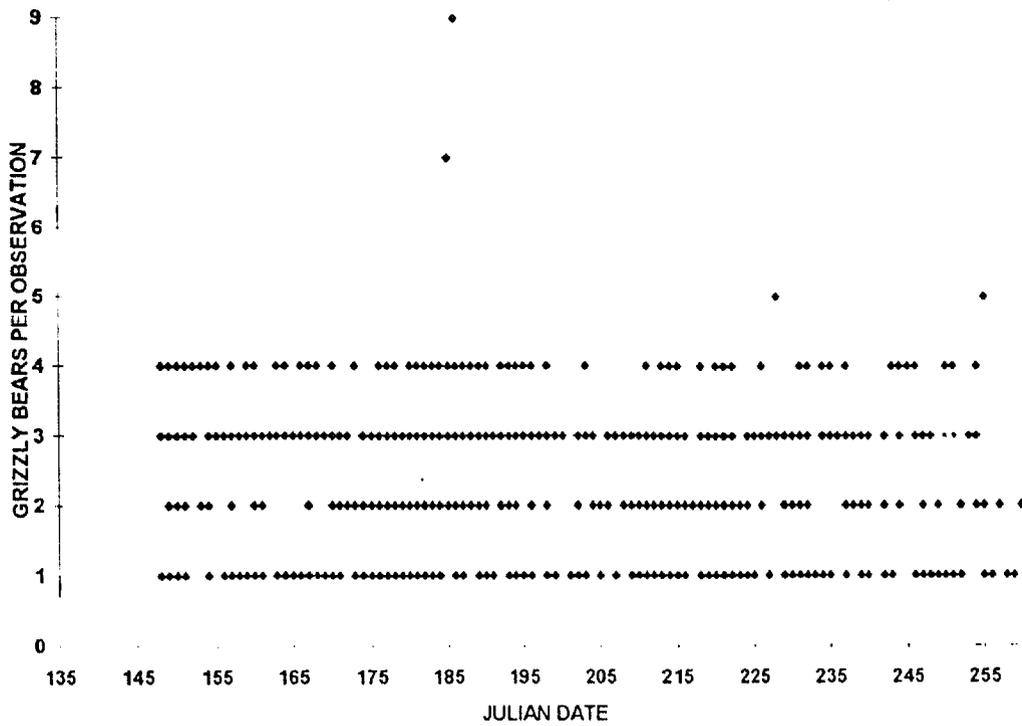


FIG. 105A. MEAN NUMBER OF GRIZZLY BEARS PER OBSERVATION BY MONTH, 1989

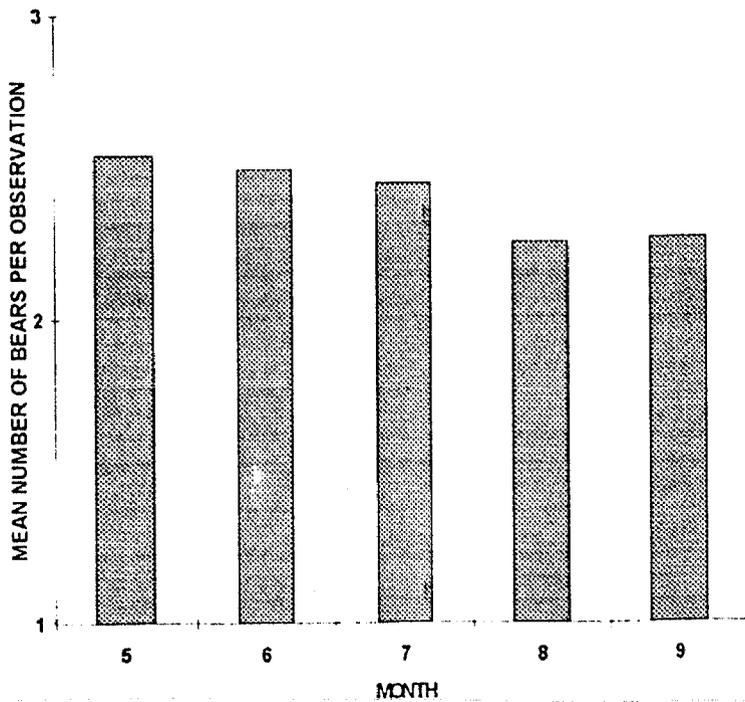
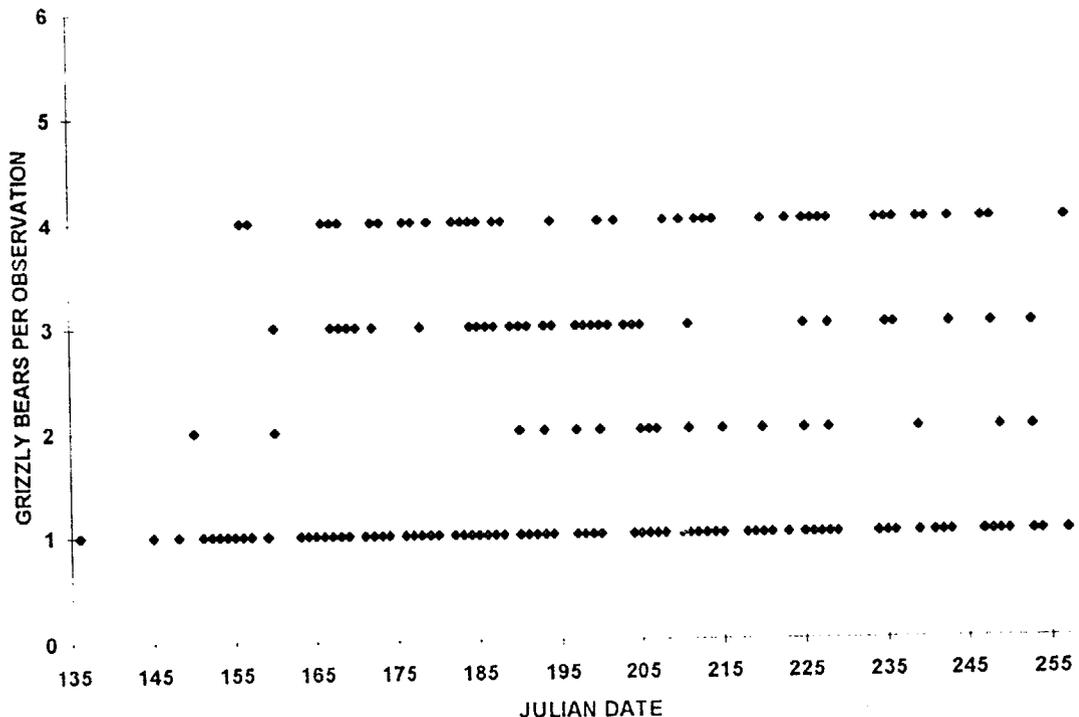


FIG. 105B. NUMBER OF GRIZZLY BEARS PER OBSERVATION BY JULIAN DATE, 1991



Individual grizzly bear observations were more widespread in 1988 and 1989 than in 1991 (Figs. 106-107A), partly due to few recordings being made past milepost 66 during 1991 (Table 8). Fewest records were between mileposts 0 to 5 and from milepost 75 to 87 in all years. Observations of 4 bears, typically a sow with three cubs, were recorded most frequently from mileposts 35 through 75.

Mean number of grizzly bears observed per bus trip indicates primary bear use. Mean number of grizzly bears observed per bus trip varied by month for 1989 (Figs. 108-Fig. 113). May and September, the 2 months with the fewest days of records, also showed greatest restriction in location of observations. Mean number of bears per milepost was not only highest during June, but more mileposts showed mean values than for other months (Fig. 109). Mileposts with the highest monthly mean number of bears observed per bus trip were 38-40 and 65, with 0.2 bears observed per trip during June and July.

Annually, mileposts 34-72 were areas with highest values of mean number of bears per bus trip. Mileposts 38-41, with 0.3-0.4 bears observed per trip, were mileposts with highest mean values,

consequently, the areas where bears would most likely be observed on a routine basis.

FIG. 106. NUMBER OF GRIZZLY BEARS PER OBSERVATION BY MILEPOST, 1988

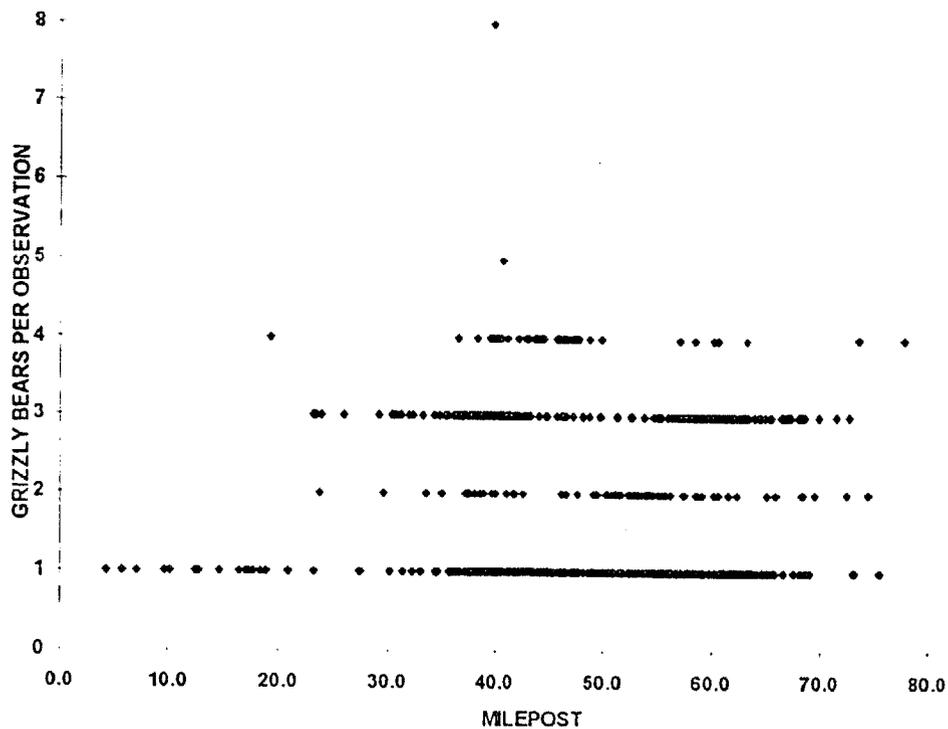


FIG. 107. NUMBER OF GRIZZLY BEARS PER OBSERVATION BY MILEPOST, 1989

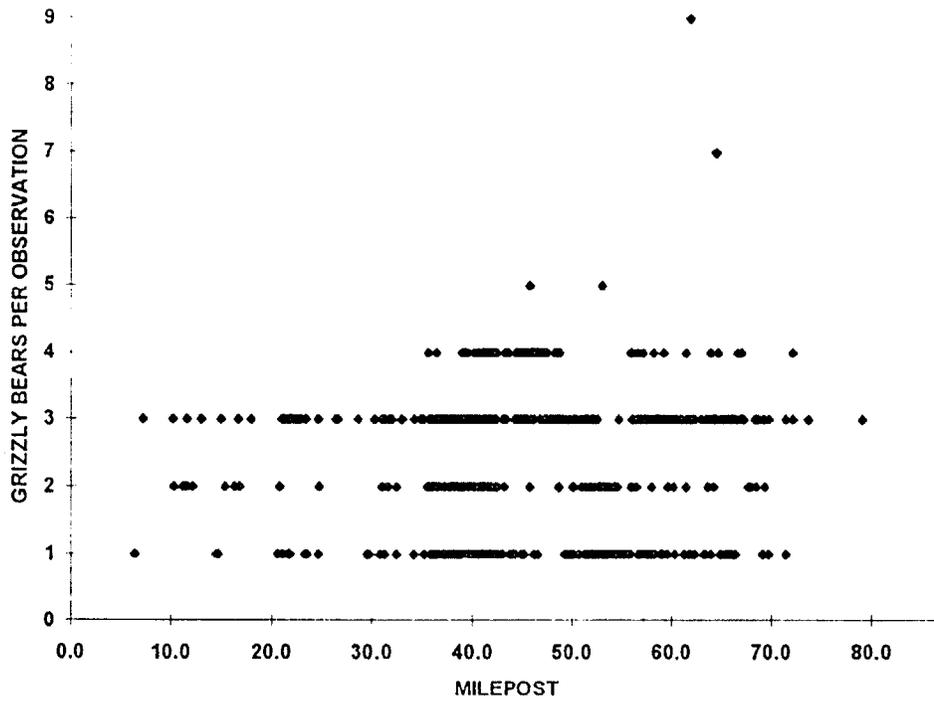


FIG. 107A. NUMBER OF GRIZZLY BEARS PER OBSERVATION BY MILEPOST, 1991.

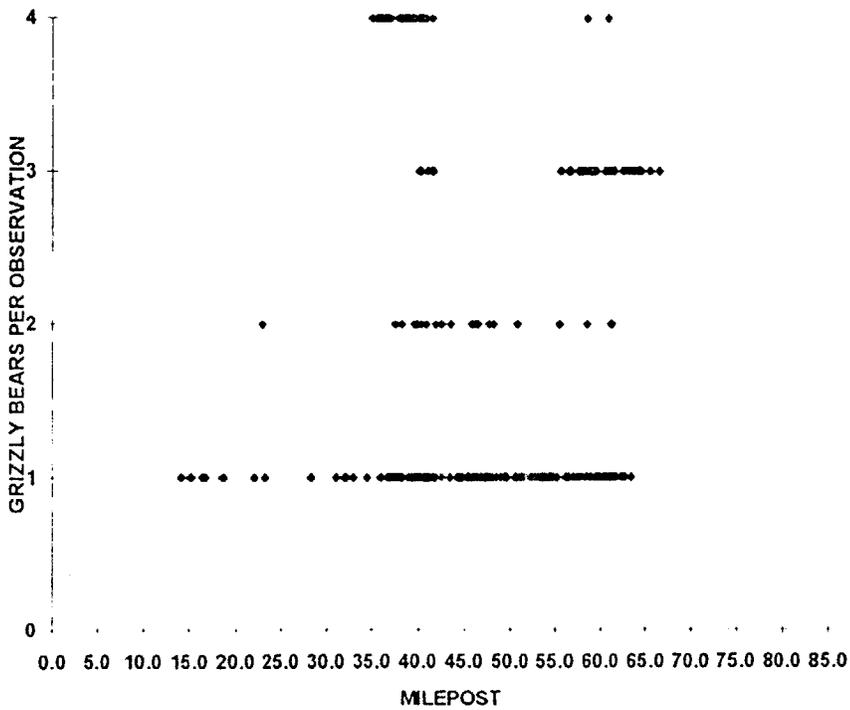


FIG. 108. MEAN NUMBER OF GRIZZLY BEARS PER MILEPOST PER BUS TRIP, MAY, 1989

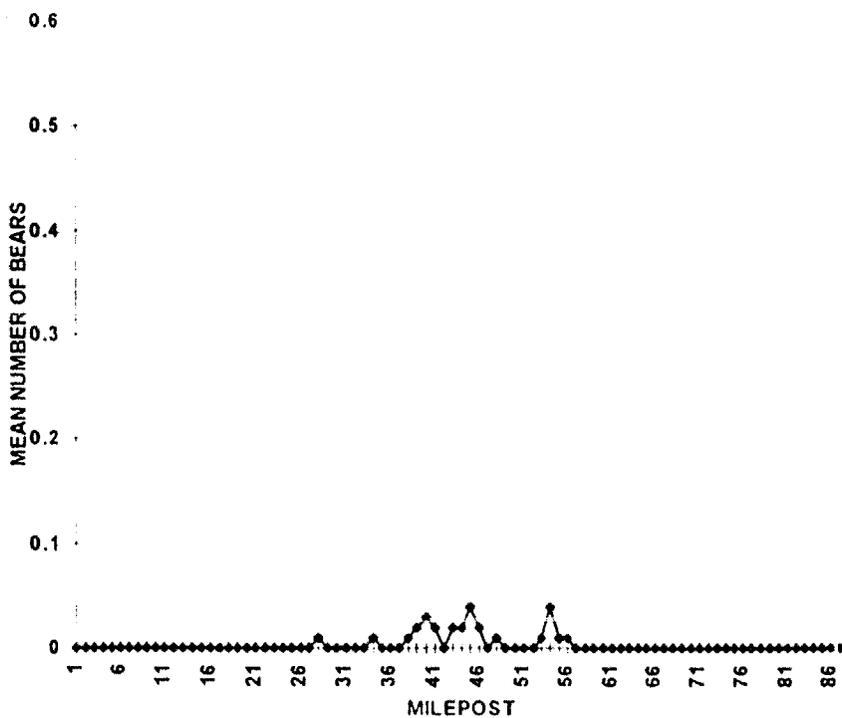


FIG. 109. MEAN NUMBER OF GRIZZLY BEARS PER MILEPOST PER BUS TRIP, JUNE, 1989

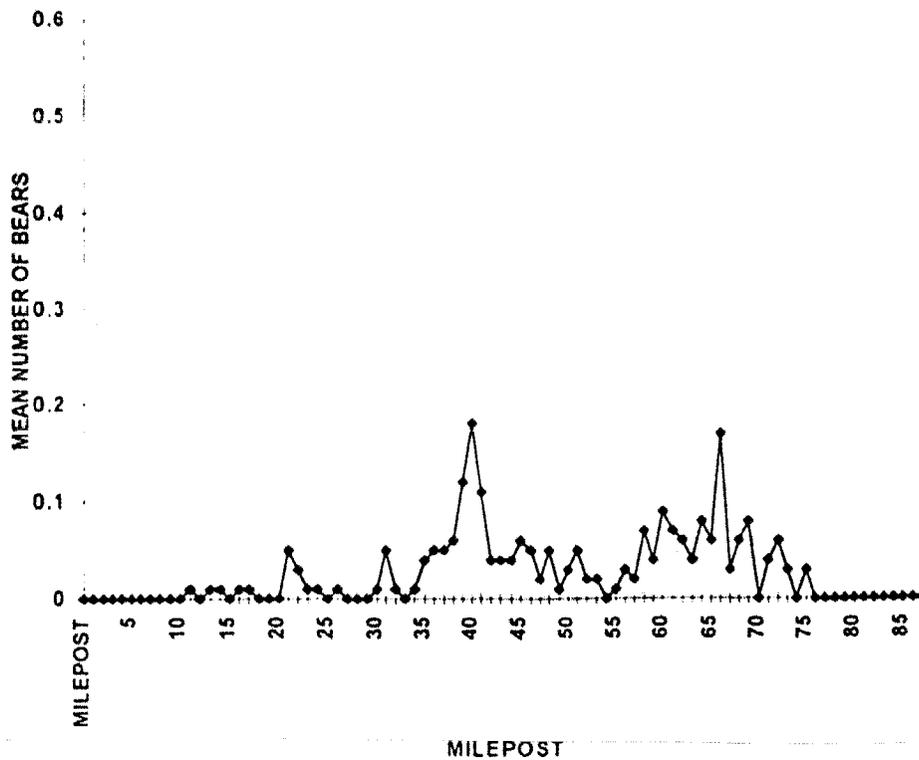


FIG. 110. MEAN NUMBER OF GRIZZLY BEARS PER MILEPOST PER BUS TRIP, JULY, 1989

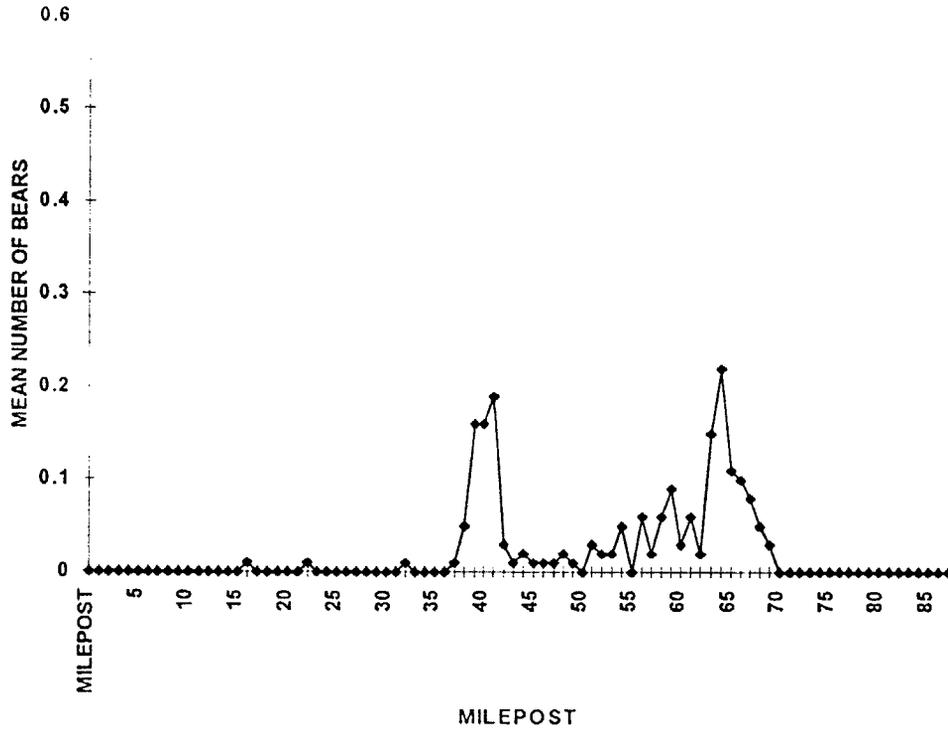


FIG. 111. MEAN NUMBER OF GRIZZLY BEARS PER MILEPOST PER BUS TRIP, AUGUST, 1989

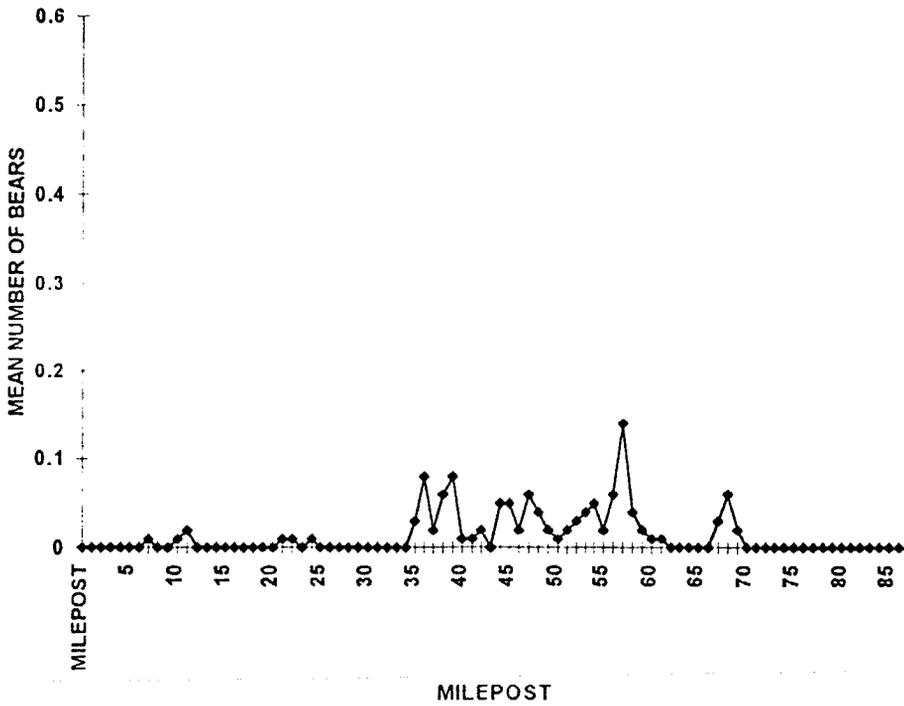


FIG. 112. MEAN NUMBER OF GRIZZLY BEARS PER MILEPOST PER BUS TRIP, SEPTEMBER, 1989

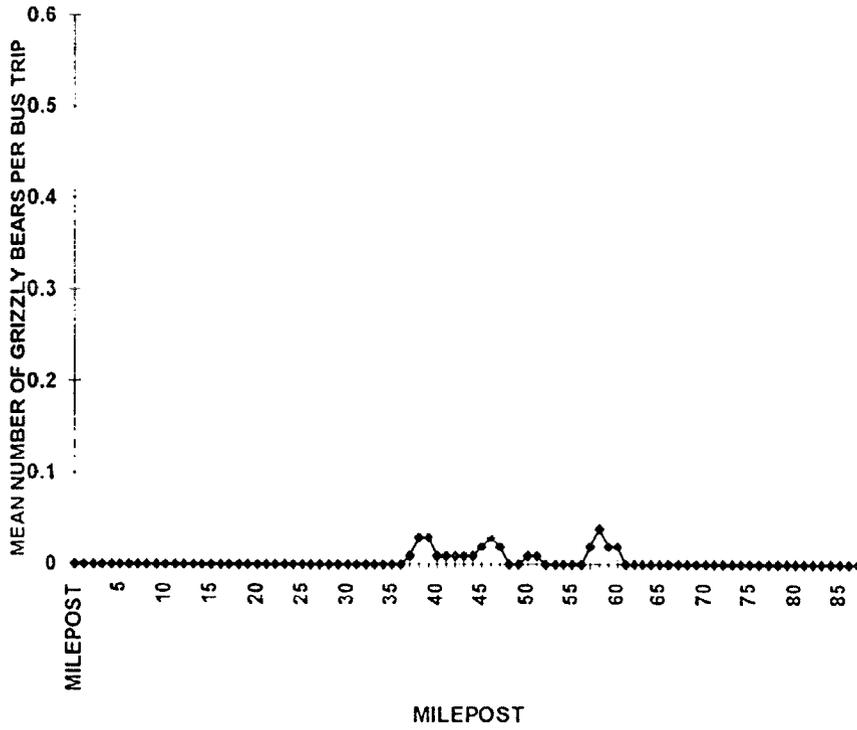


FIG. 113. MEAN NUMBER OF GRIZZLY BEARS PER MILEPOST PER BUS TRIP FOR THE SEASON-1989

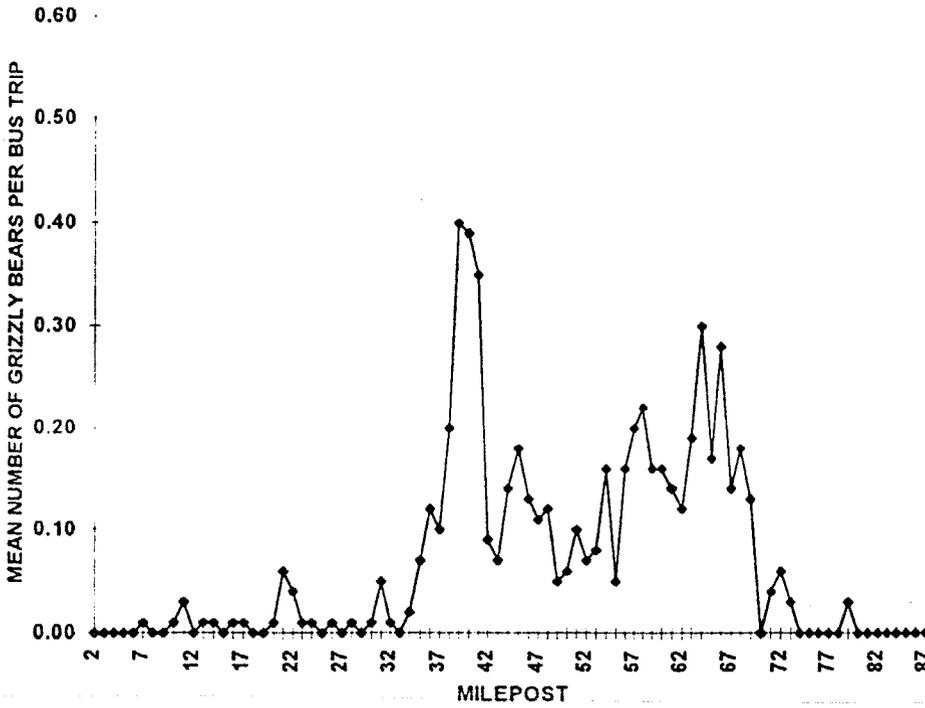
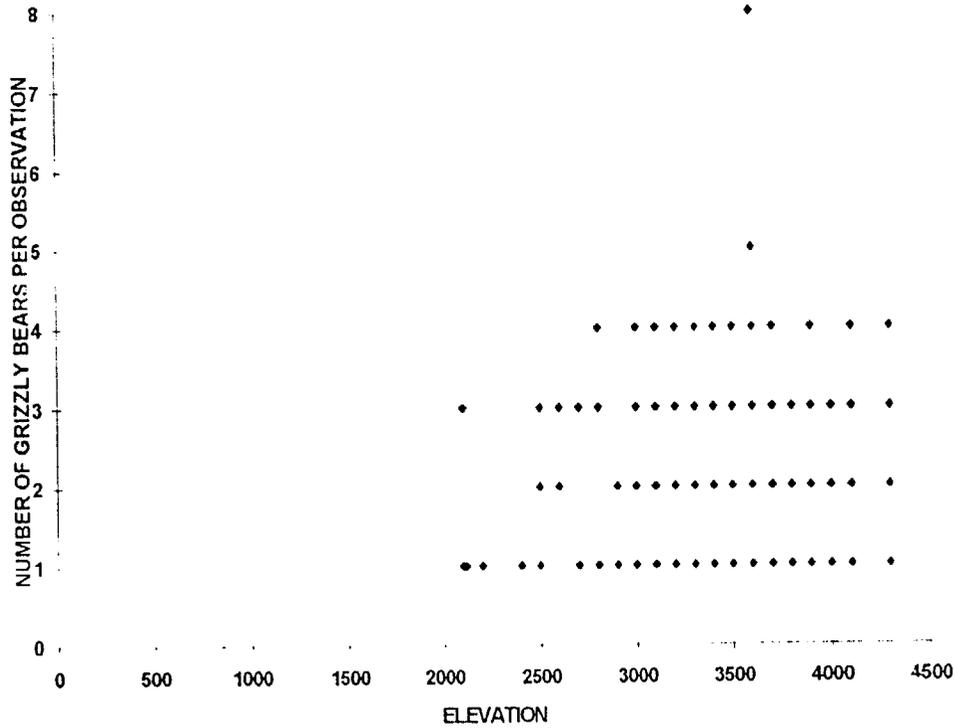
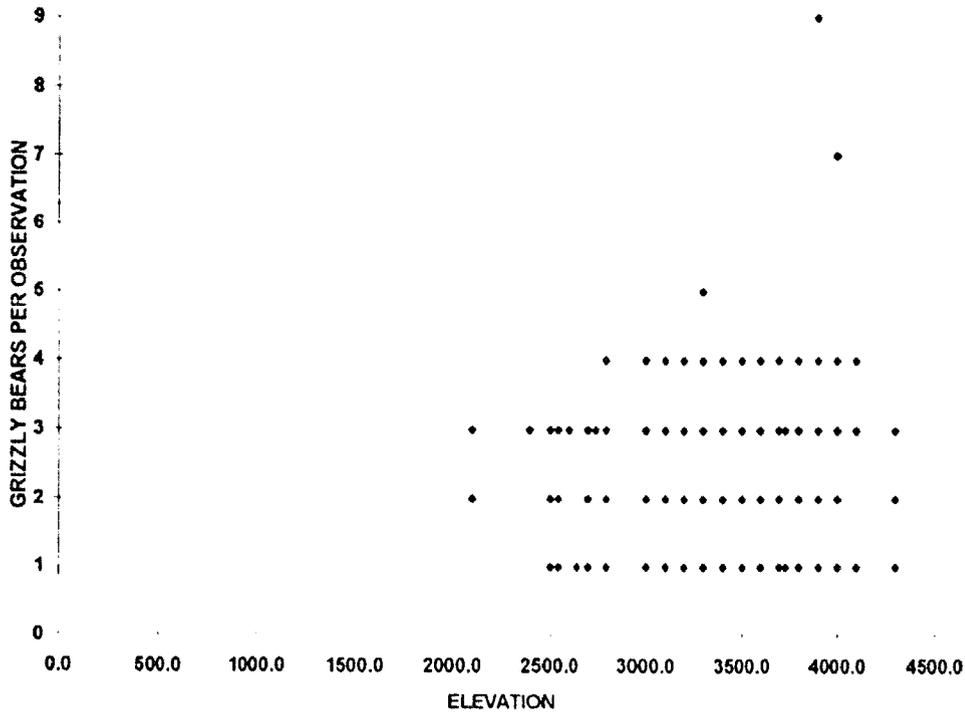


FIG. 114. NUMBER OF GRIZZLY BEARS PER OBSERVATION AT ELEVATION, 1988



Individual grizzly bears, and groups of two and three animals each, were recorded at nearly every elevation along the park road (Figs. 114 & 115). Observations of 4 or more bears were confined to elevations above 2500 ft.

FIG. 115. NUMBER OF GRIZZLY BEARS PER OBSERVATION AT ELEVATION, 1989



Overall group size varied from one bear to as many as nine bears per stop (Tables 50-67). Original data sheets indicate groups larger than four were of multiple families within a general vicinity of a stop.

Group size changed by month through the years. Single animals were most common at stops during July, 1988 (Table 50), but by September, group size of three was most common (Table 52). During 1989, groups of three were most common during June and July, when a sow and cubs were observed in one spot for several days in a row. Group size 1-3 was observed with similar frequency during August, with groups of 1 and 2 being most common in September, 1989.

During 1990 and 1991, single individuals made up 35% to 86% of all stops for bears. During the few observation days of May, 1990, 35% of stops were for single individuals, and 45% were for two bears. From June, and for each observation month through the end of the study in September, 1991, single bears made up greater than 50% of all stops. During 1988 and 1989, only during July 1988 did stops for single bears exceed 50% of all stops.

Monthly values for group size are reflected in annual values (Figs. 116-119). On an annual basis, stops to observe groups of 1 and 3 animals were most common in 1988 and 1989, with stops for three bears being most common in 1989 (see note above for 1989). Stops to observe single bears exceeded 50% in 1990, and exceeded 60% in 1991, suggesting productivity of grizzly bears was low during these two years.

Table 50. Group size, number and percentage of stops for observation of grizzly bears, July, 1988.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	1780	81.5%	other animals
1	233	10.7%	57.8%
2	27	1.2%	6.7%
3	120	5.5%	29.8%
4	22	1.0%	5.5%
5	1	0.0%	0.2%
TOTALS	2183	100.0%	100.0%

Table 51. Group size, number and percentage of stops for observation of grizzly bears, August, 1988.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	1916	83.2%	other animals
1	144	6.3%	37.3%
2	35	1.5%	9.1%
3	168	7.3%	43.5%
4	39	1.7%	10.1%
5	0	0.0%	0.0%
TOTAL	2302	100.0%	100.0%

Table 52. Group size, number and percentage of stops for observation of grizzly bears, September, 1988.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	468	76.1%	other animals
1	51	8.3%	34.7%
2	17	2.8%	11.6%
3	76	12.4%	51.7%
4	2	0.3%	1.4%
5	0	0.0%	0.0%
6	0	0.0%	0.0%
7	0	0.0%	0.0%
8	1	0.2%	0.7%
TOTALS	615	100.0%	100.0%

FIG. 116. GRIZZLY BEAR GROUP SIZE-JULY-SEPTEMBER, 1988

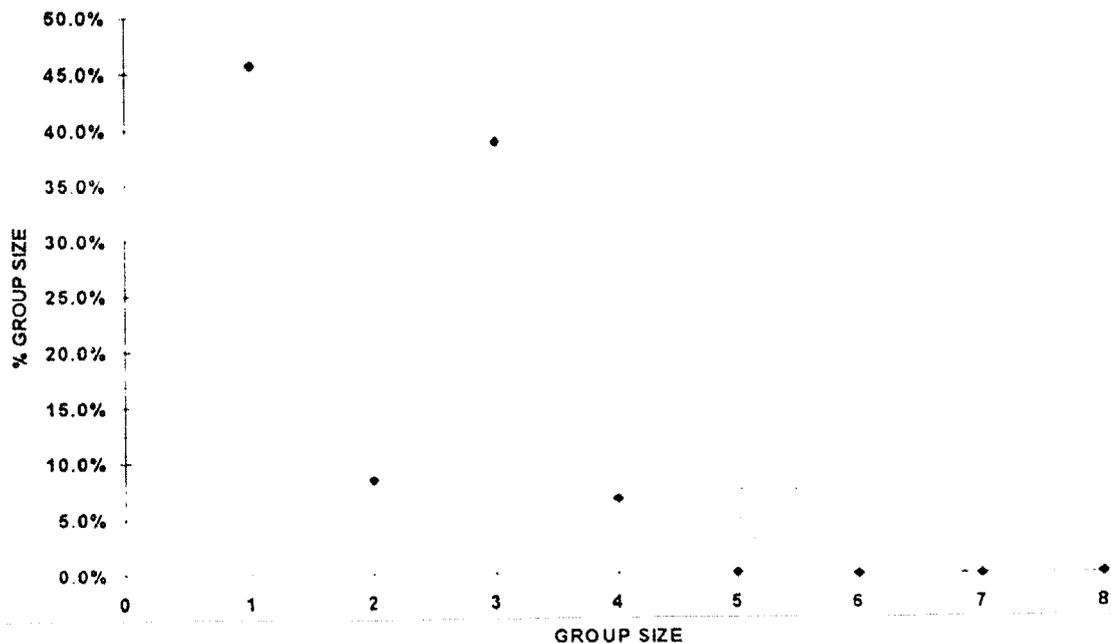


Table 53. Group size, number and percentage of stops for observation of grizzly bears, May, 1989.

MAY			
Group Size	Number of Stops	% Stops	% Observations by Group Size
0	291	86.1	other animals
1	10	3.0	21.3
2	9	2.7	19.2
3	13	3.8	27.7
4	15	4.4	31.9
Total	338	100	100.1

338-291=47 stops to observe grizzly bears during May, 1989.

Table 54. Group size, number and percentage of stops for observation of grizzly bears, June, 1989.

JUNE			
Group Size	Number of Stops	% Stops	% Observations by Group Size
0	1503	82.2	other animals
1	76	4.2	23.4
2	44	2.4	13.5
3	164	9.0	50.5
4	40	2.2	12.3
5	1	0.1	0.3
Totals	1828	100	100

1828-1503=325 stops to observe grizzly bears during June, 1989.

Table 55. Group size, number and percentage of stops for observation of grizzly bears, July, 1989.

JULY			
Group Size	Number of Stops	% Stops	% Observations by Group Size
0	867	78.0	other animals
1	56	5.0	22.8
2	54	4.9	22.0
3	108	9.7	44.1
4	26	2.3	10.6
9	1	0.1	0.4
Totals	1112	100	99.9

1112-867=245 stops made to observe grizzly bears during July, 1989.

Table 56. Group size, number and percentage of stops for observation of grizzly bears, August, 1989.

AUGUST			
Group Size	Number of Stops	% Stops	% Observations by Group Size
0	953	82.4	other animals
1	59	5.1	28.9
2	56	4.8	27.5
3	66	5.7	32.4
4	22	1.9	10.8
5	1	0.1	0.5
Totals	1157	100	100.1

1157-953=204 stops made to observe grizzly bears during August, 1989.

Table 57. Group size, number and percentage of stops for observation of grizzly bears, September, 1989.

SEPTEMBER			
Group Size	Number of Stops	% Stops	% Observations by Group Size
0	385	86.5	other animals
1	19	4.3	31.7
2	18	4.0	30.0
3	14	3.1	23.3
4	8	1.8	13.3
5	1	0.2	1.7
Totals	445	100	100

445-385=60 stops made to observe grizzly bears during September, 1989.

FIG. 117. GRIZZLY BEAR GROUP SIZE-1989

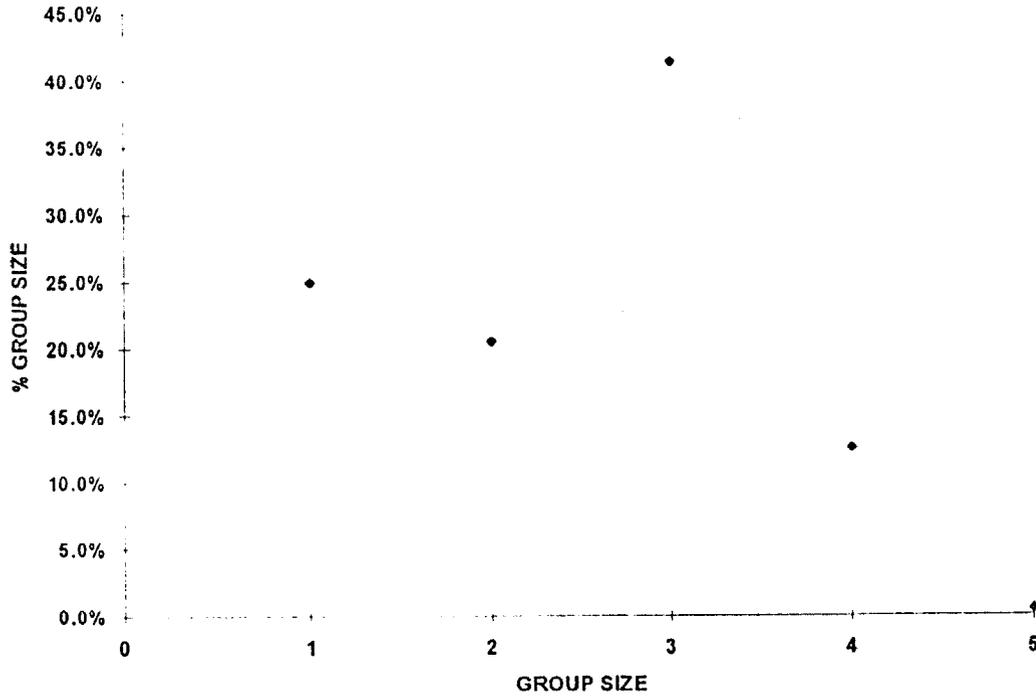


Table 58. Group size, number and percentage of stops for observation of grizzly bears, May, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	131	86.8%	other animals
1	7	4.6%	35.0%
2	9	6.0%	45.0%
3	2	1.3%	10.0%
4	2	1.3%	10.0%
TOTAL	151	100.0%	100.0%

Table 59. Group size, number and percentage of stops for observation of grizzly bears, June, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	520	85.4%	other animals
1	47	7.7%	52.8%
2	25	4.1%	28.1%
3	16	2.6%	18.0%
4	1	0.2%	1.1%
TOTAL	609	100.0%	100.0%

Table 60. Group size, number and percentage of stops for observation of grizzly bears, July, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	438	83.4%	other animals
1	49	9.3%	56.3%
2	9	1.7%	10.3%
3	24	4.6%	27.6%
4	4	0.8%	4.6%
5	0	0.0%	0.0%
6	1	0.2%	1.1%
TOTAL	525	100.0%	100.0%

Table 61. Group size, number and percentage of stops for observation of grizzly bears, August, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	499	84.6%	other animals
1	50	8.5%	54.9%
2	15	2.5%	16.5%
3	26	4.4%	28.6%
TOTAL	590	100.0%	100.0%

Table 62. Group size, number and percentage of stops for observation of grizzly bears, September, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	133	89.9%	other animals
1	11	7.4%	73.3%
2	0	0.0%	0.0%
3	4	2.7%	26.7%
TOTAL	148	100.0%	100.0%

FIG. 118. GRIZZLY BEAR GROUP SIZE, SUMMER SEASON, 1990

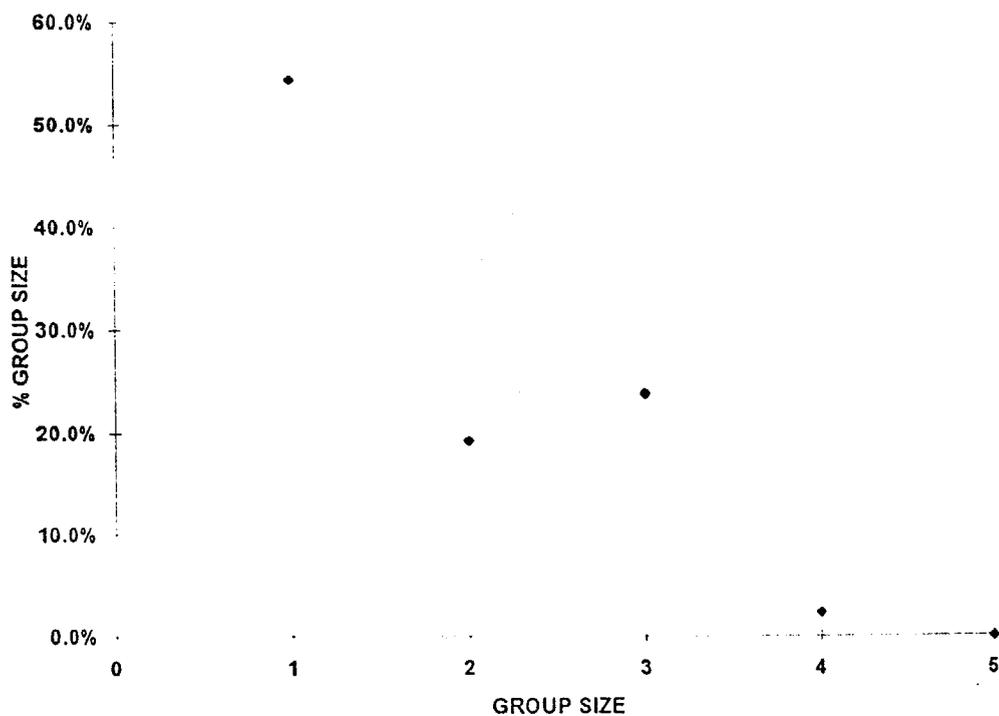


Table 63. Group size, number and percentage of stops for observation of grizzly bears, May, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	123	89.8%	other animals
1	12	8.8%	85.7%
2	2	1.5%	14.3%
TOTAL	137	100.0%	100.0%

Table 64. Group size, number and percentage of stops for observation of grizzly bears, June, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	603	87.1%	other animals
1	63	9.1%	70.8%
2	2	0.3%	2.2%
3	11	1.6%	12.4%
4	13	1.9%	14.6%
TOTAL	692	100.0%	100.0%

Table 65. Group size, number and percentage of stops for observation of grizzly bears, July, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	685	82.2%	other animals
1	83	10.0%	56.1%
2	13	1.6%	8.8%
3	36	4.3%	24.3%
4	16	1.9%	10.8%
TOTAL	833	100.0%	100.0%

Table 66. Group size, number and percentage of stops for observation of grizzly bears, August, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	637	88.0%	other animals
1	53	7.3%	60.9%
2	8	1.1%	9.2%
3	5	0.7%	5.7%
4	21	2.9%	24.1%
TOTAL	724	100.0%	100.0%

Table 67. Group size, number and percentage of stops for observation of grizzly bears, September, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	89	82.4%	other animals
1	11	10.2%	57.9%
2	2	1.9%	10.5%
3	2	1.9%	10.5%
4	4	3.7%	21.1%
TOTAL	108	100.0%	100.0%

FIG. 119. GRIZZLY BEAR GROUP SIZE, SUMMER SEASON, 1991

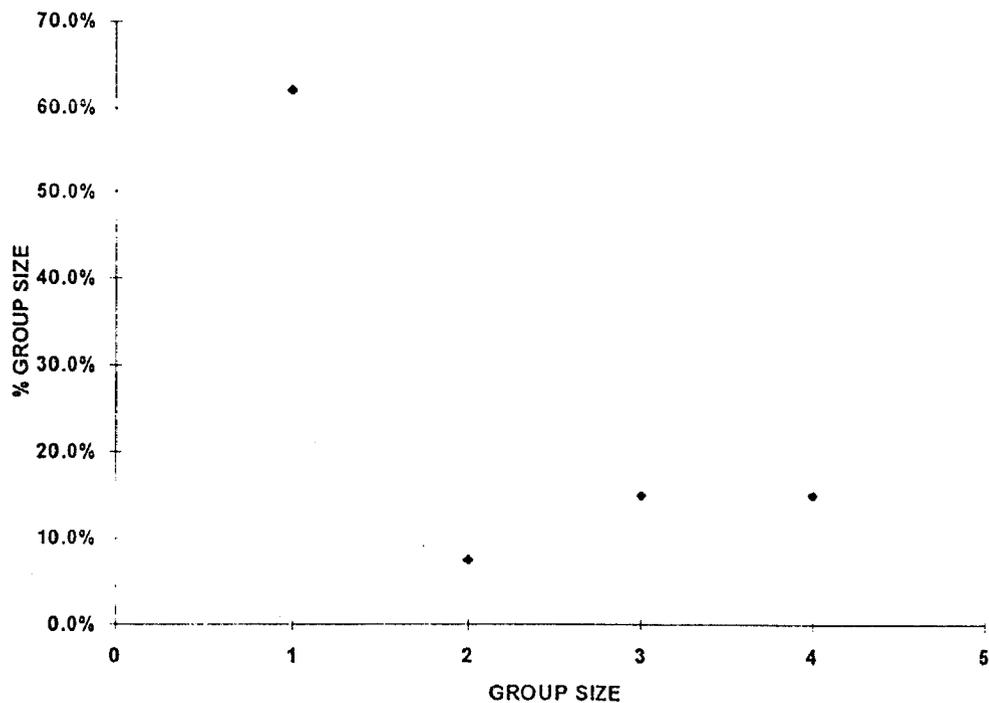


FIG. 120. NUMBER OF GRIZZLY BEARS PER OBSERVATION BY HOUR OF THE DAY, 1988

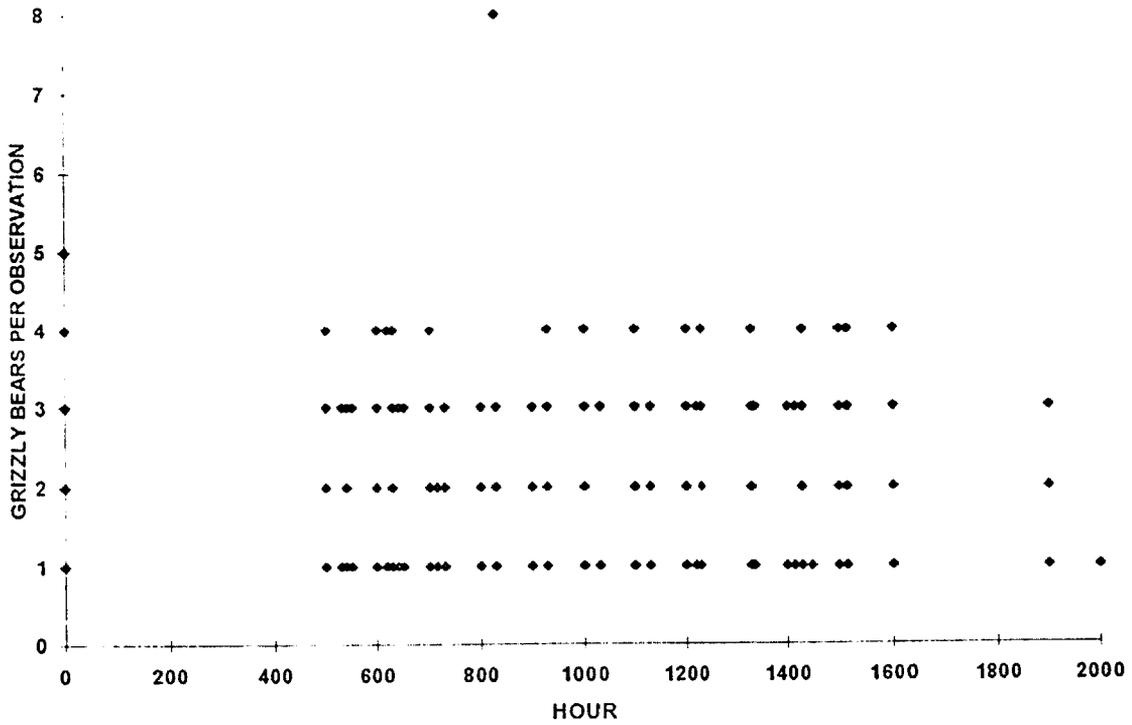


FIG. 120A. MEAN NUMBER OF GRIZZLY BEARS PER OBSERVATION BY HOUR OF BUS DEPARTURE, 1988

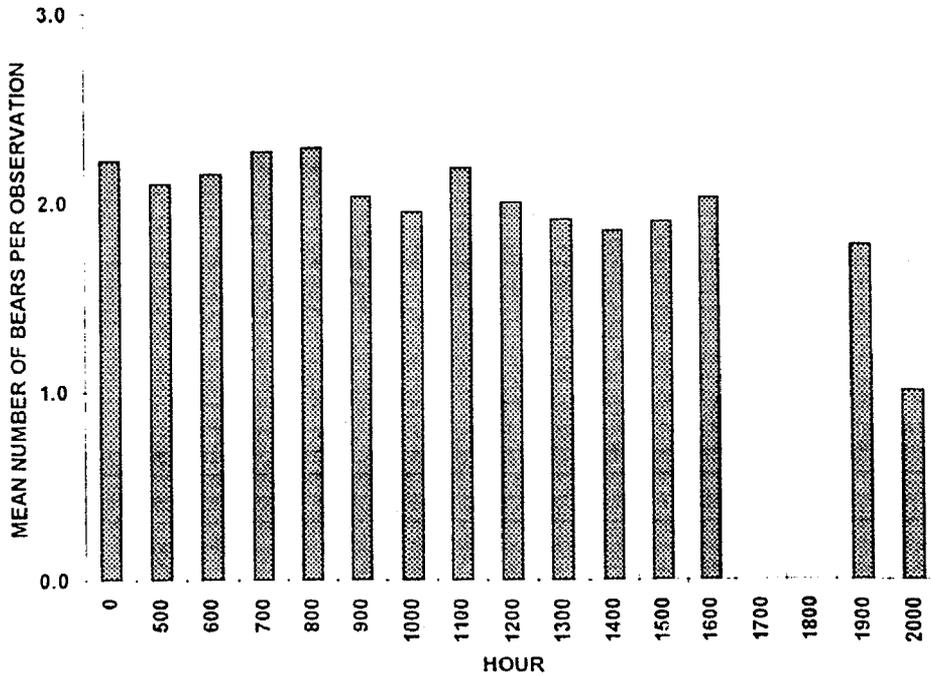
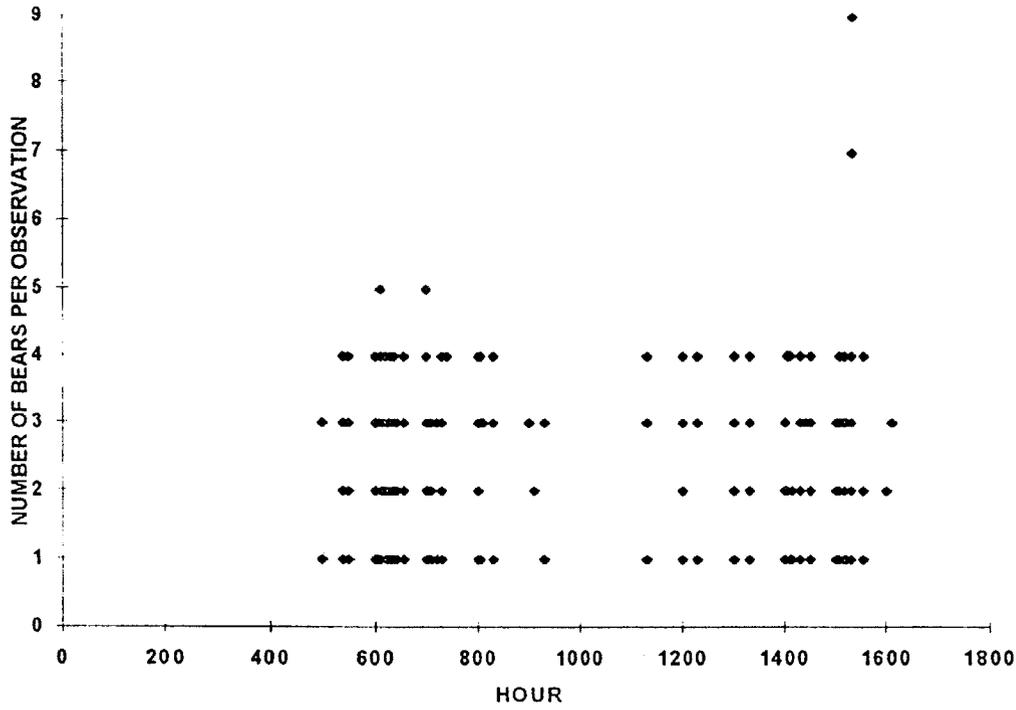


FIG. 121. NUMBER OF GRIZZLY BEARS PER OBSERVATION BY HOUR, 1989



Hour of bus departure was compared with the number of bears per observation for 1988 and 1989 (Figs. 120, 120A, 121 & 121A). The data indicate there was no difference in number of bears per observation in early departure versus later departure times. The mean number of bears observed by hour of bus departure was slightly less in 1988 compared to 1989 (Figs. 120A & 121A). Distances grizzly bears were recorded from the road showed no definitive pattern of change through the seasons of 1988 and 1989 (Figs. 122 & 123). The number present on the road (category 0) and to 100 m (categories 1-10) varied through the season, but there was no pattern to indicate movement away from the road as the season progressed. Categories 11 (100-200 m), 12 (200-300 m), 13 (300-400 m), and 14 (>400 m) were levels of highest recorded number of observations (Figs. 122 & 123).

The percent of observations by distance category showed a remarkable similarity between the four years (Figs. 124-127). Categories 0-10 (note: for 1990 and 1991, 0 was included with 1), varied less than 2% between years. Categories 11-14 varied less than 7% between the four years, indicating a relative stability of grizzly bear distances from the road through the summer season.

FIG. 122. GRIZZLY BEAR OBSERVATIONS BY DISTANCE CATEGORY BY JULIAN DATE, 1988

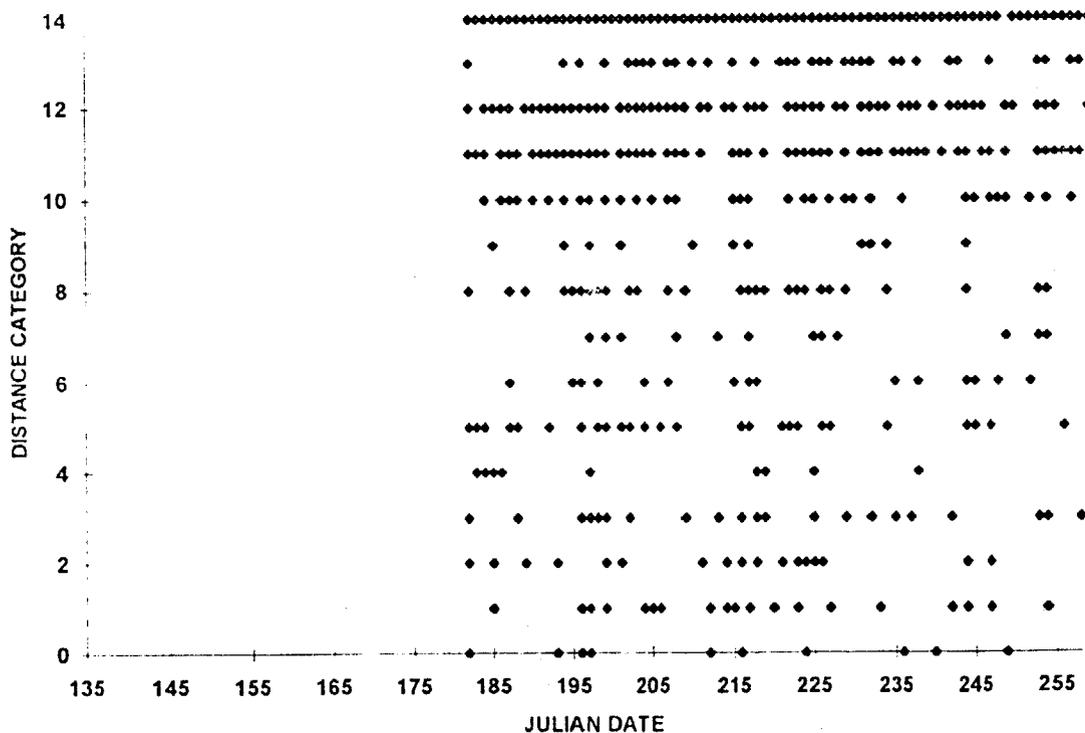


FIG. 123. GRIZZLY BEAR OBSERVATIONS BY DISTANCE CATEGORY BY JULIAN DATE, 1989

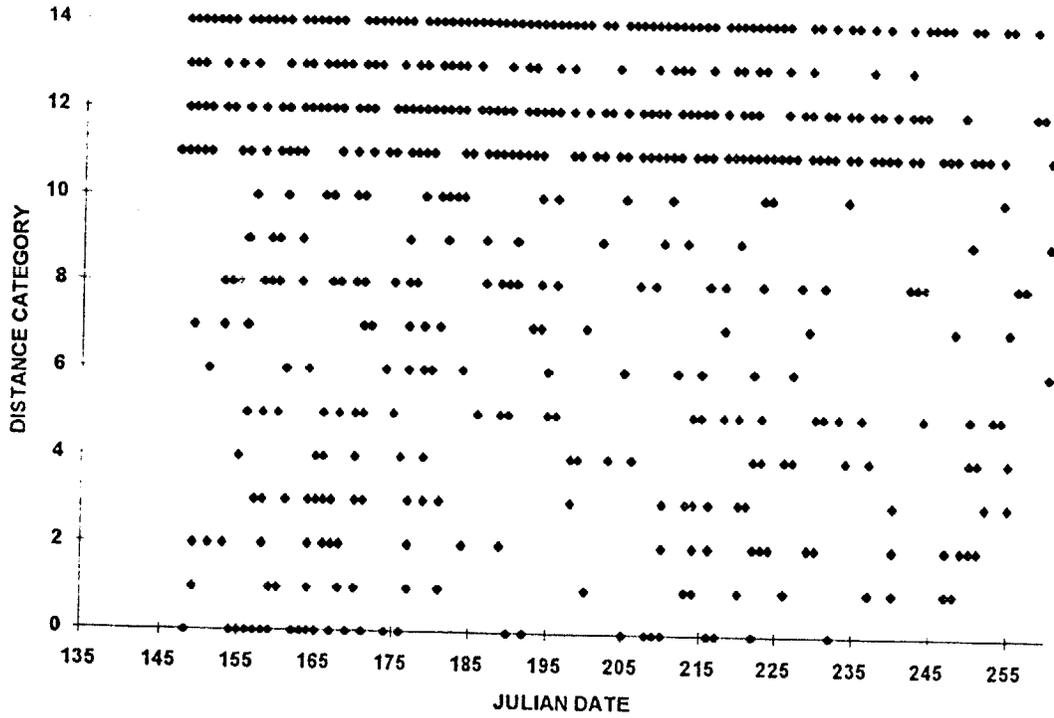


FIG. 124. % OF GRIZZLY BEAR OBSERVATIONS BY DISTANCE CATEGORY, 1988

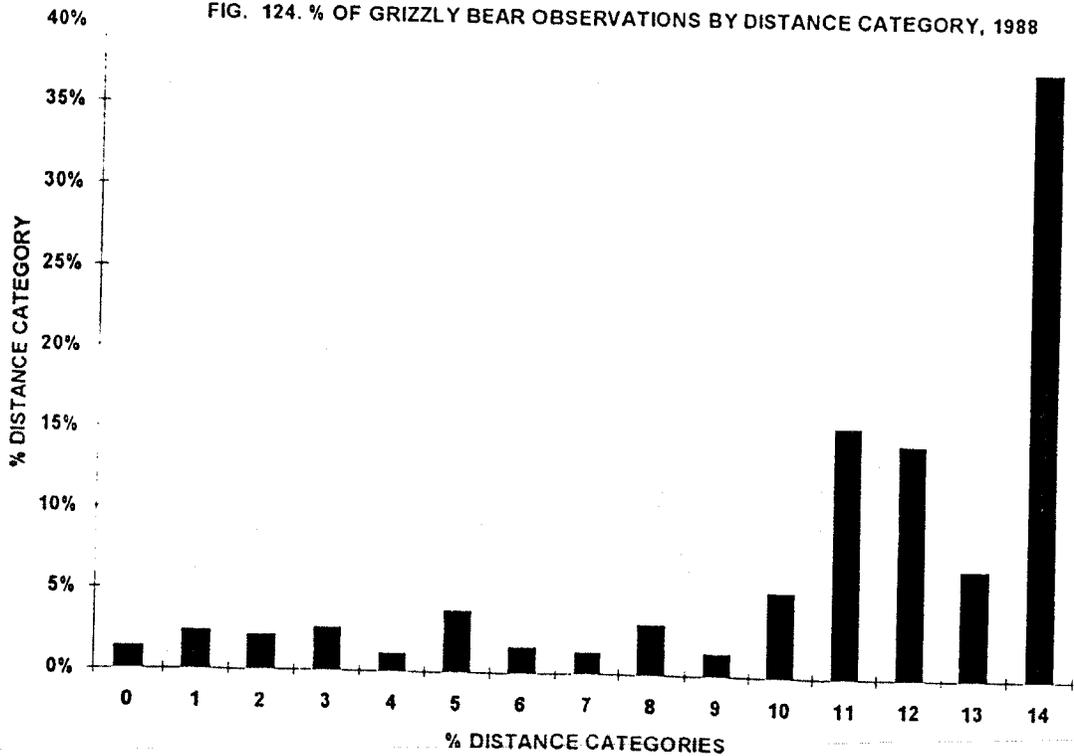


FIG. 125. % OF GRIZZLY BEAR OBSERVATIONS BY DISTANCE CATEGORY, 1989

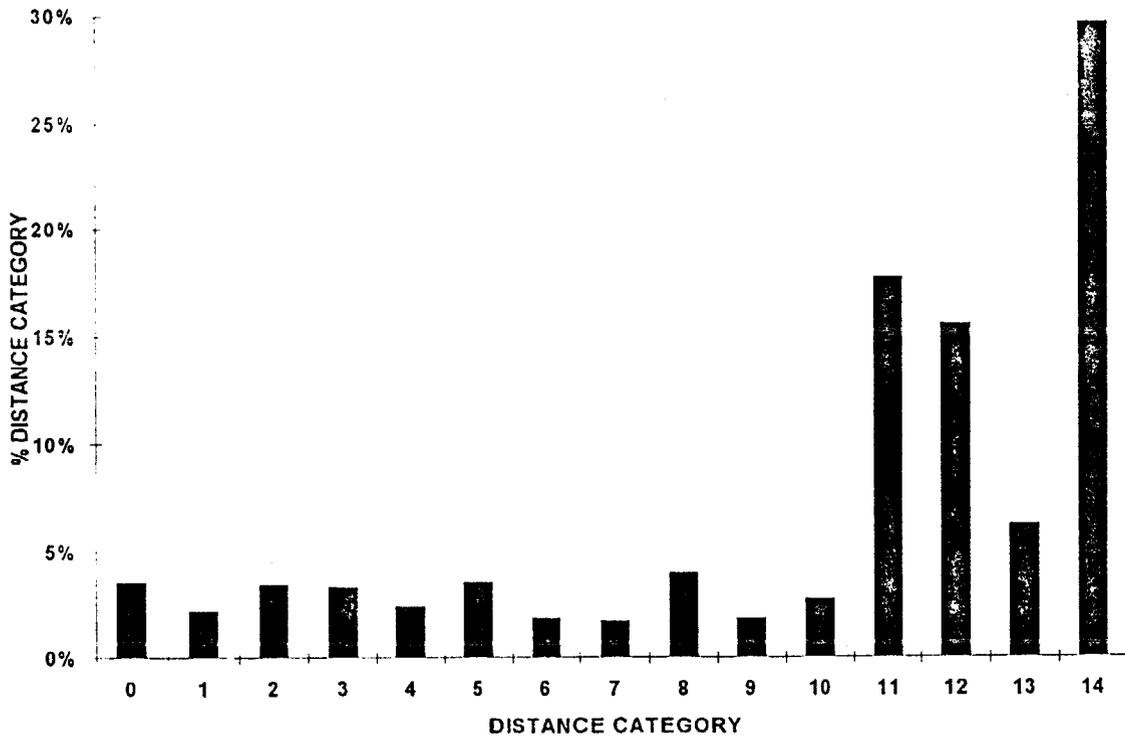


FIG. 126. % OBSERVATIONS OF GRIZZLY BEARS BY DISTANCE CATEGORY, 1990

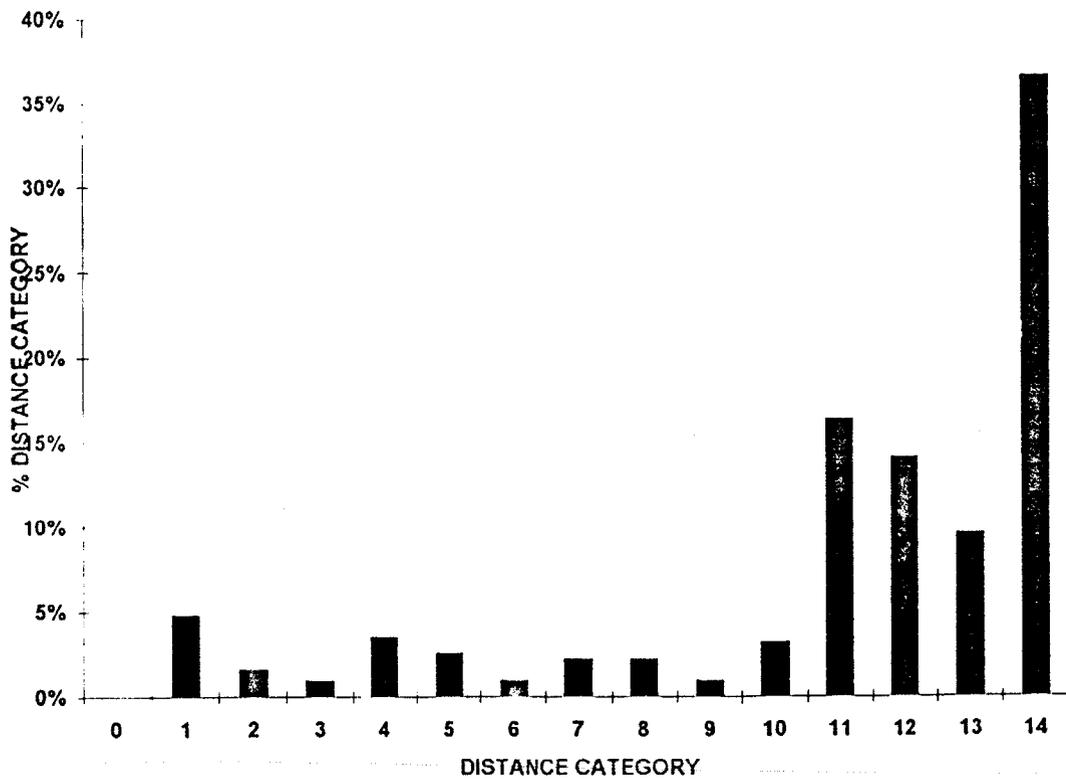
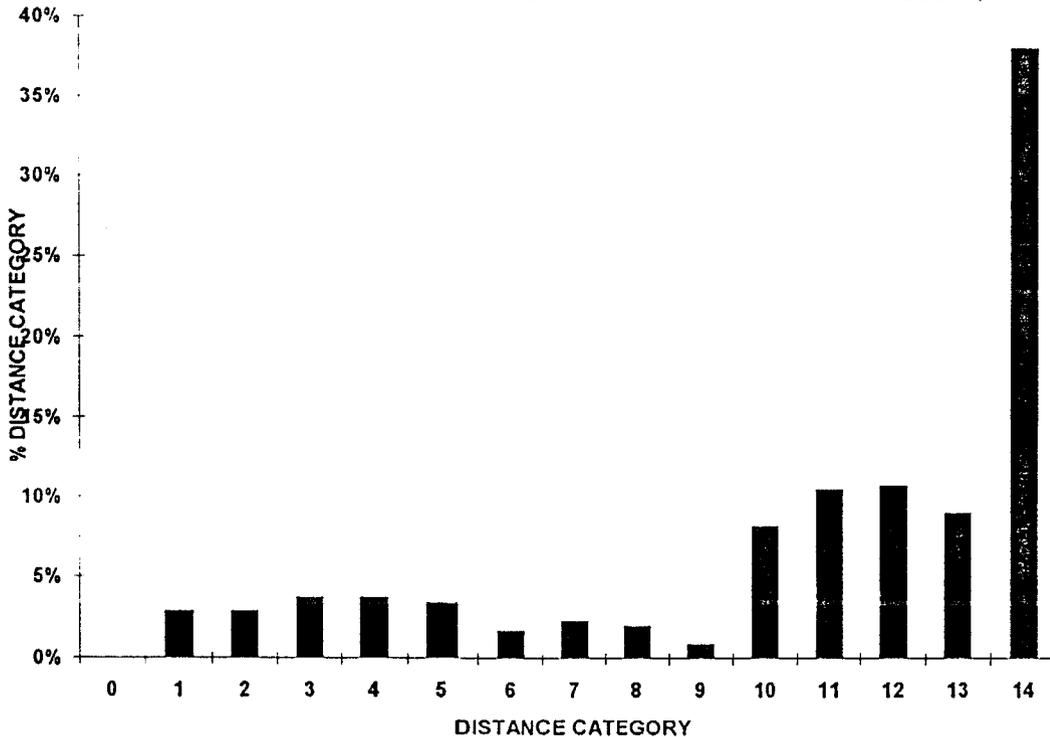


FIG. 127. % OBSERVATIONS OF GRIZZLY BEARS BY DISTANCE CATEGORY, 1981



The number of young grizzly bears per observation changed little throughout the seasons of 1988 and 1989 (Figs. 128 and 129). The number of triplets fluctuated on a daily basis during both years. With few exceptions, twins were observed on a daily basis, but observations of single cubs varied daily.

The number of triplets, twins, and single cubs observed changed little by hour of the day observation buses started their trip, thus indicating early morning departures offer little advantage to number of young bears observed (Figs. 130 & 131).

Location of young grizzly bears by group size is almost identical to that for total bears (Figs. 132 & 133 compared to Figs. 106 & 107). Young were recorded from milepost 6 to milepost 80 (Figs. 132 & 133). Observations of triplets were restricted to locations between milepost 30 and 78. During 1988 and 1989, observations of twins occurred at greater ranges than for triplets and for single young (Figs. 132 & 133).

Single and twin grizzly bear young were recorded at nearly every elevation range along the road (Figs. 134 & 135). Triplets were confined to areas above 2700 ft. Occurrence of young at

elevation levels is similar to that for all bears (Figs. 114 & 115).

FIG. 128. NUMBER OF YOUNG GRIZZLY BEARS PER OBSERVATION BY JULIAN DATE, 1988

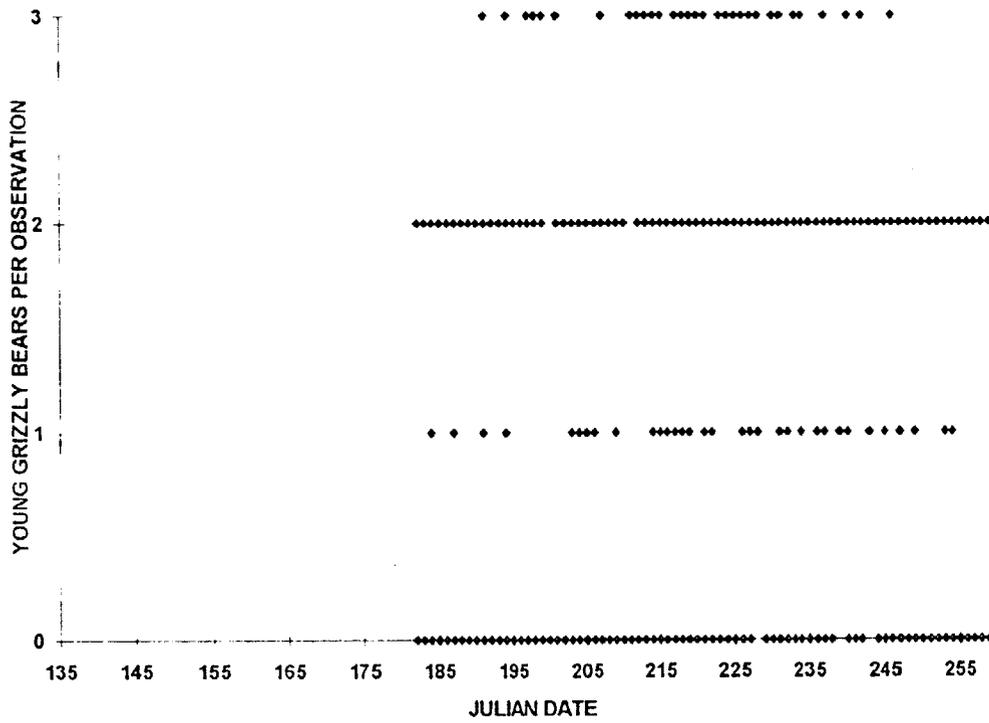


FIG. 129. NUMBER OF YOUNG GRIZZLY BEARS PER OBSERVATION BY JULIAN DATE, 1989

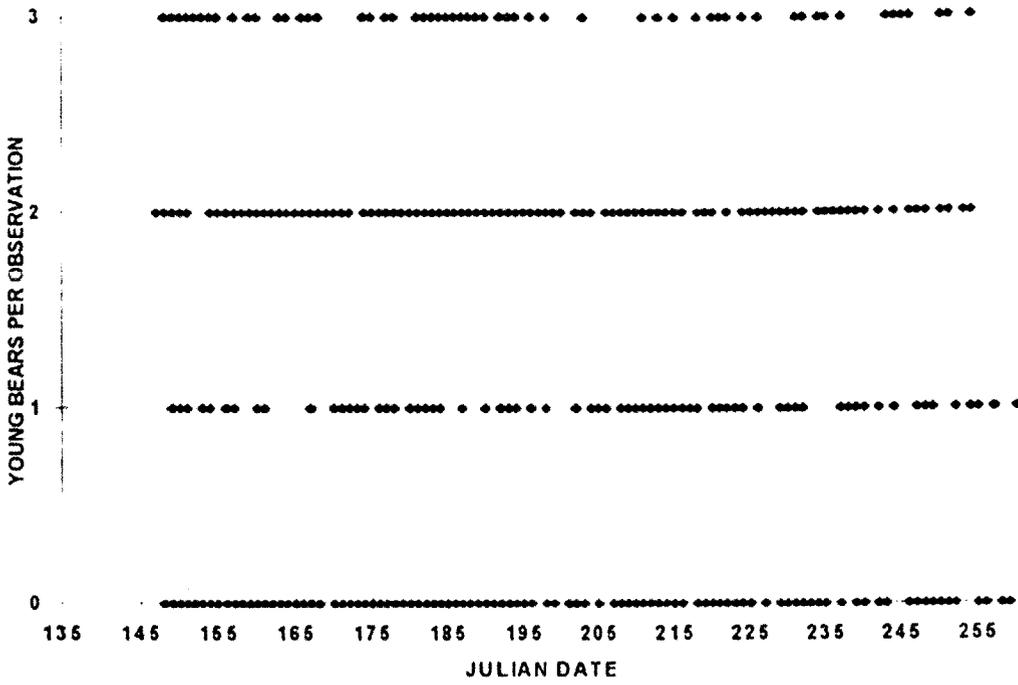


FIG. 130. NUMBER OF YOUNG GRIZZLY BEARS PER OBSERVATION BY HOUR OF BUS DEPARTURE, 1988

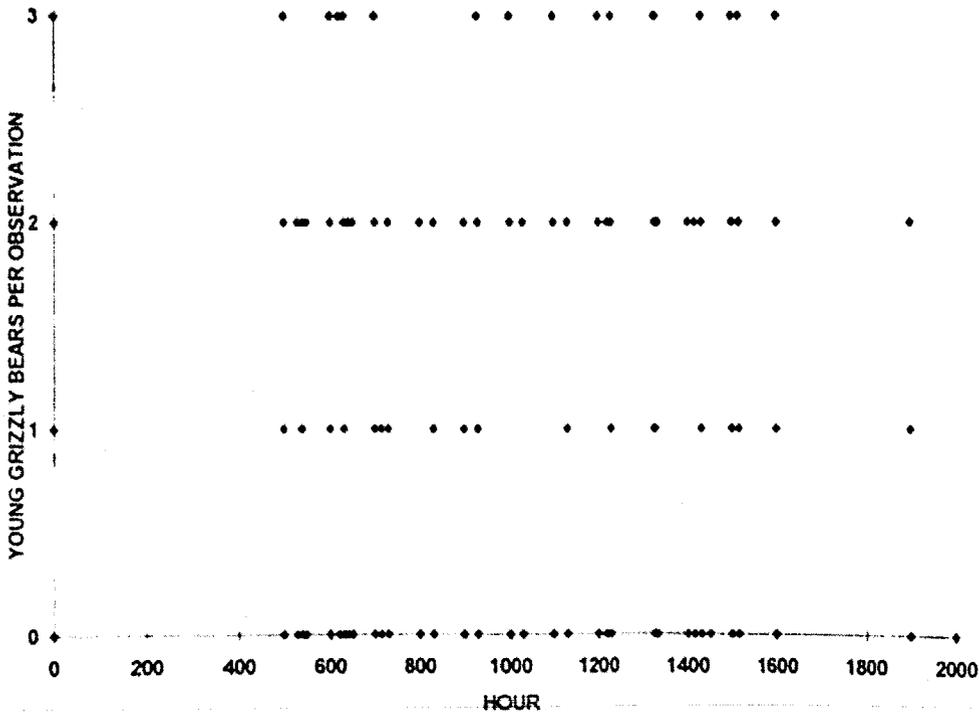


FIG. 131. NUMBER OF YOUNG GRIZZLY BEARS OBSERVED BY HOUR OF BUS DEPARTURE, 1989

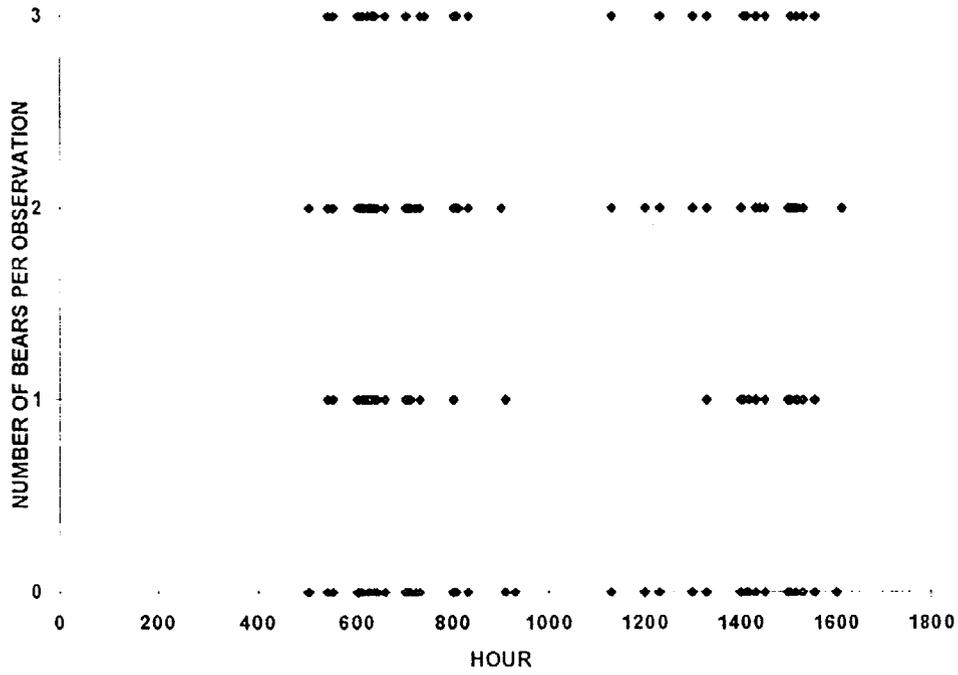


FIG. 132. NUMBER OF YOUNG GRIZZLY BEARS PER OBSERVATION BY MILEPOST, 1988

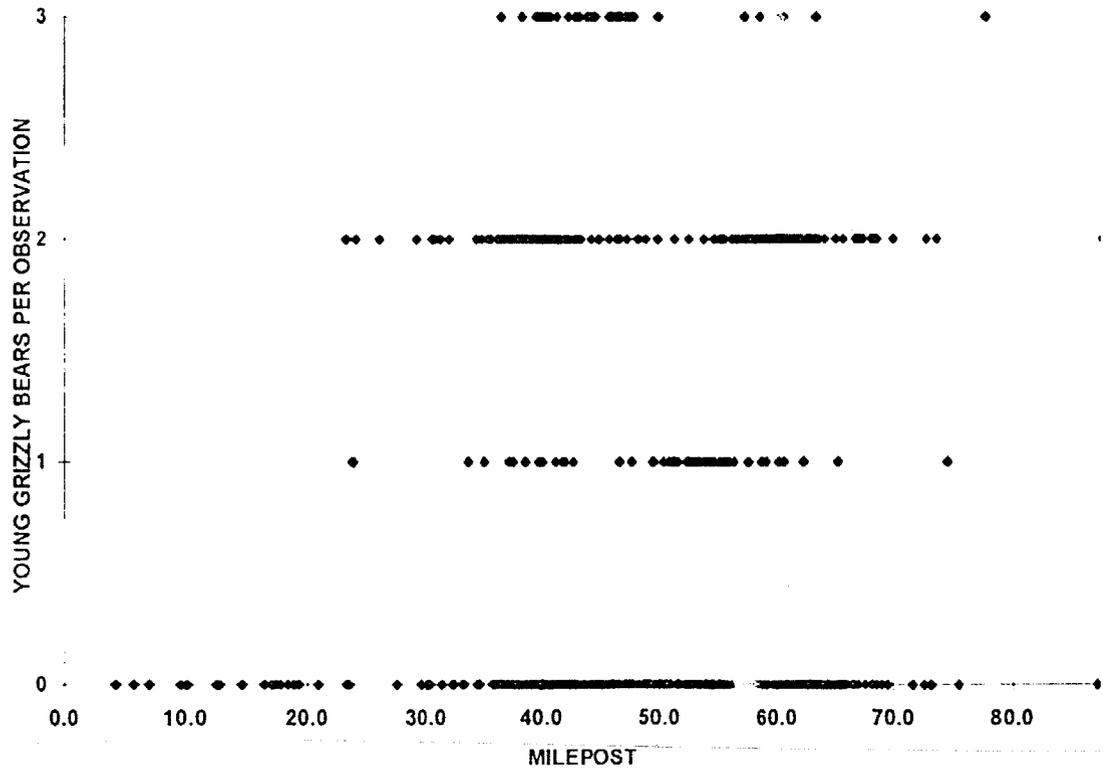


FIG. 133. NUMBER OF YOUNG GRIZZLY BEARS PER OBSERVATION BY MILEPOST, 1989

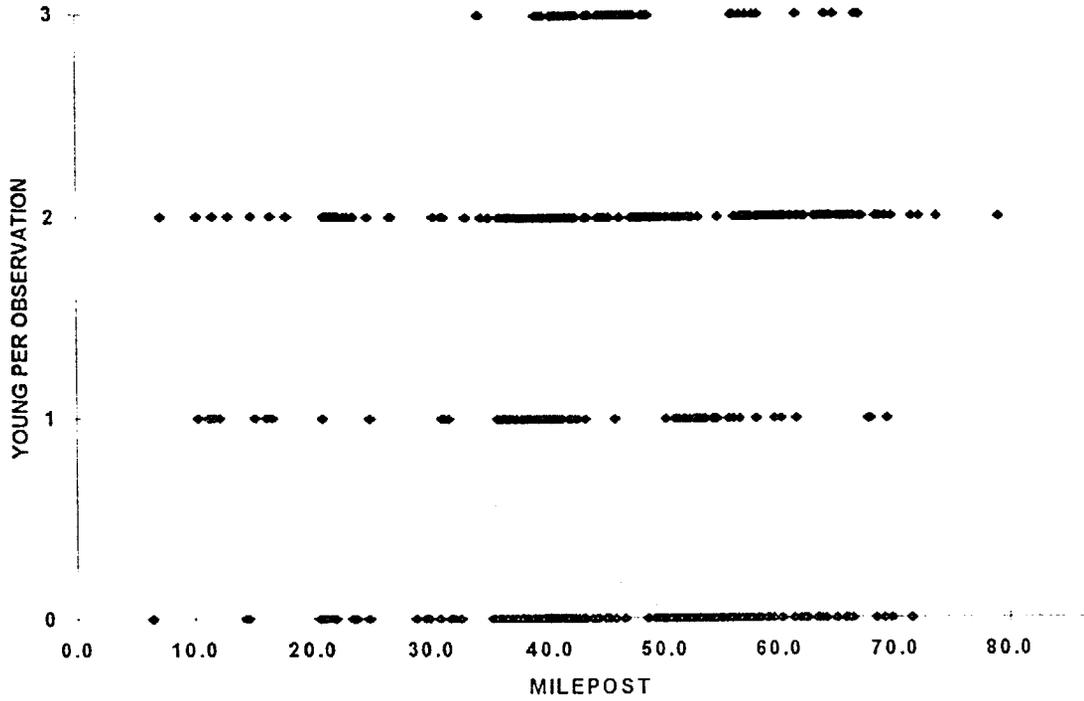


FIG. 134. NUMBER OF YOUNG GRIZZLY BEARS PER OBSERVATION AT ELEVATION, 1988

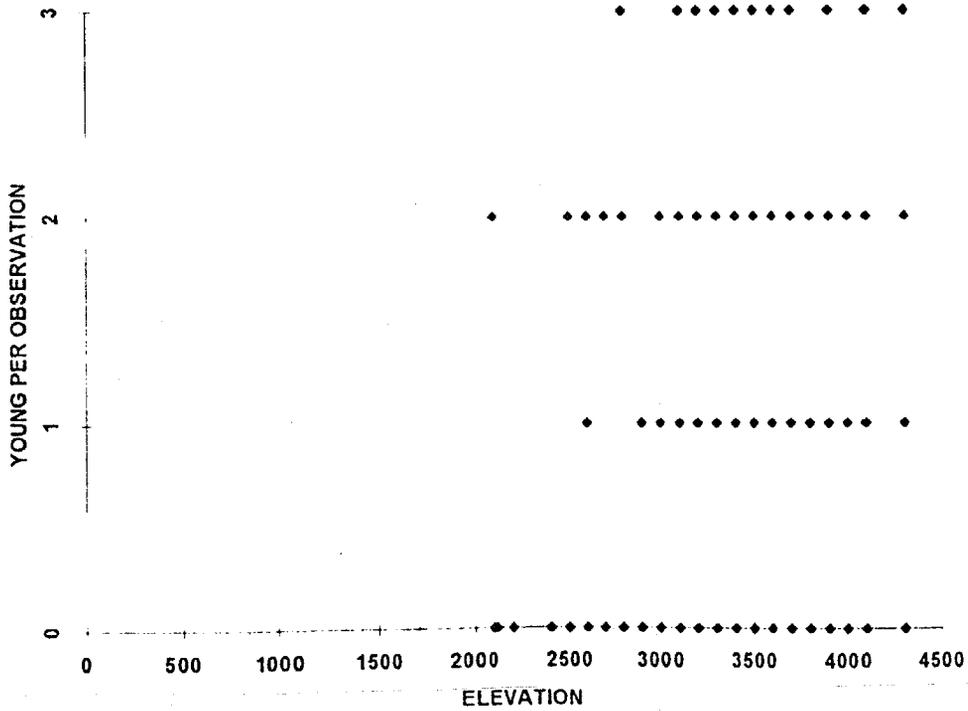
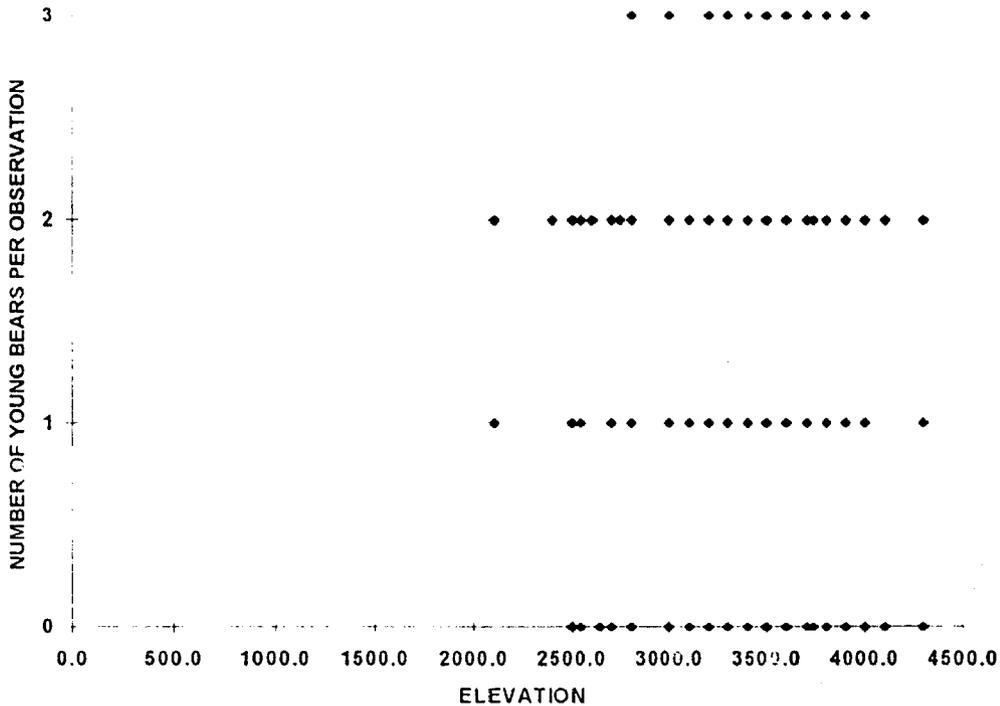
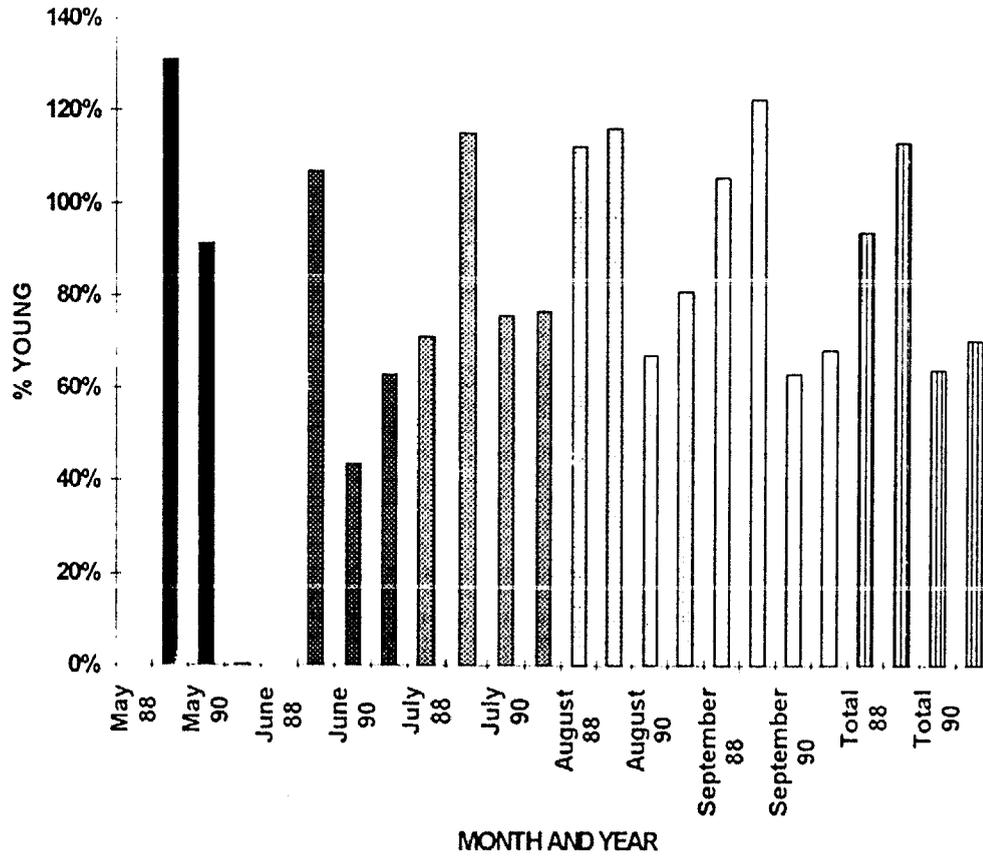


FIG. 135. NUMBER OF YOUNG GRIZZLY BEARS PER OBSERVATION AT ELEVATION, 1989



The total number of young bears observed by month and year was compared to total number of adult bears observed by month and year (Fig. 136). The percentage of bears that were young fluctuates considerably during May and June and is a poor indicator of the percent young that will be observed during the season. Both highest and lowest percentages of young were recorded during the month of May. The percentage increased from June to July each year, indicating stability of the numbers observed is not reached until July. The number present during July, August, and September is relatively stable and reflects the percent young that will be recorded for the year.

FIG. 136.% YOUNG GRIZZLY BEARS BY MONTH AND YEAR



MOOSE

More passengers observed moose during May and June than during the other months (Table 68). Sixty-two to 93% of passengers observed moose during these months, a time when moose are calving. The lowest percentage of observations occurred during July and August when 36% to 64% of passengers observed moose. Percentage of passengers who observed moose increased during September, from July and August levels, with 40% to 66% of passengers reporting observations (Table 68).

Annually, the percentage of total passengers who observed moose varied from 51 to 62%. The lowest percentage of observations of moose occurred, by month and year, during 1990.

The percentage of moose observed from shuttle and tour buses varied by month and year, with neither system showing an advantage. In 1988 and 1989, a higher percentage of passengers observed moose from shuttle buses than from tour buses during 4 months. During 3 months more passengers observed moose from tour than shuttles, and the percentage of observations was even between the two systems one month. The percentage observation was 55% for shuttle and 56% for tour for 1988, and 63% for shuttle and 61% for tour during 1989.

Table 68. Percentage of passengers who observed moose by month and year.

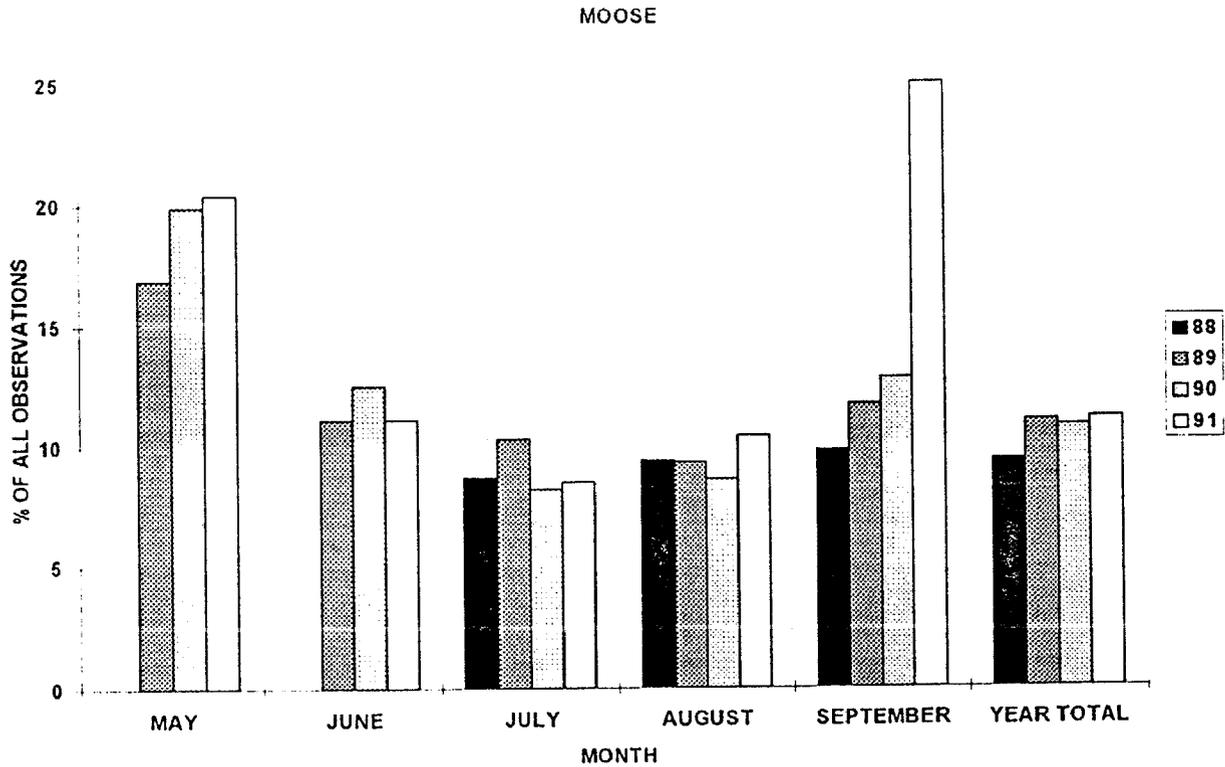
SPECIES	YEAR	MONTH	PASSENGER OBSERVERS	TOTAL PASSENGERS	PERCENT WHO OBSERVED
MOOSE	1988 SHUTTLE	JULY	1470	2781	52.86
		AUGUST	1353	2469	54.80
		SEPTEMBER	659	1045	63.06
		TOTAL	3482	6295	55.31
	TOUR	JULY	2881	5494	52.44
		AUGUST	3345	5250	63.71
		SEPTEMBER	604	1496	40.37
		TOTAL	6830	12240	55.80
	TOTAL	JULY	4351	8275	52.58
		AUGUST	4698	7719	60.86
		SEPTEMBER	1253	2541	49.90
		TOTAL	10312	18535	55.64

Table 68. Concluded.

.....				
1989				
SHUTTLE	MAY	363	439	82.69
	JUNE	1740	2224	78.24
	JULY	952	1807	52.68
	AUGUST	944	1886	50.05
	SEPTEMBER	273	433	63.05
	TOTAL	4272	6789	62.93
TOUR	MAY	319	414	77.05
	JUNE	1937	2705	71.61
	JULY	1812	3568	50.78
	AUGUST	1981	3393	58.38
	SEPTEMBER	1003	1548	64.79
	TOTAL	7052	11628	60.65
TOTAL	MAY	682	853	79.95
	JUNE	3677	4929	74.60
	JULY	2764	5375	51.42
	AUGUST	2925	5279	55.41
	SEPTEMBER	1276	1981	64.41
	TOTAL	11324	18417	61.49
.....				
1990				
	MAY	627	715	87.69
	JUNE	1992	3231	61.65
	JULY	1336	3691	36.20
	AUGUST	1725	3508	49.17
	SEPTEMBER	608	1108	54.87
TOTAL	6288	12253	51.32	
.....				
1991				
	MAY	640	688	93.02
	JUNE	1800	2576	69.88
	JULY	2040	4025	50.68
	AUGUST	1815	3534	51.36
	SEPTEMBER	564	849	66.43
TOTAL	6859	11672	58.76	

Moose made up 8% to 24% of total observations of moose, caribou, Dall's sheep, grizzly bears and wolves, during any 1 month (Fig. 137). Lowest percentages occurred during July and August. Highest average monthly percentages occurred during May. September 1991 showed the highest single month in percentage of moose observations in comparison to other species. Observations between years varied slightly around 10% of total observations (Fig. 137).

FIG. 137. % OF TOTAL OBSERVATIONS OF CARIBOU, DALL'S SHEEP, GRIZZLY BEARS, MOOSE, AND WOLVES THAT WERE OF MOOSE.



The number of moose per observation by date varied little through the year for 1988 (Fig. 138). During 1989, no groups of three were recorded during mid summer (Fig. 139). Groups of 5-9 moose, probably groups in close proximity and recorded as one group, were noted more frequently during 1989 than during 1988 (Figs. 138 & 139).

FIG. 138. NUMBER OF MOOSE PER OBSERVATION BY JULIAN DATE, 1988

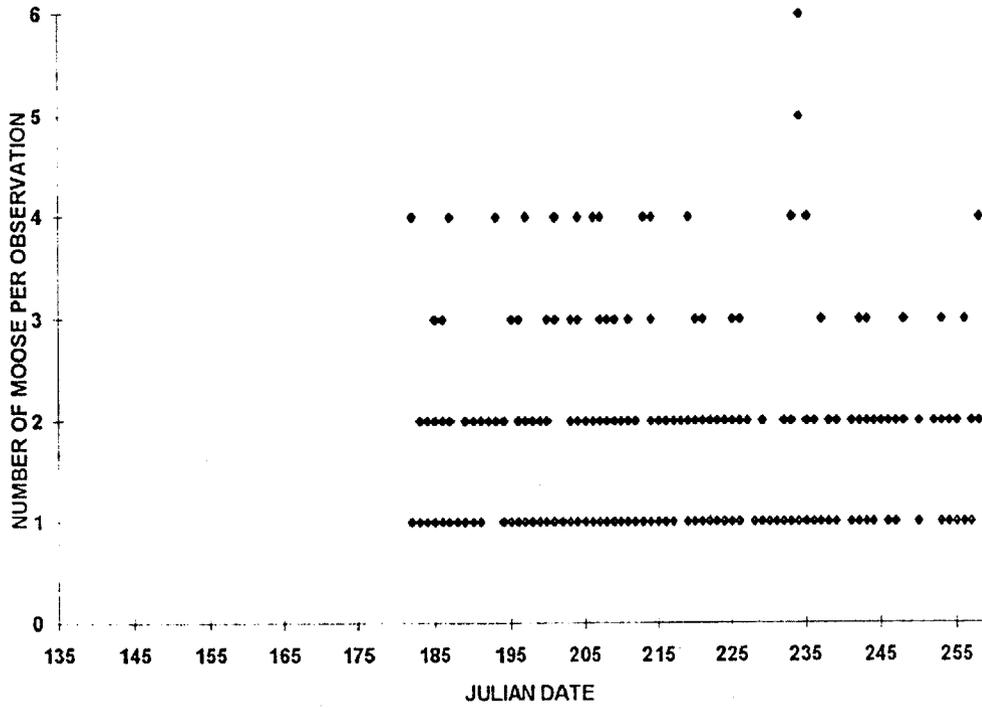


FIG. 138A. MEAN NUMBER OF MOOSE PER OBSERVATION BY MONTH, 1988

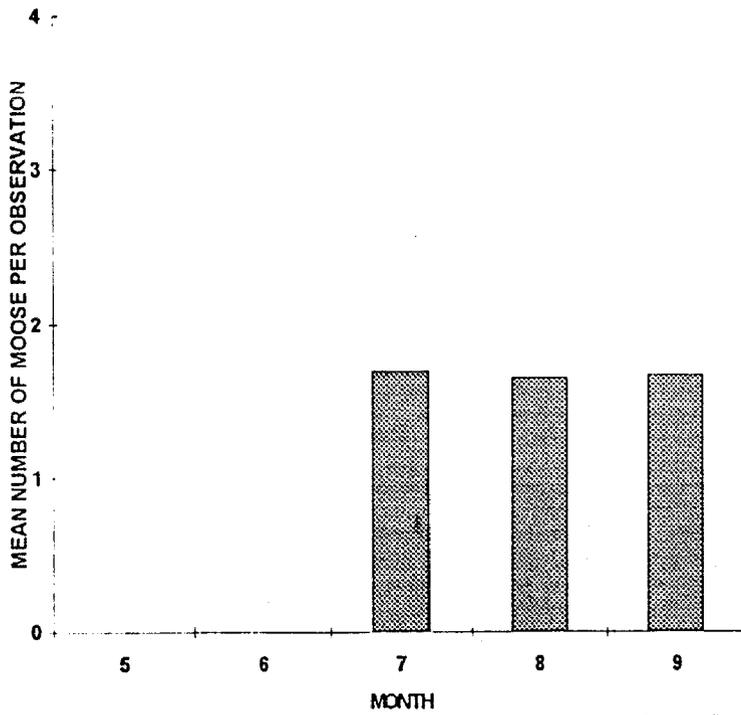


FIG. 139. NUMBER OF MOOSE PER OBSERVATION BY JULIAN DATE, 1989

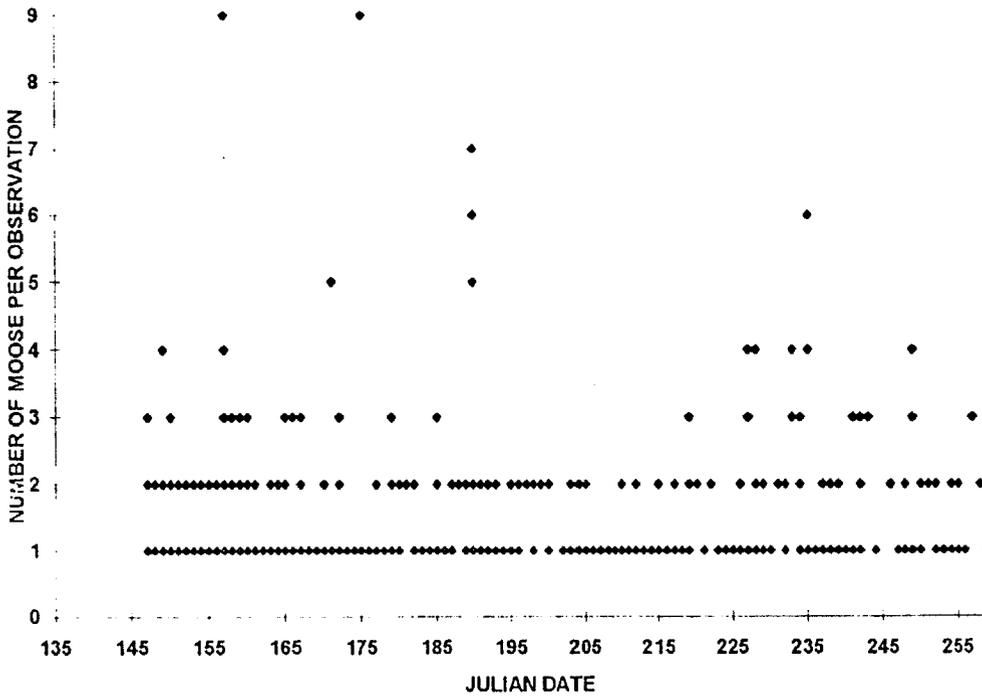
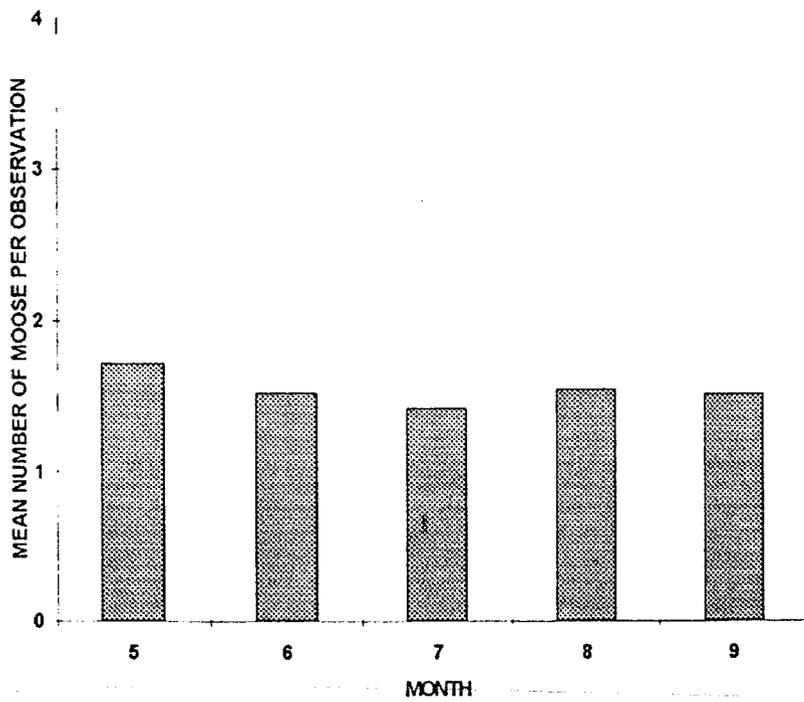


FIG. 139A. MEAN NUMBER OF MOOSE PER OBSERVATION BY MONTH, 1989



Mean number of moose per observation by month varied little between months and between years (Figs 138A & 139A). During 1988, mean number varied from 1.6 to 1.7 moose per observation in all months (Fig. 138A). During 1989, mean number per observation varied from a low of 1.3 during July to a high of 1.6 during May (Fig. 139A).

Aside from largest groups of moose being recorded from buses that departed from 0600-0800 hours, the number of moose per observation by hour varied little (Figs. 140 & 141). Moose were observed at all hours measured during the day.

Number of moose per trip by hour of bus departure (Tables 4 & 5) varied between years (Figs. 140A & 141A). During 1988, 0500-0600 hour departures resulted in highest mean number of moose per trip. No consistent pattern followed throughout the remainder of hours of record (Fig. 140A). In 1989, the mean number of moose per trip by hour of bus departure was consistently higher in morning hours compared to afternoon hours (Fig. 141A). It is unknown if the difference between the two years is the result of lack of data for May and June, 1988.

FIG. 140. NUMBER OF MOOSE PER OBSERVATION BY HOUR OF BUS DEPARTURE, 1988

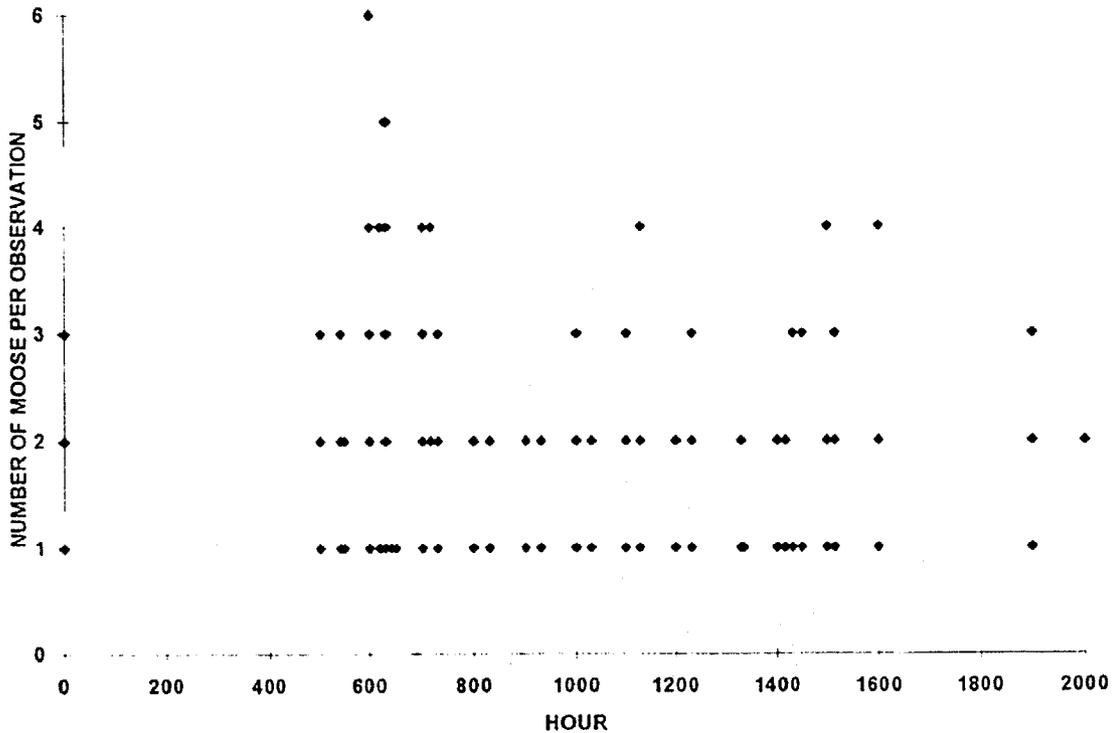


FIG. 14. MEAN NUMBER OF MOOSE PER TRIP BY HOUR OF BUS DEPARTURE, 1988

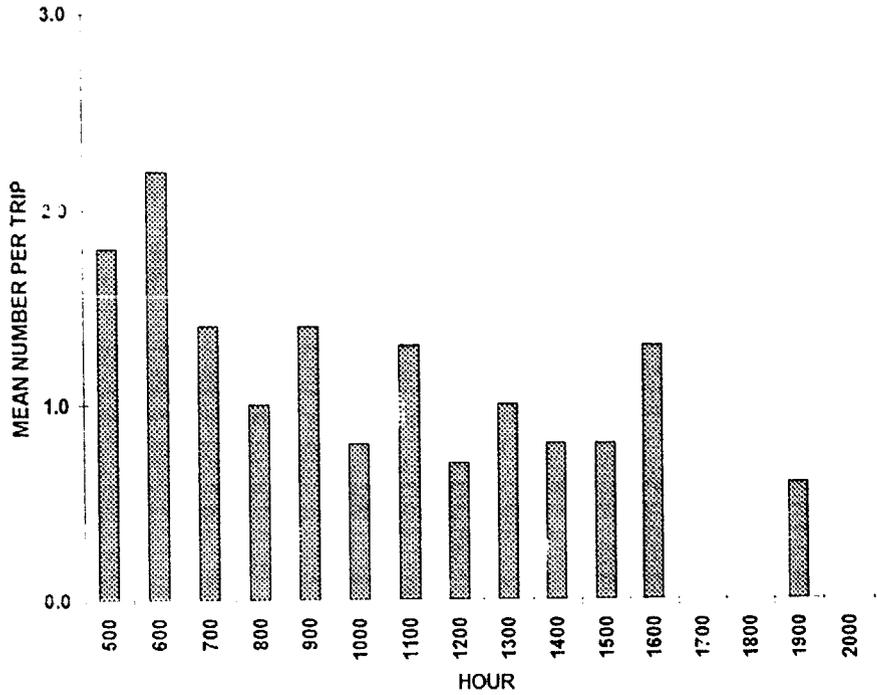


FIG. 141. NUMBER OF MOOSE PER OBSERVATION BY HOUR OF BUS DEPARTURE, 1989

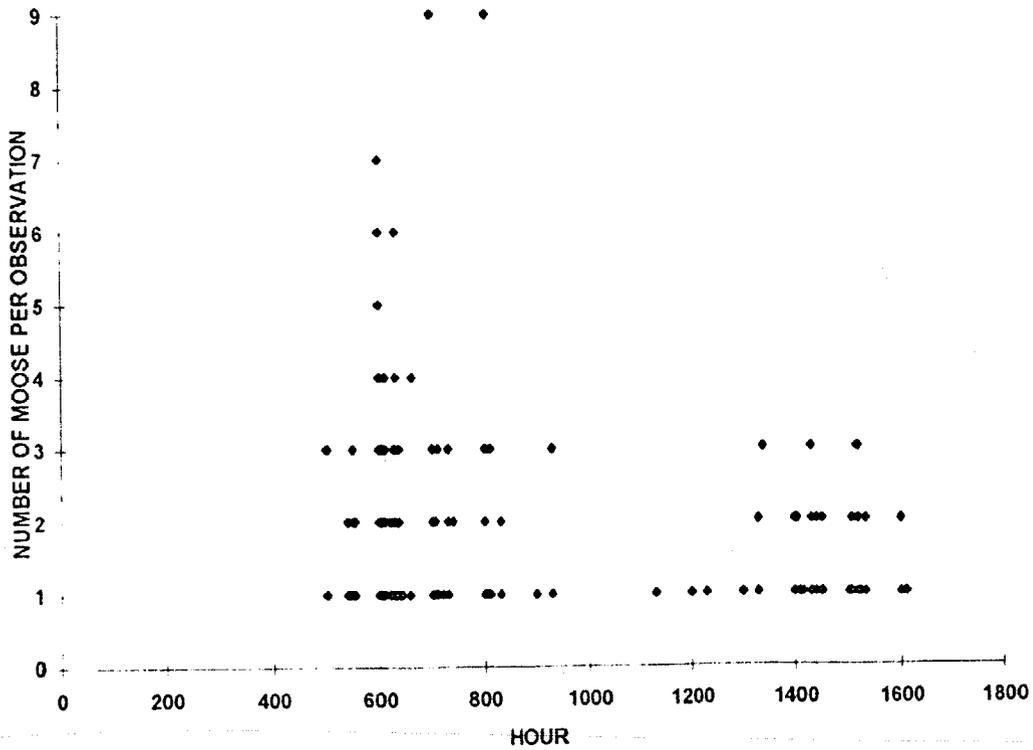


FIG. 141A. MEAN NUMBER OF MOOSE PER TRIP BY HOUR OF BUS DEPARTURE, 1989

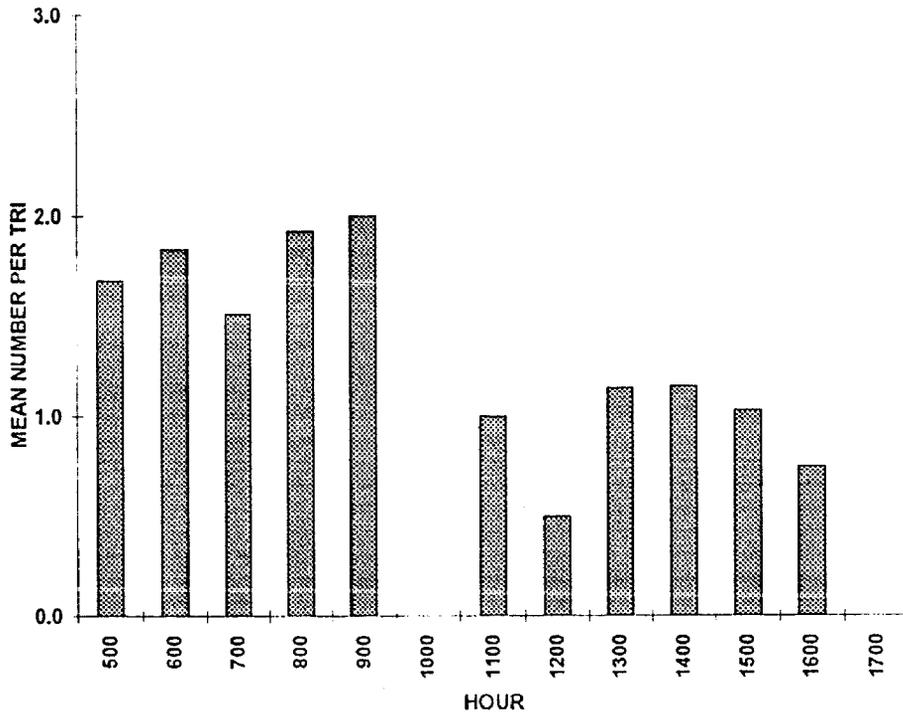


FIG. 142. NUMBER OF MOOSE PER OBSERVATION AT EACH MILEPOST, 1988

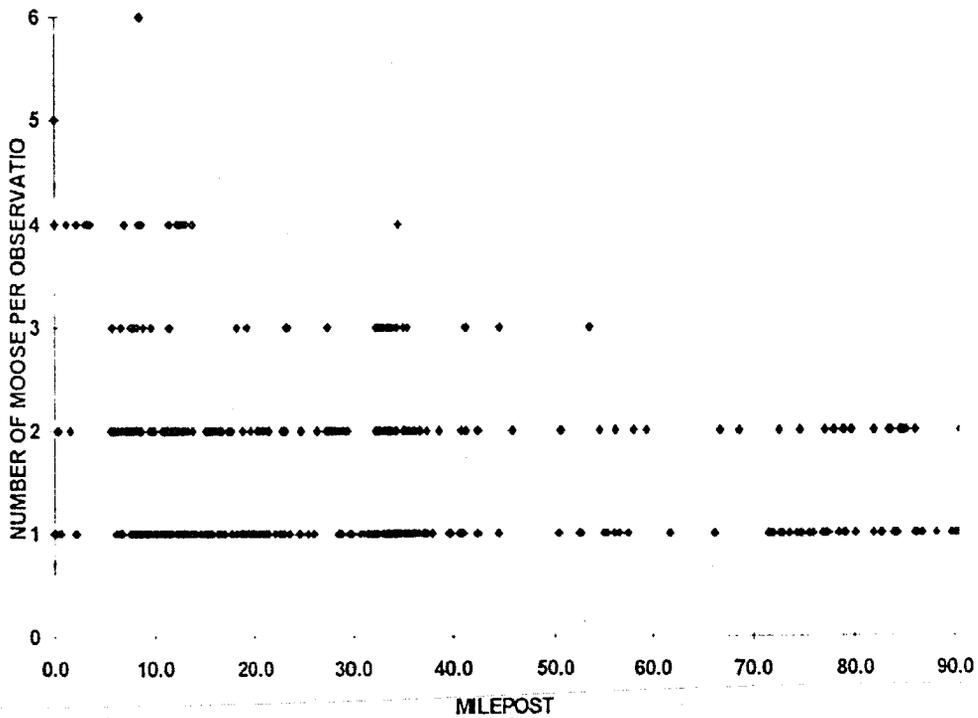
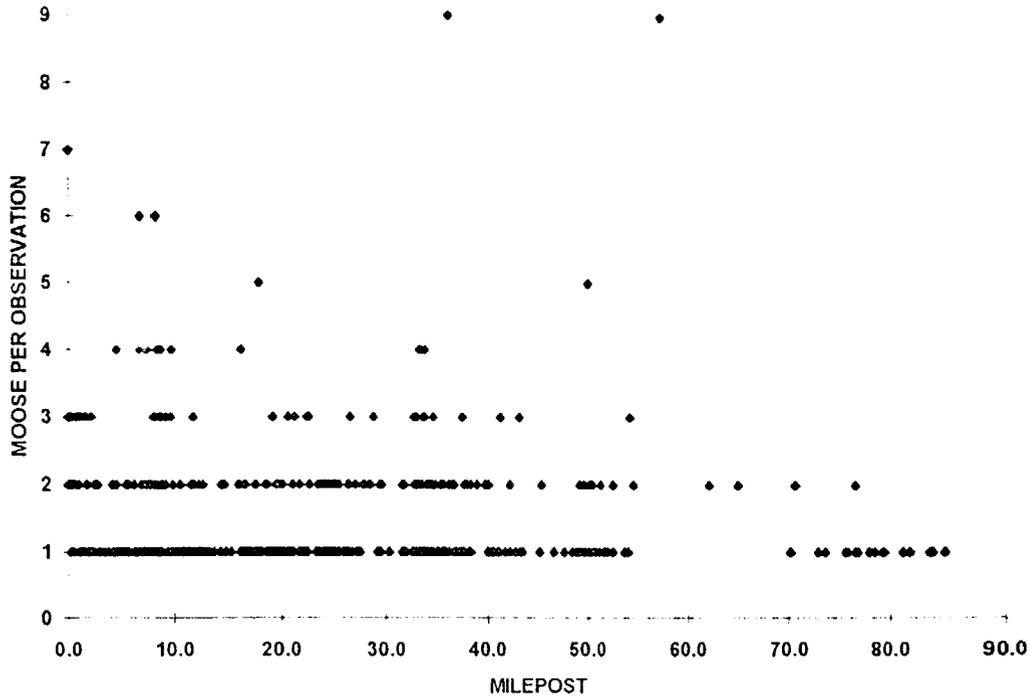


FIG. 143. NUMBER OF MOOSE PER OBSERVATION BY MILEPOST, 1989



Moose were observed at almost every milepost during 1988 and 1989 (Figs. 142 & 143). Areas where few moose observations occurred were mileposts 45-50 and 55-70. Moose in groups of 3 or larger were not observed beyond milepost 55 during either 1988 or 1989. On a more specific level, the mean number of moose per milepost per bus trip was calculated for the length of the road. These data are interpreted as indicative of moose habitat during the summer season (Figs. 144-149). During May, moose were observed from milepost 1-9, and at isolated locations to milepost 55, the end of the trip for May, hence, there were no records past that point (see Table 8) (Fig. 144). During June, locations of observations became more prevalent to milepost 50, with isolated locations to milepost 86 (Fig. 145). Pattern of location was sporadic during July, August, and September (Figs. 146-148). The most consistent pattern, with one exception, was the lack of moose reports from milepost 52-70. The exception was during August when .01 moose per trip per milepost was reported from milepost 65 (Fig. 147).

The highest mean number of moose per milepost was .06 moose per trip per milepost at milepost 9 during August. This was followed by .05 moose at milepost 2 during June, and milepost 34 during August (Figs. 145 & 147).

FIG. 144. MEAN NUMBER OF MOOSE PER MILEPOST PER BUS TRIP, MAY, 1989

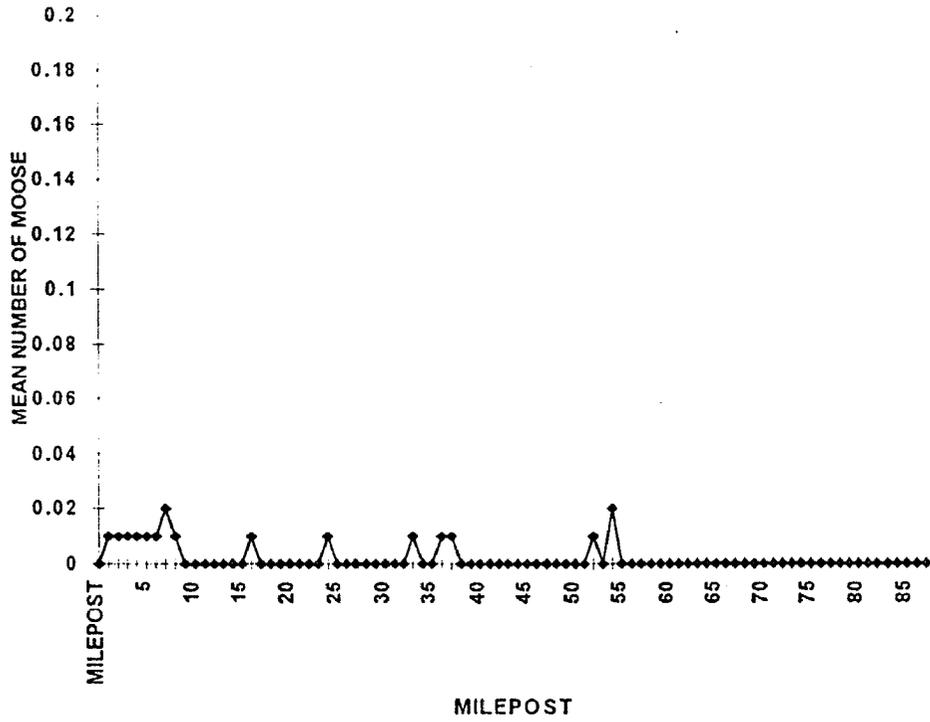


FIG. 145. MEAN NUMBER OF MOOSE PER MILEPOST PER BUS TRIP, JUNE, 1989

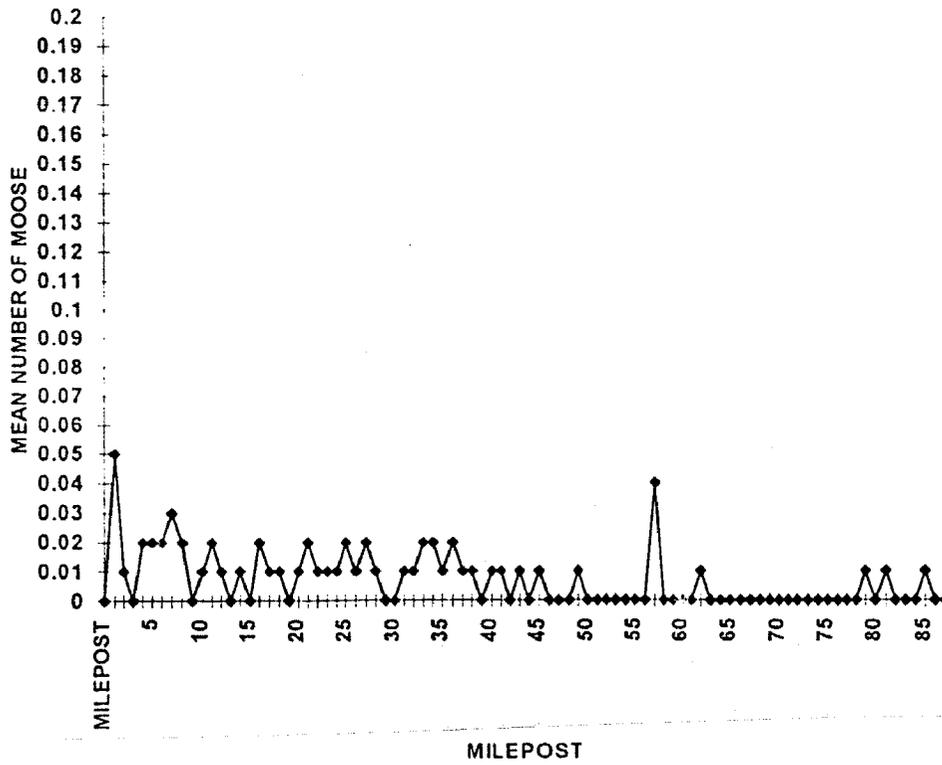


FIG. 146. MEAN NUMBER OF MOOSE PER MILEPOST PER BUS TRIP, JULY, 1989

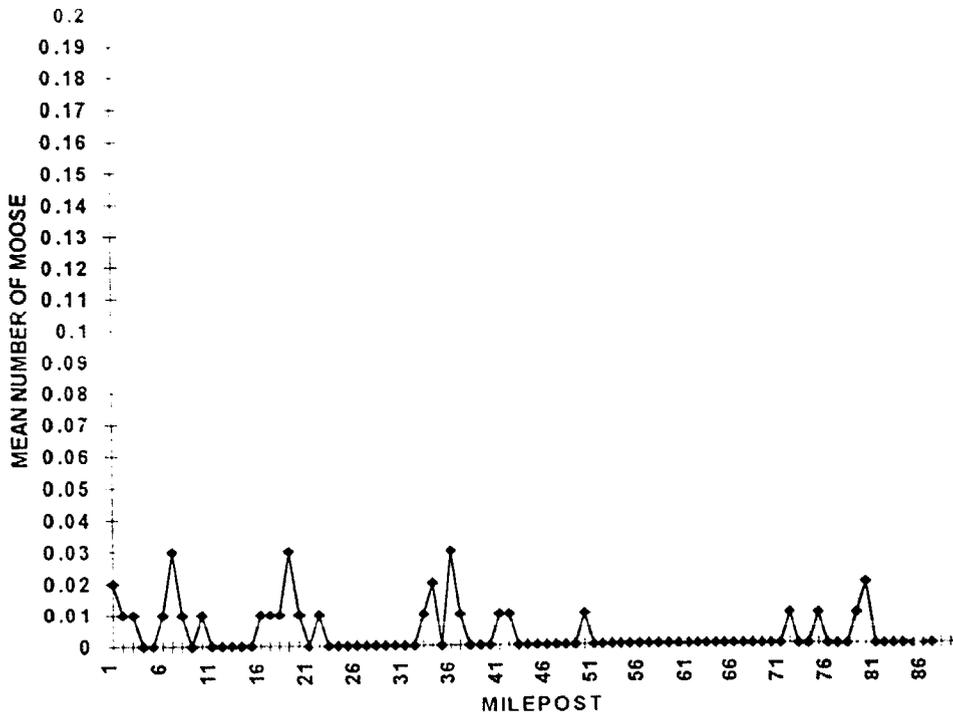


FIG. 147. MEAN NUMBER OF MOOSE PER MILEPOST PER BUS TRIP, AUGUST, 1989

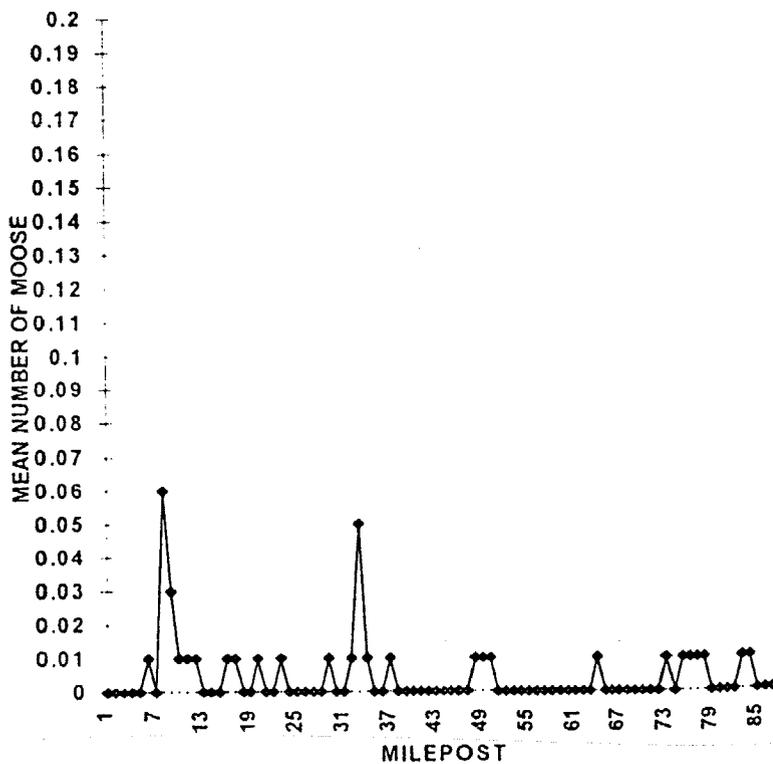


FIG. 148. MEAN NUMBER OF MOOSE PER MILEPOST PER BUS TRIP, SEPTEMBER, 1989

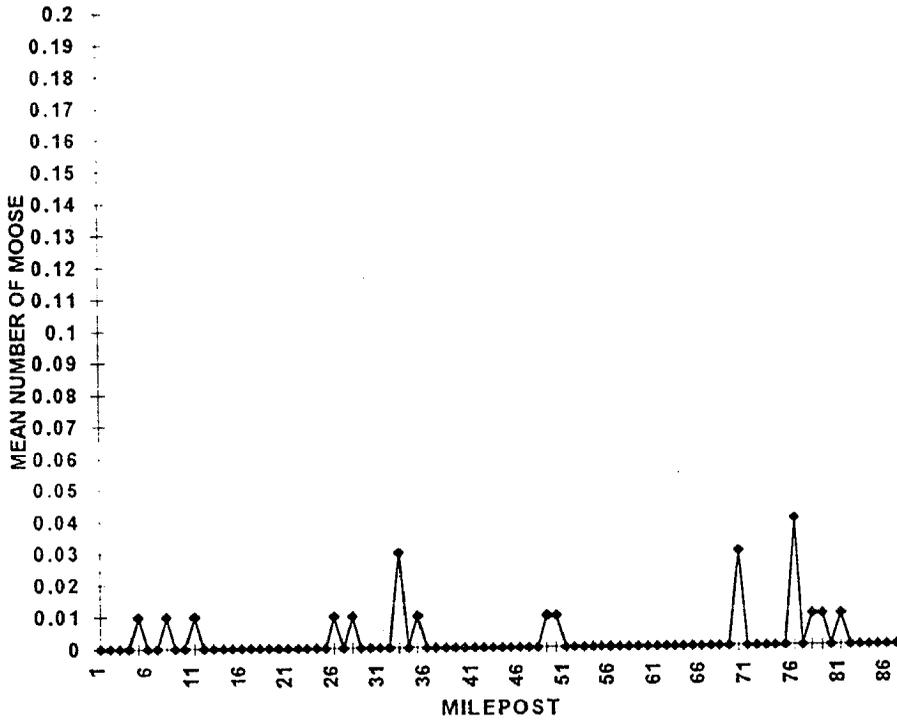


FIG. 149. MEAN NUMBER OF MOOSE OBSERVED PER MILEPOST PER BUS TRIP, 1989

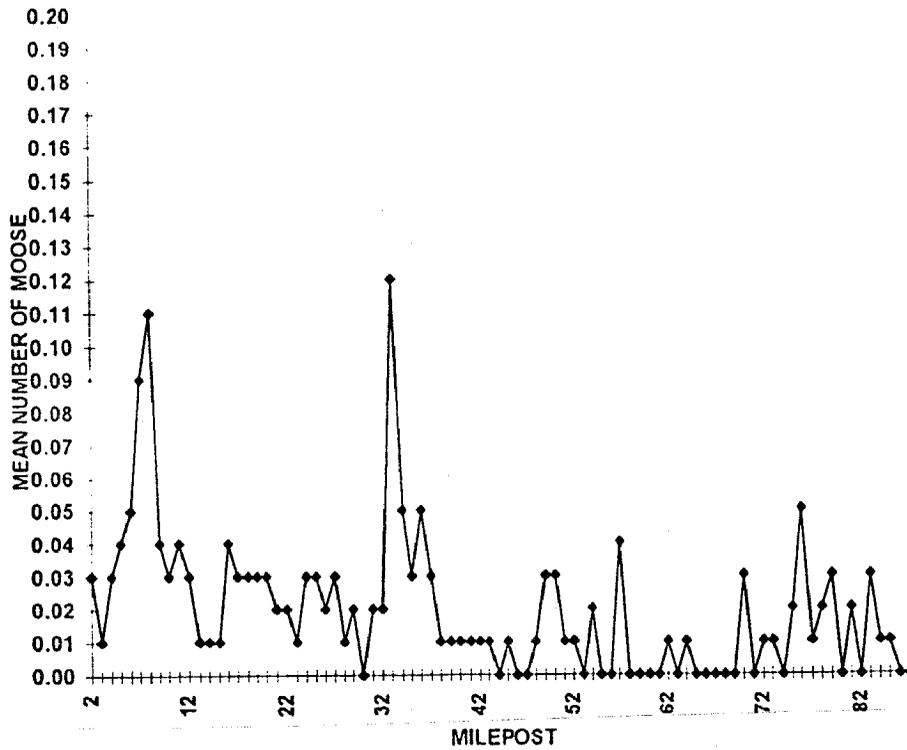
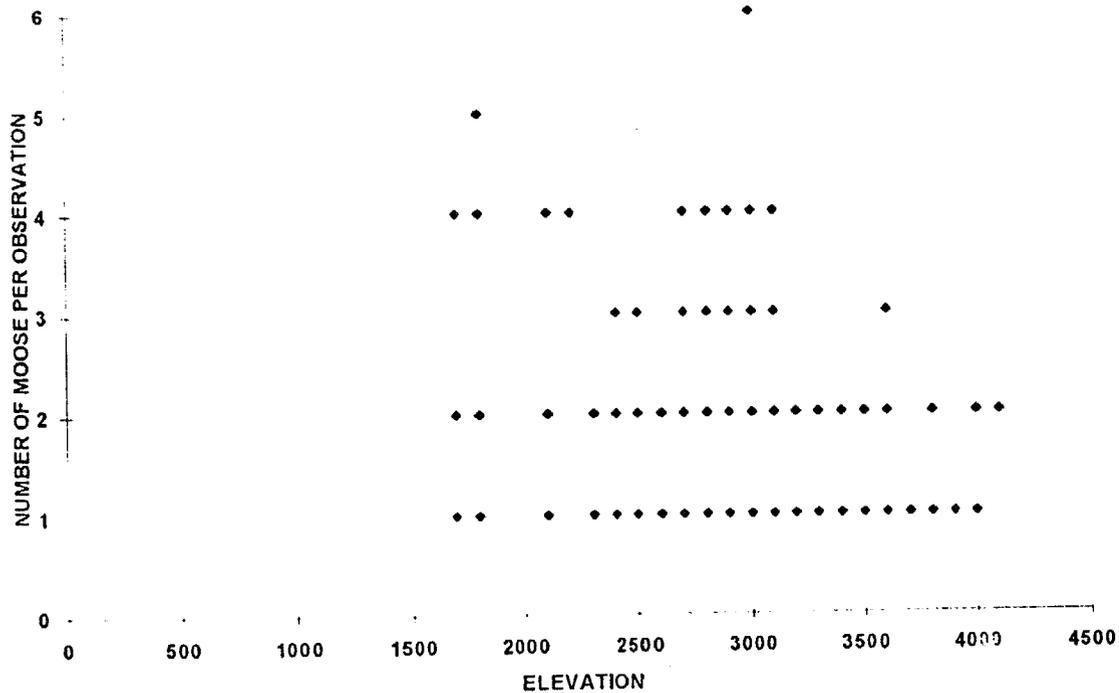


FIG. 150 NUMBER OF MOOSE PER OBSERVATION AT ELEVATION, 1988



Moose were observed frequently enough during the summer season for a minimum report of .01 moose per milepost per bus trip at 64 of the 87 mileposts (Fig. 149). The highest annual mean number was .12 moose per milepost per bus trip at milepost 33, .11 at milepost 9, and .09 at milepost 8 (Fig.149).

Moose were observed at all but 1900 and 2000 ft. elevations (Figs. 150 & 150A). Larger groups were observed in the mid ranges of elevation. Highest percentage of observations, 17% occurred at 3000 ft. elevation (Fig. 150B), which occurs near mileposts 10, 20, 33, and 70 (Fig. 2).

FIG. 150A. NUMBER OF MOOSE PER OBSERVATION AT ELEVATION, 1989

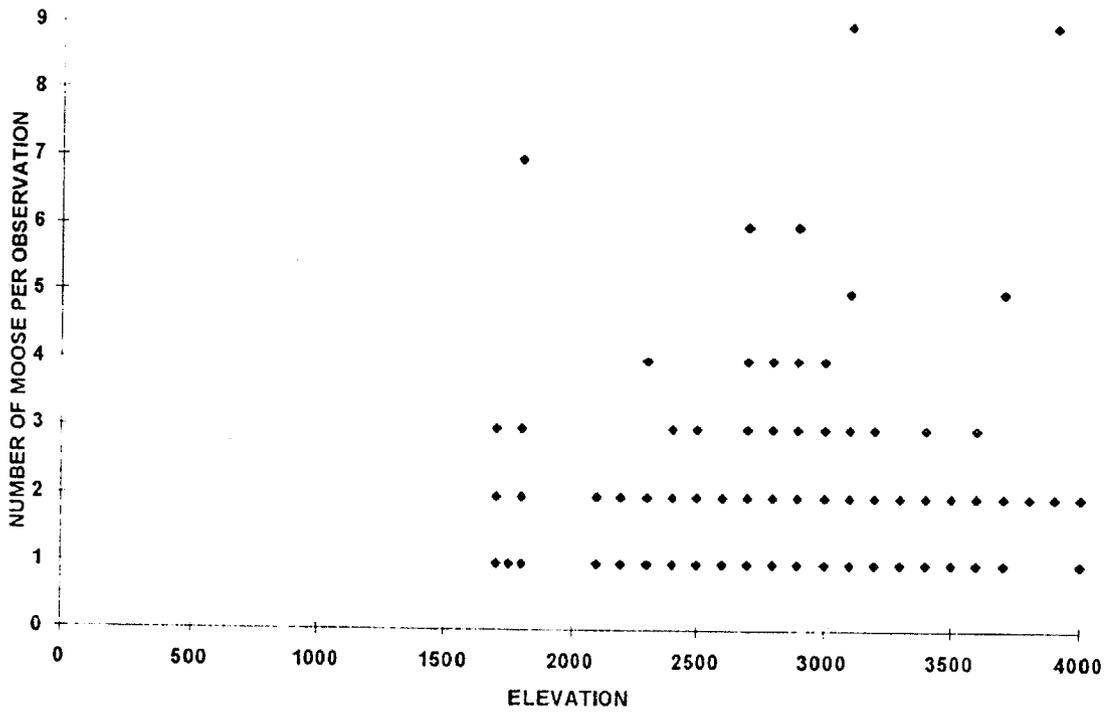
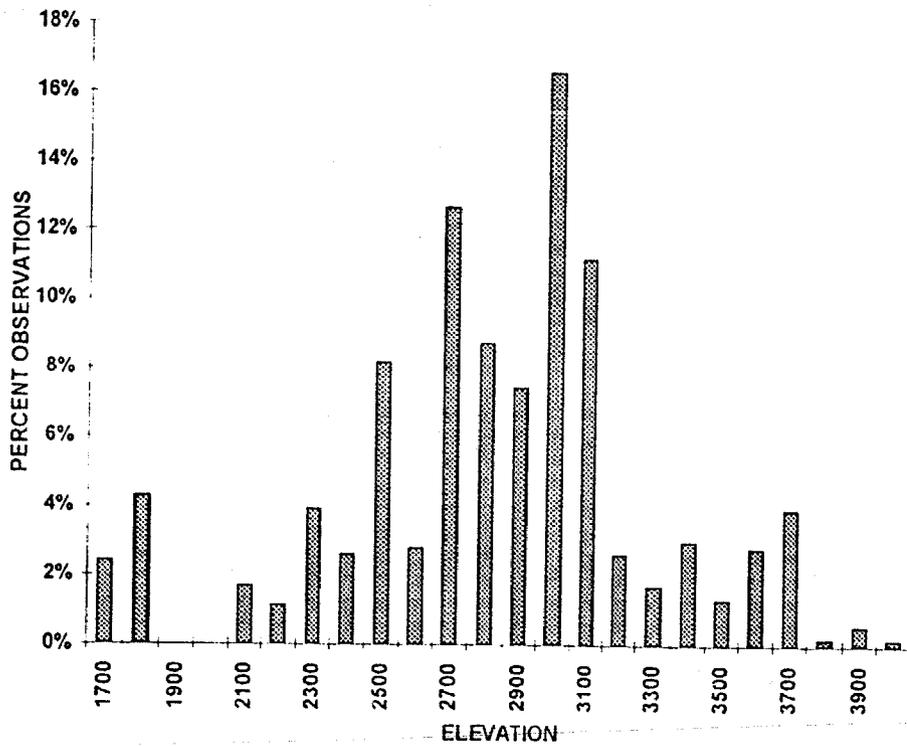


FIG. 150B. PER CENT OF MOOSE OBSERVATIONS BY ELEVATION, 1989



Moose group size fluctuated from month to month and between years (Tables 69-86 and Figs.151-154). Single moose were most common observations during all months and for all years. Group size of two was most frequently highest in May, declined during June and July, and typically increased to or exceeded May levels during August and September. Moose in groups of two were present 10% of the time more often during 1988 than during other years. Moose in groups of 3 were encountered >10% of the time 5 of the 18 months where measurements were made. Two of those records were during August, two during September, and one during June. Only once, September 1990, did group sizes of three exceed 15% (Table 81). Group size of 4 exceeded 5% only during May 1989 (Table 72). Groups of 5 and more never exceeded 5% of total observations of moose. Data forms were always checked when large group size was recorded. All records were confirmed.

Annually, approximately 65% of all stops for moose were stops to observe single animals (Figs. 151-154). The higher number of groups of two animals noted for 1988 resulted in a lower level of single individuals for that year (Fig. 151). Groups of three or more animals never exceeded 10% of the total stops for moose observations for any one year (Figs. 151-154).

Table 69. Group size, number and percentage of stops for observation of moose, July, 1988.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	1994	91.3%	other animals
1	95	4.4%	50.3%
2	68	3.1%	36.0%
3	17	0.8%	9.0%
4	9	0.4%	4.8%
5	0	0.0%	0.0%
6	0	0.0%	0.0%
7	0	0.0%	0.0%
8	0	0.0%	0.0%
TOTALS	2184	100.0%	100.0%

Table 70. Group size, number and percentage of stops for observation of moose, August, 1988.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	2085	90.6%	other animals
1	121	5.3%	55.8%
2	69	3.0%	31.8%
3	15	0.7%	6.9%
4	10	0.4%	4.6%
5	1	0.0%	0.5%
6	1	0.0%	0.5%
7	0	0.0%	0.0%
8	0	0.0%	0.0%
TOTAL	2302	100.0%	100.0%

Table 71. Group size, number and percentage of stops for observation of moose, September, 1988.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	555	90.2%	other animals
1	28	4.6%	46.7%
2	27	4.4%	45.0%
3	4	0.7%	6.7%
4	1	0.2%	1.7%
5	0	0.0%	0.0%
6	0	0.0%	0.0%
7	0	0.0%	0.0%
8	0	0.0%	0.0%
TOTAL	615	100.1%	100.1%

FIG. 151. MOOSE GROUP SIZE, JULY-SEPTEMBER, 1988.

MOOSE GROUP SIZE-JULY-SEPTEMBER, 1988

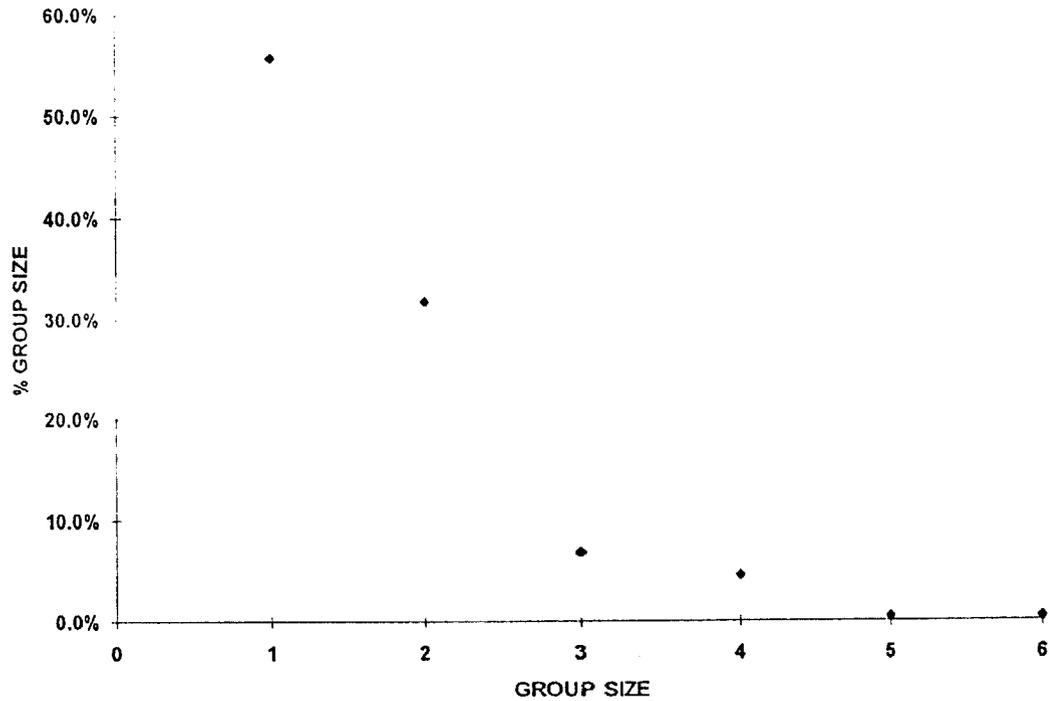


Table 72. Group size, number and percentage of stops for observation of moose, May, 1989.

MAY			
Group Size	Number of Stops	% Stops	% Observations by Group Size
0	281	83.1	other animals
1	31	9.2	54.4
2	18	5.3	31.6
3	4	1.2	7.0
4	4	1.2	7.0
Totals	338	100	100

338-281=57 stops made to observe moose during May, 1989.

Table 73. Group size, number and percentage of stops for observation of moose, June, 1989.

JUNE			
Group Size	Number of Stops	% Stops	% Observations by Group Size
0	1622	88.7	other animals
1	137	7.5	66.5
2	51	2.8	24.8
3	15	0.8	7.3
4	1	0.1	0.5
9	2	0.1	1.0
Totals	1828	100	100.1
1828-1622=206 stops made to observe moose during June, 1989.			

Table 74. Group size, number and percentage of stops for observation of moose, July, 1989.

JULY			
Group Size	Number of Stops	% Stops	% Observations by Group Size
0	998	89.7	other animals
1	83	7.5	72.8
2	28	2.5	24.6
3	2	0.2	1.8
4	1	0.1	0.9
Totals	1112	100	100.1
1112-998=114 stops made to observe moose during July, 1989.			

Table 75. Group size, number and percentage of stops for observation of moose, August, 1989.

AUGUST			
Group Size	Number of Stops	% Stops	% Observations by Group Size
0	1049	90.7	other animals
1	75	6.5	69.4
2	17	1.5	15.7
3	11	1.0	10.2
4	4	0.3	3.7
6	1	0.1	0.9
Totals	1157	100	99.9
1157-1049=108 stops made to observe moose during August, 1989.			

Table 76. Group size, number and percentage of stops for observation of moose, September, 1989.

Group Size	Number of Stops	SEPTEMBER	
		% Stops	% Observations by Group Size
0	393	88.3	other animals
1	33	7.4	63.5
2	15	3.4	28.8
3	3	0.7	5.8
4	1	0.2	1.9
Totals 445		100	
445-393=52 stops to observe moose during September, 1989.			

FIG. 152. % GROUP SIZE FOR MOOSE, 1989

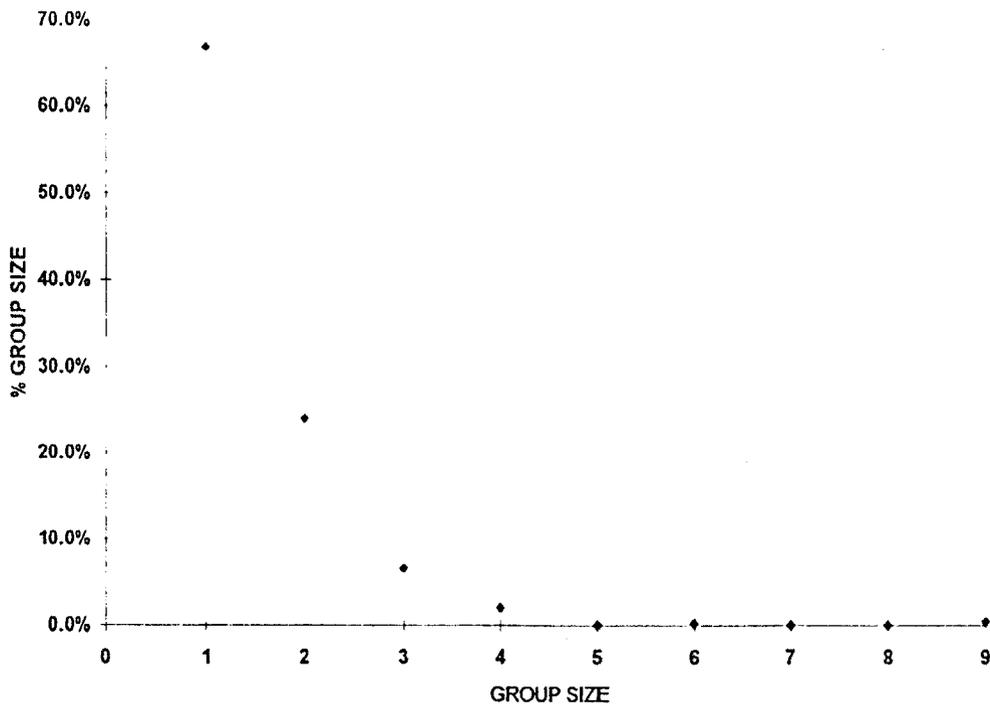


Table 77. Group size, number and percentage of stops for of moose, May, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	121	80.1%	other animals
1	24	15.9%	80.0%
2	5	3.3%	16.7%
3	1	0.7%	3.3%
TOTAL	151	100.0%	100.0%

Table 78 . Group size, number and percentage of stops for of moose, June, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	533	87.5%	other animals
1	53	8.7%	69.7%
2	14	2.3%	18.4%
3	7	1.1%	9.2%
7	1	0.2%	1.3%
12	1	0.2%	1.3%
TOTAL	609	100.0%	100.0%

Table 79 . Group size, number and percentage of stops for of moose, July, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	482	91.8%	other animals
1	33	6.3%	76.7%
2	6	1.1%	14.0%
3	3	0.6%	7.0%
4	1	0.2%	2.3%
TOTAL	525	100.0%	100.0%

Table 80. Group size, number and percentage of stops for observation of moose, August, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	539	91.4%	other animals
1	28	4.7%	54.9%
2	16	2.7%	31.4%
3	6	1.0%	11.3%
5	1	0.2%	2.0%
TOTAL	590	100.0%	100.0%

Table 81. Group size, number and percentage of stops for observation of moose, September, 1990.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	129	87.2%	other animals
1	9	6.1%	47.4%
2	7	4.7%	36.8%
3	3	2.0%	15.8%
TOTAL	148	100.0%	100.0%

FIG. 153. MOOSE GROUP SIZE, SUMMER SEASON, 1990

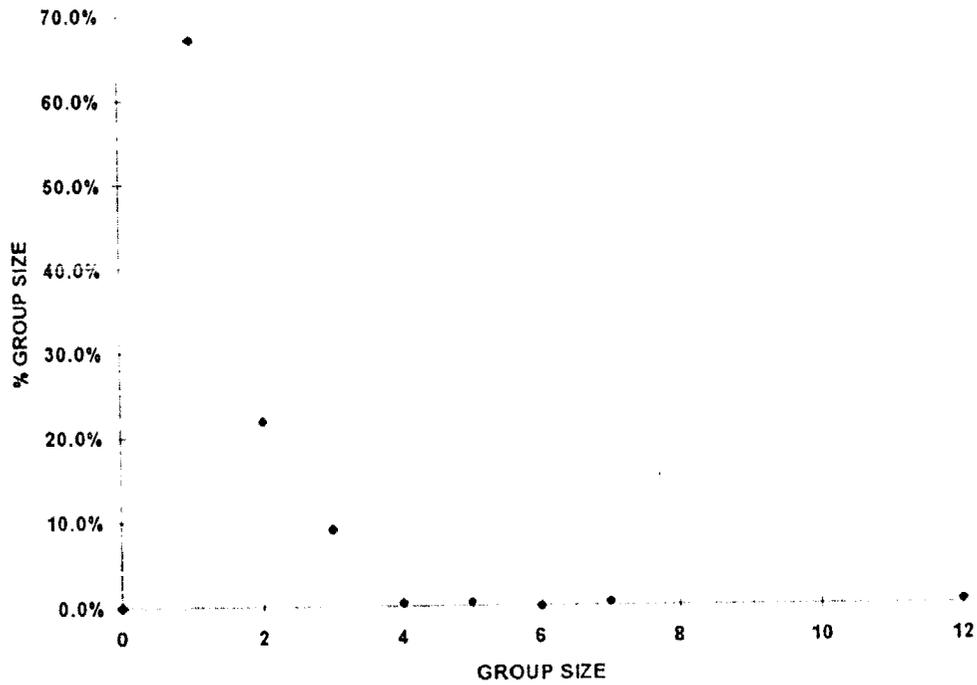


Table 82. Group size, number and percentage of stops for observation of moose, May, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	109	79.6%	other animals
1	22	16.1%	78.6%
2	6	4.4%	21.4%
TOTAL	137	100.0%	100.0%

Table 83. Group size, number and percentage of stops for observation of moose, June, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	615	88.9%	other animals
1	54	7.8%	70.1%
2	14	2.0%	18.2%
3	8	1.2%	10.4%
8	1	0.1%	1.3%
TOTAL	692	100.0%	100.0%

Table 84. Group size, number and percentage of stops for observation of moose, July, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	762	91.5%	other animals
1	55	6.6%	77.5%
2	12	1.4%	16.9%
3	4	0.5%	5.6%
TOTAL	833	100.0%	100.0%

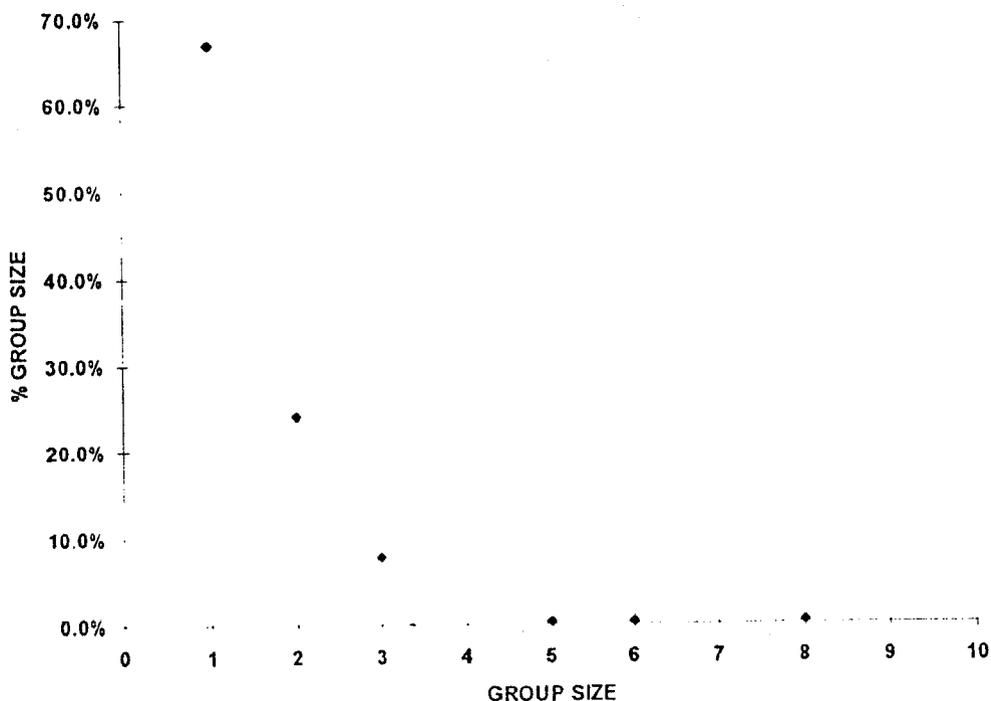
Table 85. Group size, number and percentage of stops for observation of moose, August, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	649	89.6%	other animals
1	39	5.4%	52.0%
2	28	3.9%	37.3%
3	7	1.0%	9.3%
6	1	0.1%	1.3%
TOTAL	724	100.0%	100.0%

Table 86. Group size, number and percentage of stops for observation of moose, September, 1991.

GROUP SIZE	NUMBER OF STOPS	% STOPS	% OBSERVATIONS BY GROUP SIZE
0	81	75.0%	other animals
1	16	14.8%	59.3%
2	7	6.5%	25.9%
3	3	2.8%	11.1%
5	1	0.9%	3.7%
TOTAL	108	100.0%	100.0%

FIG. 154. MOOSE GROUP SIZE, SUMMER SEASON, 1991



Distances moose were recorded from the road showed a constant pattern throughout the season (Figs. 155 & 156). The data show no evidence for moose being closer to or farther away from the road as the season progresses.

Distances by hour of the day when buses departed showed a relatively constant pattern, with records of moose being near, or on the road, during all hours (Figs.157 & 158).

The percent of records by distance category was relatively constant from year to year (Figs.159-162). Change of 8% or less between categories by year indicate relative stability of where moose occur. Distance category 0 (for on the road) was not recorded during 1990 and 1991.

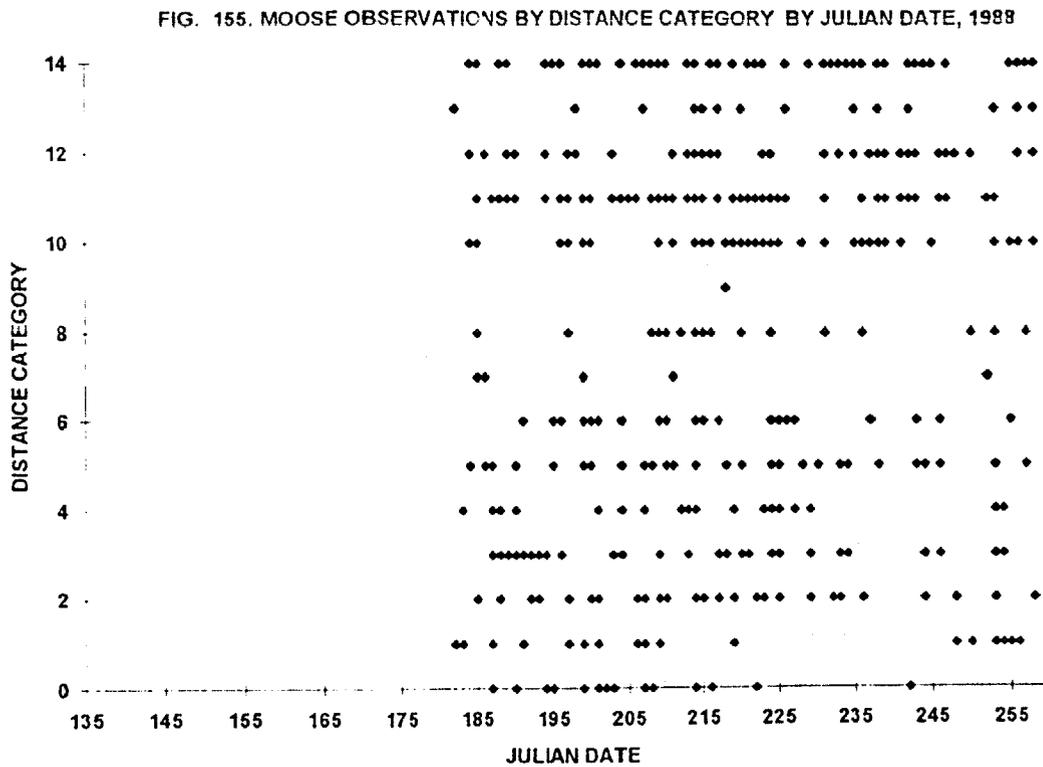


FIG. 156. MOOSE OBSERVATIONS BY DISTANCE CATEGORY BY JULIAN DATE, 1989

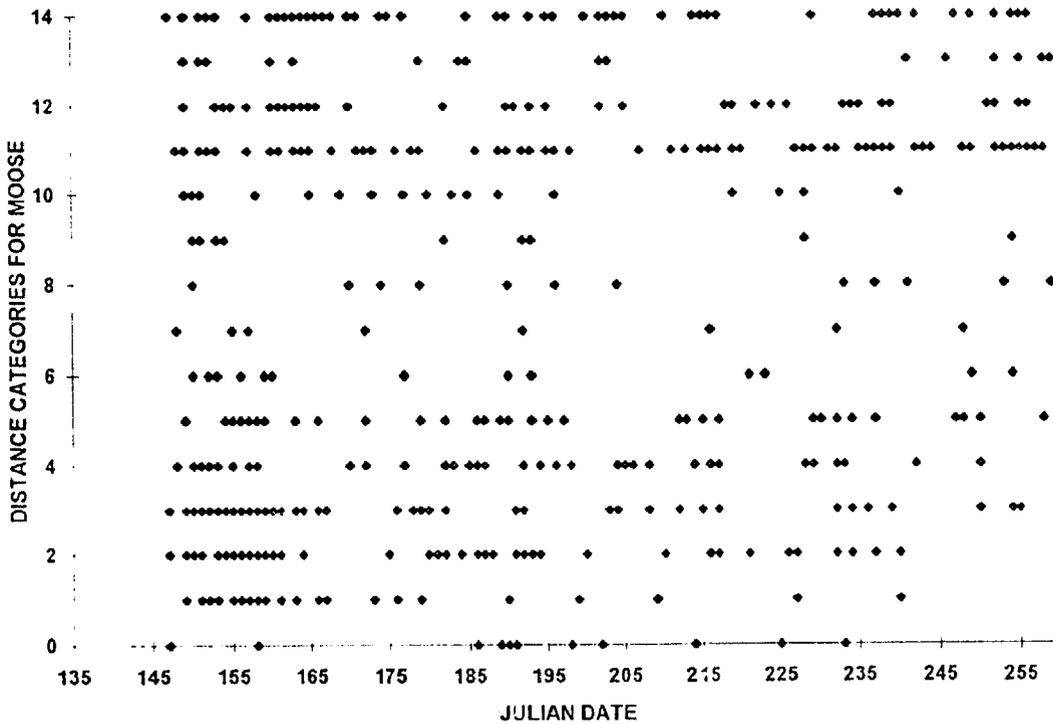


FIG. 157. DISTANCE CATEGORY FOR MOOSE BY HOUR OF BUS DEPARTURE, 1988

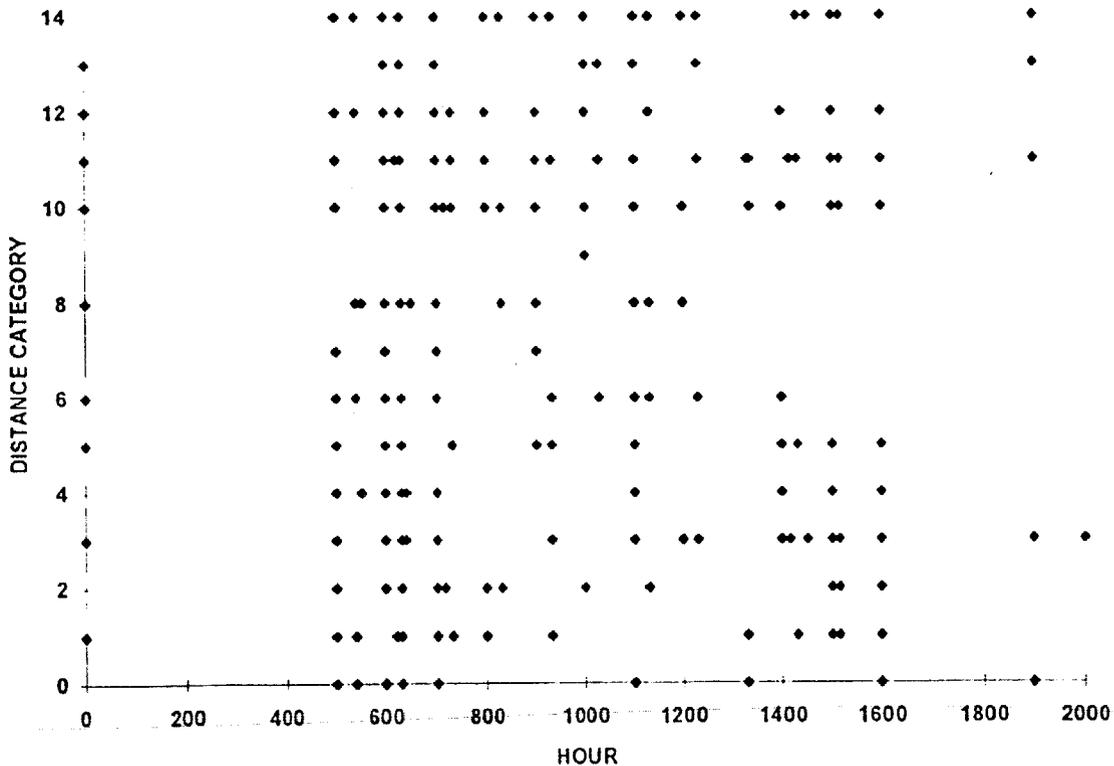


FIG. 158. MOOSE OBSERVATIONS BY DISTANCE CATEGORY BY HOUR OF BUS DEPARTURE, 1989

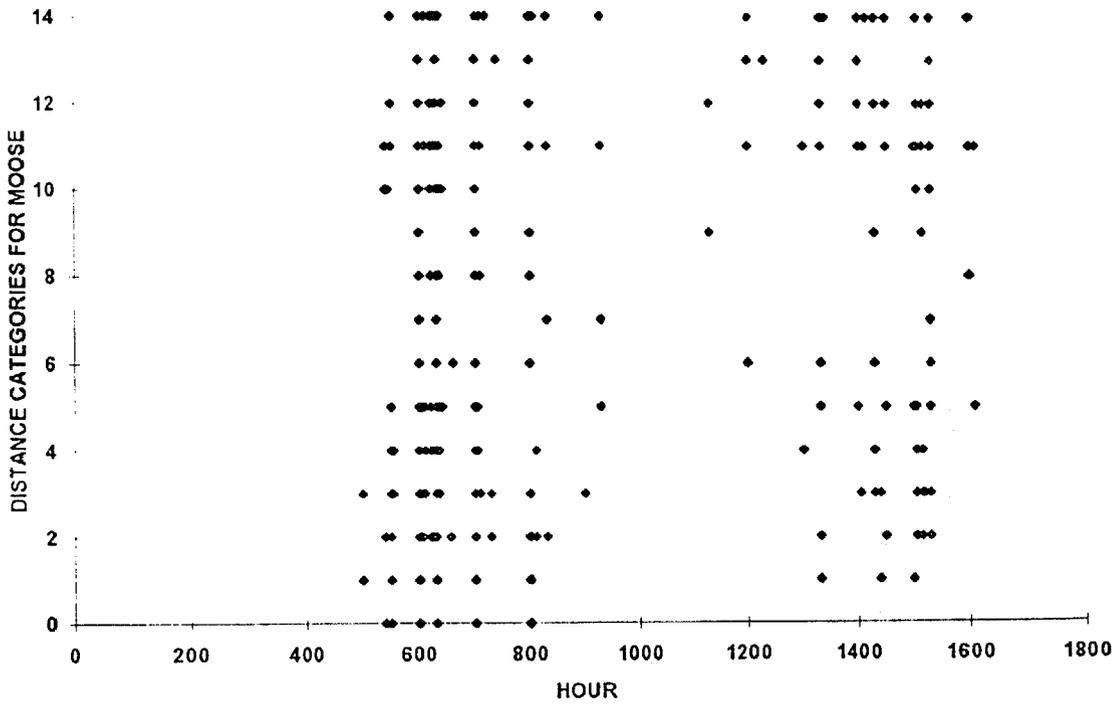


FIG. 159. % OF MOOSE OBSERVATIONS BY DISTANCE CATEGORY-1988

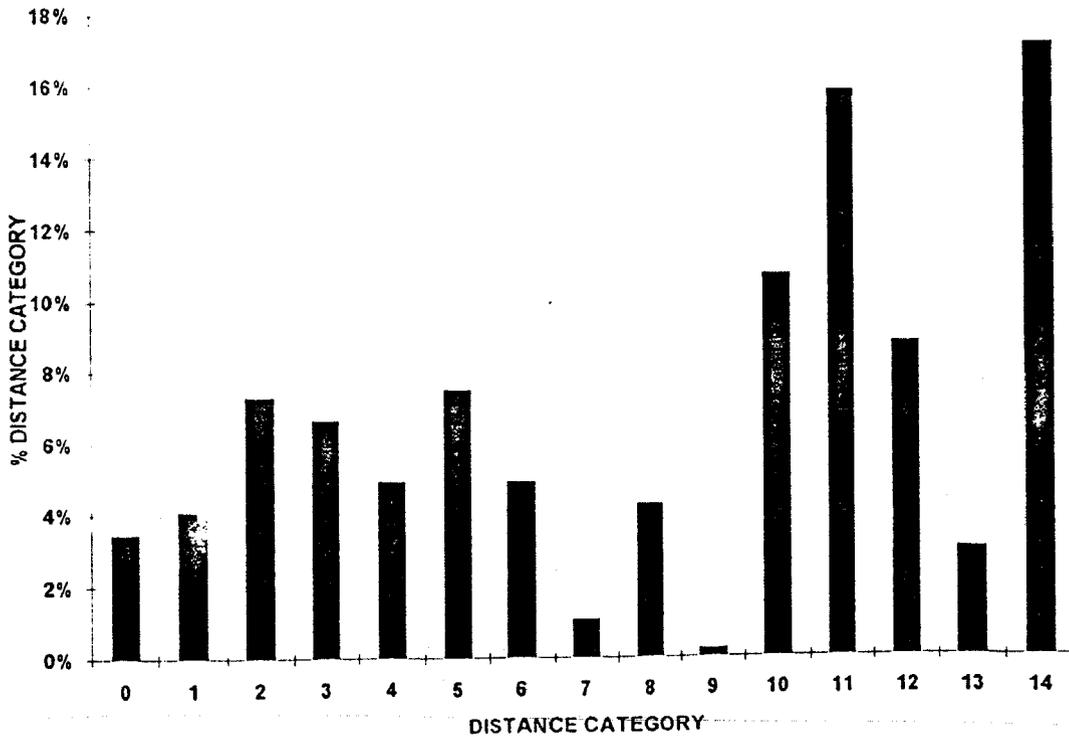


FIG. 160. % OF MOOSE OBSERVATIONS BY DISTANCE CATEGORY, 1989

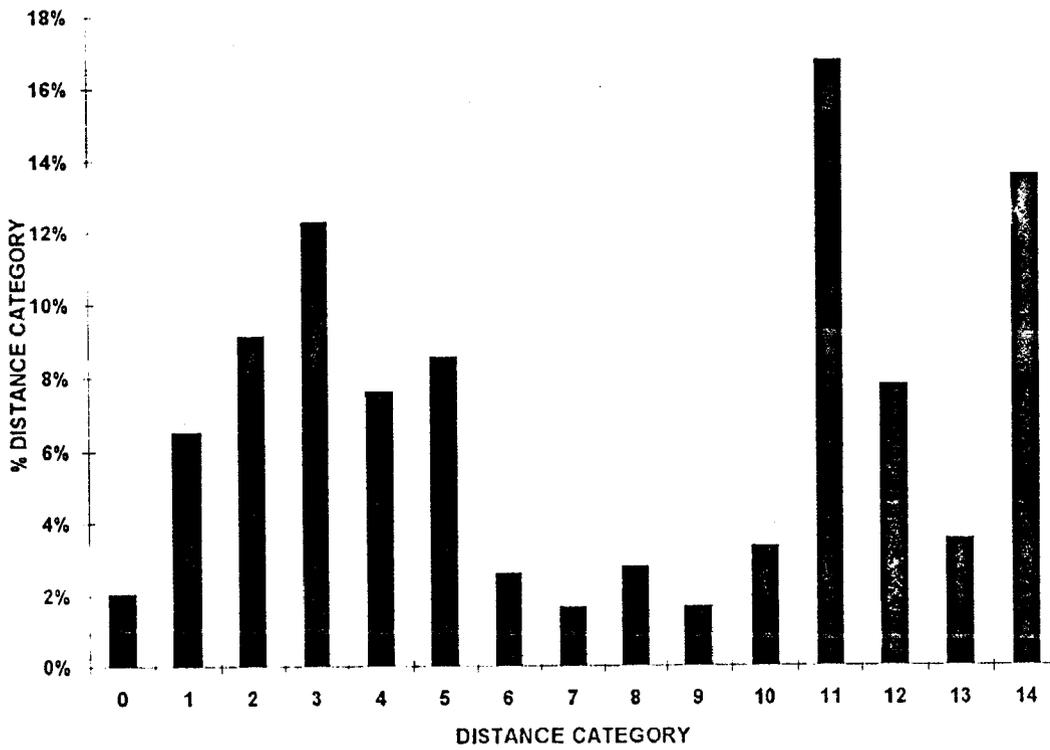


FIG. 161. % MOOSE OBSERVATIONS BY DISTANCE CATEGORIES-1990

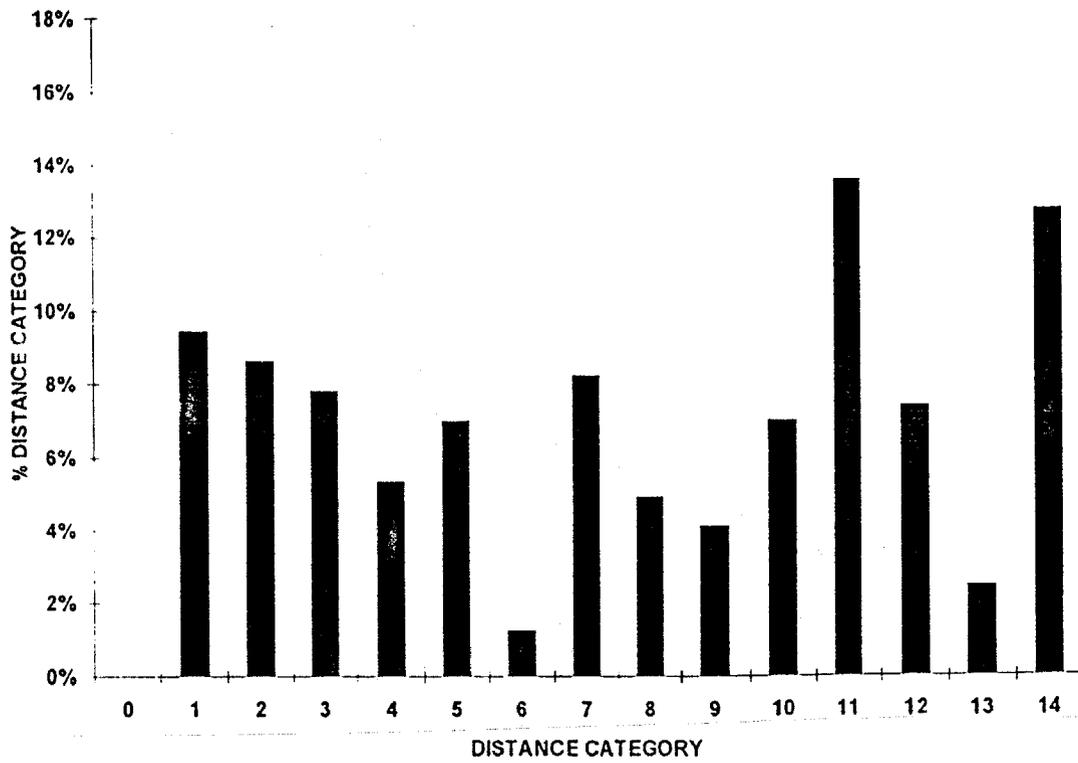


FIG. 162. % MOOSE OBSERVATIONS BY DISTANCE CATEGORY-1991

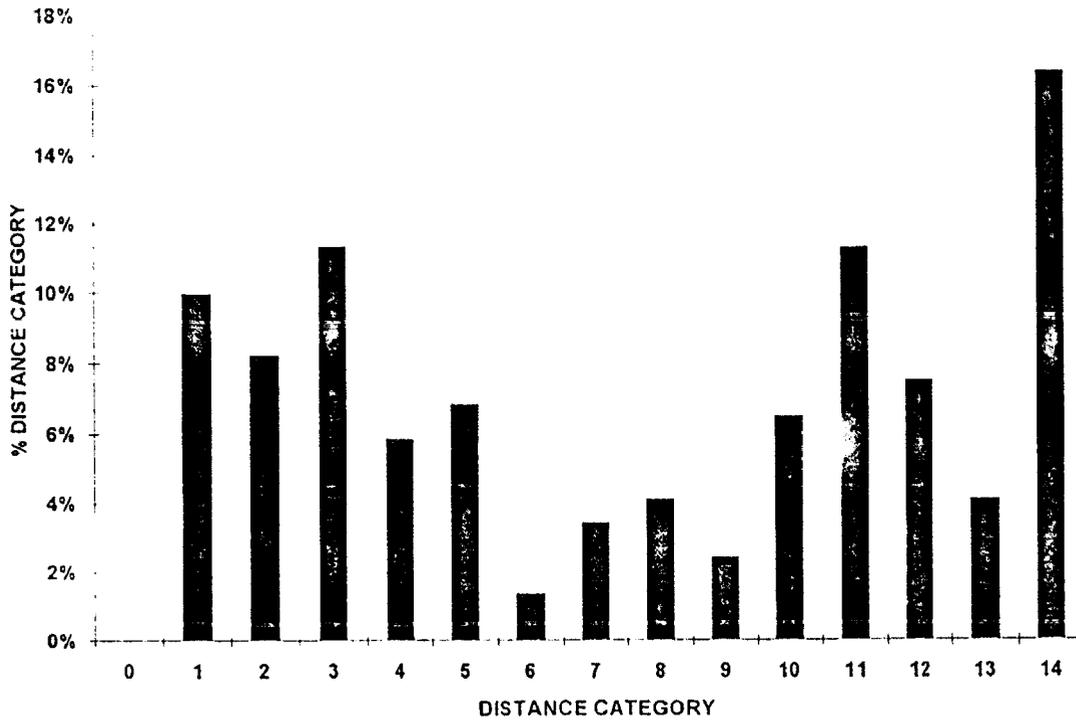


FIG. 163. NUMBER OF YOUNG MOOSE PER OBSERVATION BY MILEPOST, 1988

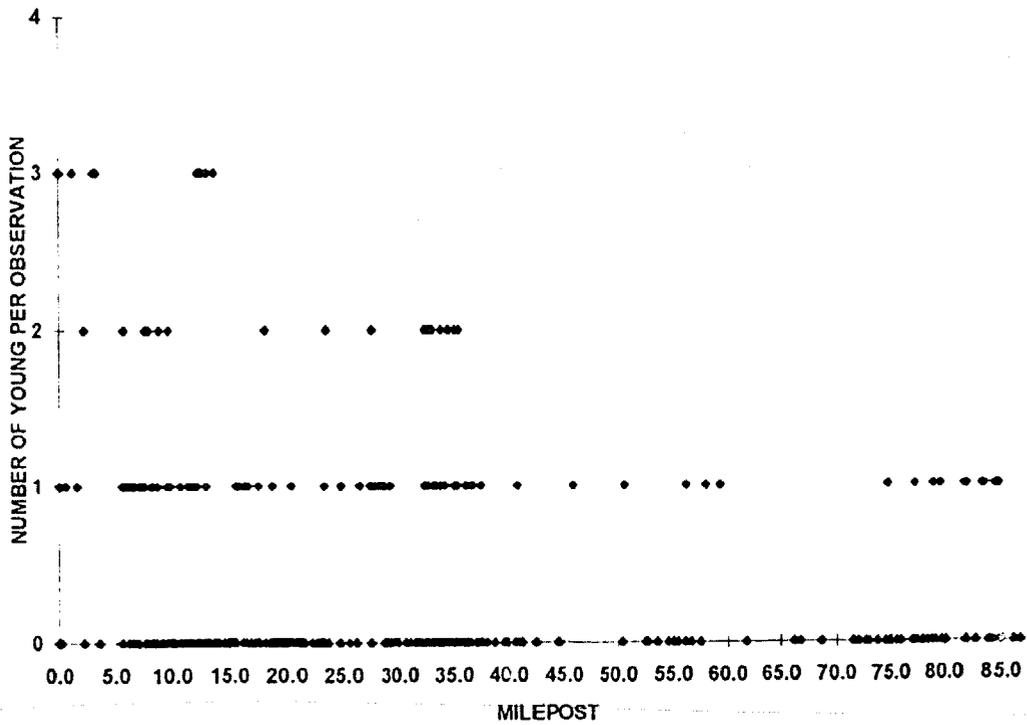
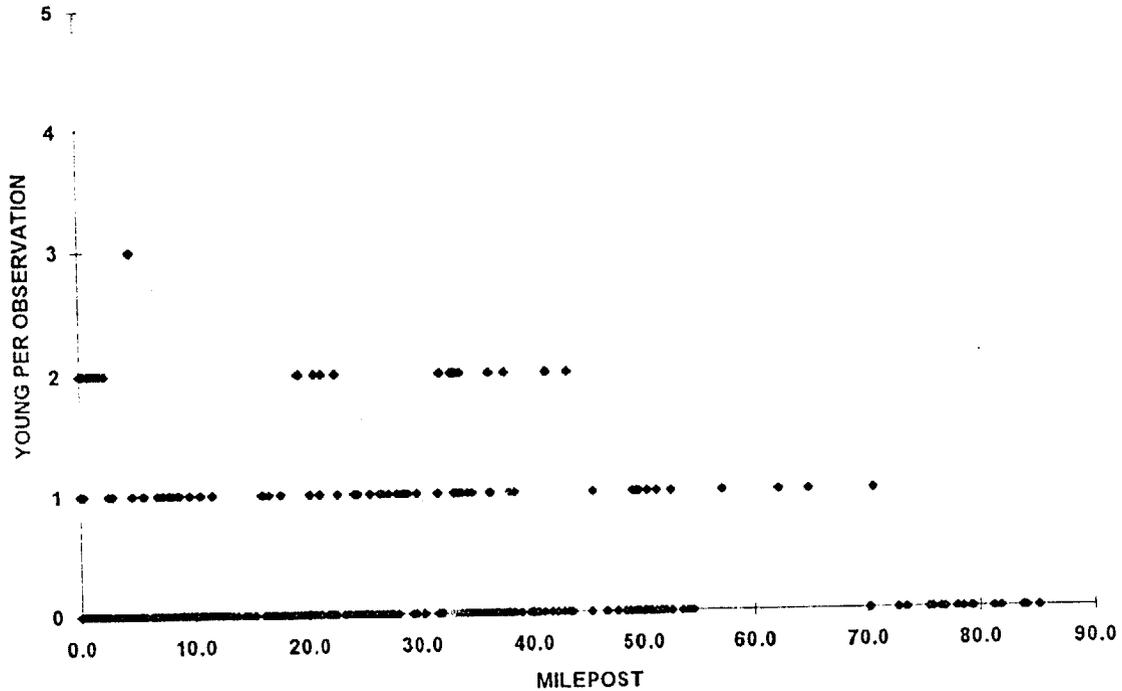


FIG. 164. NUMBER OF YOUNG MOOSE PER OBSERVATION BY MILEPOST, 1989



Young moose were observed at almost all mileposts from 0-60 during 1988 and 1989 (Figs. 163 & 164). They were not observed between mileposts 60-75 during 1988 (Fig. 163), and beyond milepost 70 during 1989 (Fig. 164). Observations of two and three young moose were confined to within mileposts 0-45 (Figs. 163 & 164).

Number of young moose per observation by milepost was graphed for each month of the season for 1989 (Figs. 165-169). The data show primary location for moose calf observations to be from mileposts 0-30 for May (see Table 8 to note all buses proceeded to milepost 53-Toklat), and 0-50 for June and July. Fewer moose calves were observed during August and locations were concentrated around mileposts 5-10, 30-40, and 50-60. Relatively few young moose were observed during September (Fig. 169).

FIG. 167. NUMBER OF YOUNG MOOSE PER OBSERVATION BY MILEPOST FOR JULY, 1989

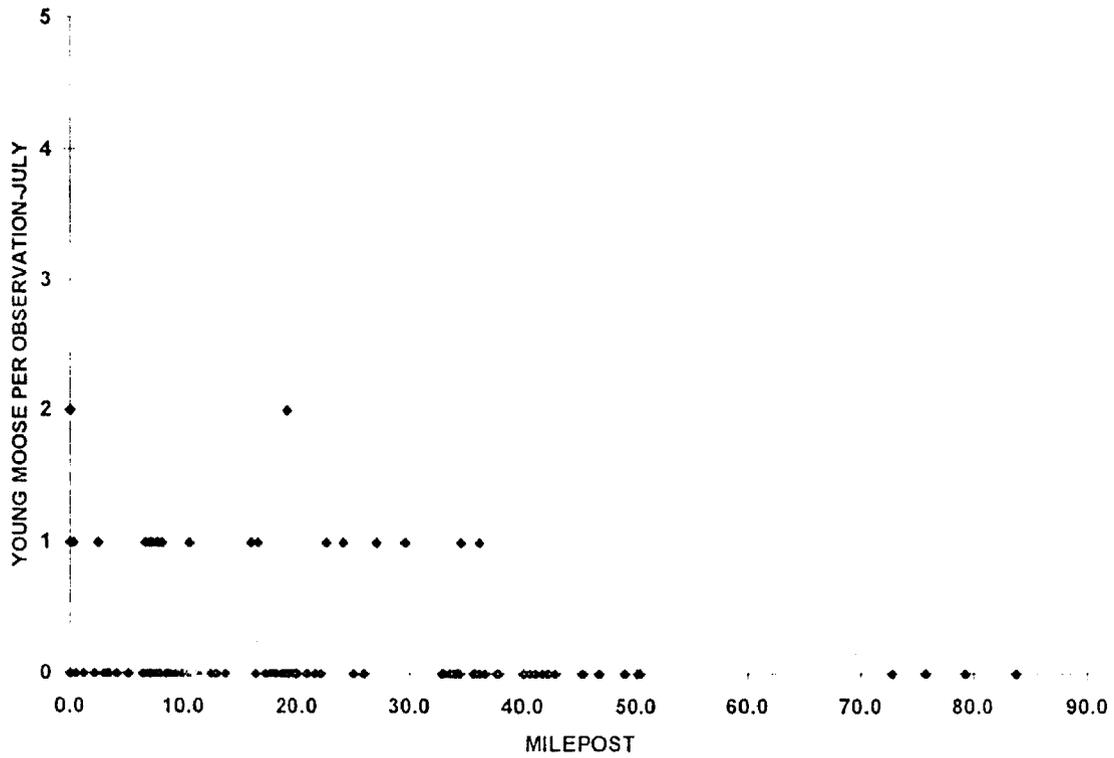


FIG. 168. NUMBER OF YOUNG MOOSE PER OBSERVATION BY MILEPOST FOR AUGUST, 1989

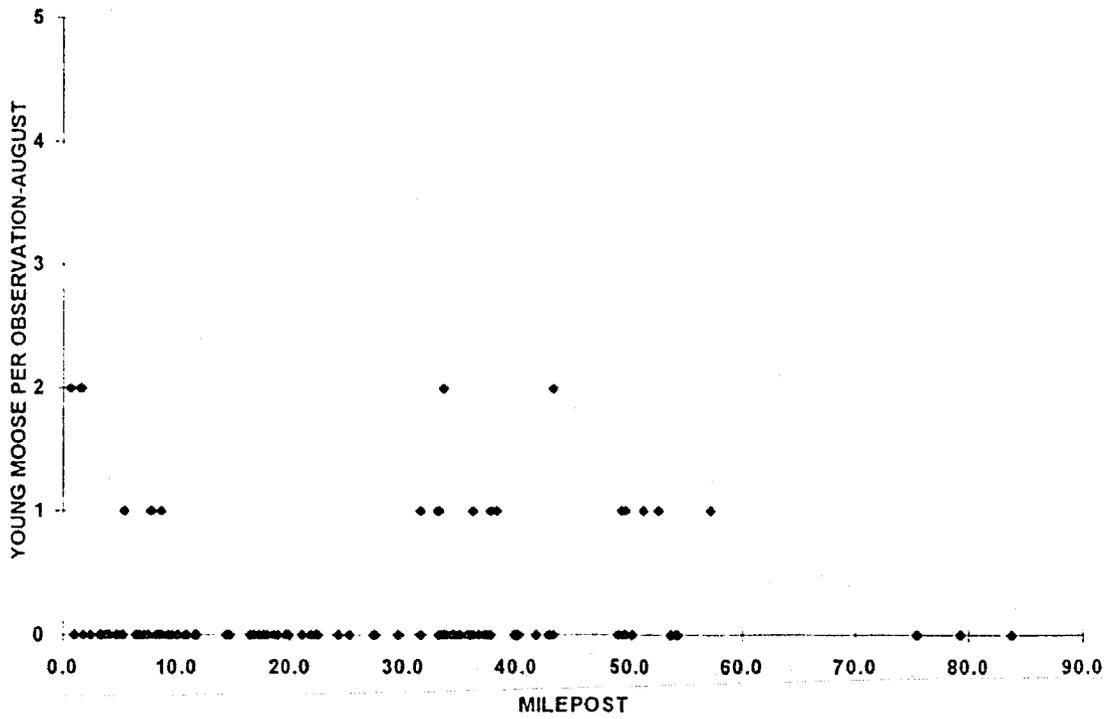
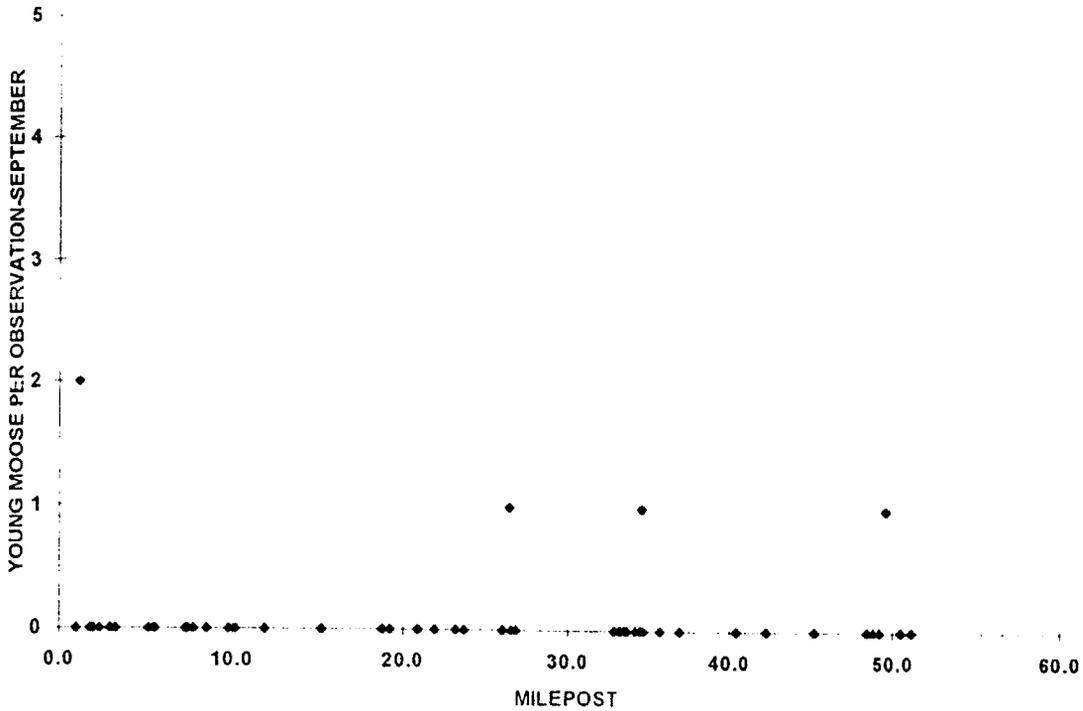


FIG. 169. NUMBER OF YOUNG MOOSE PER OBSERVATION BY MILEPOST FOR SEPTEMBER, 1989



Moose calves were observed throughout the season during 1988 and 1989 (Figs. 170 & 171). Groups of 2 were not observed the latter few days of each year, and groups of 3 were not observed the last half of the season. More observations of 3 young occurred during the short measurement period of 1988 compared to the full season of 1989 (Figs. 170 & 171).

FIG. 170. NUMBER OF YOUNG MOOSE PER OBSERVATION BY JULIAN DATE, 1988

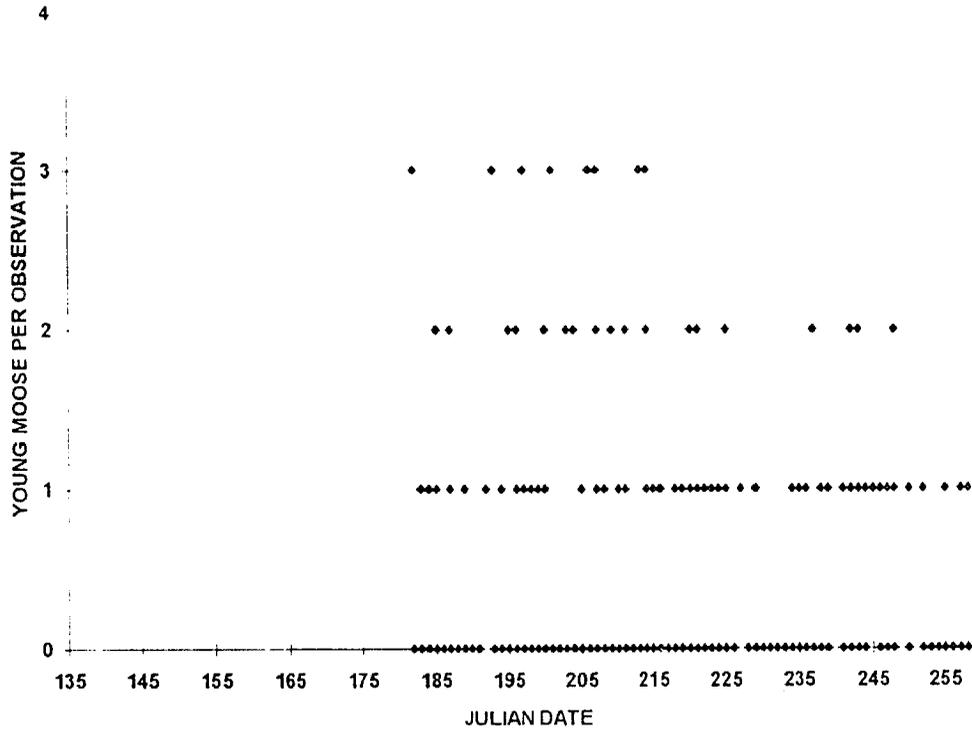


FIG. 171. NUMBER OF YOUNG MOOSE PER OBSERVATION BY JULIAN DATE, 1989

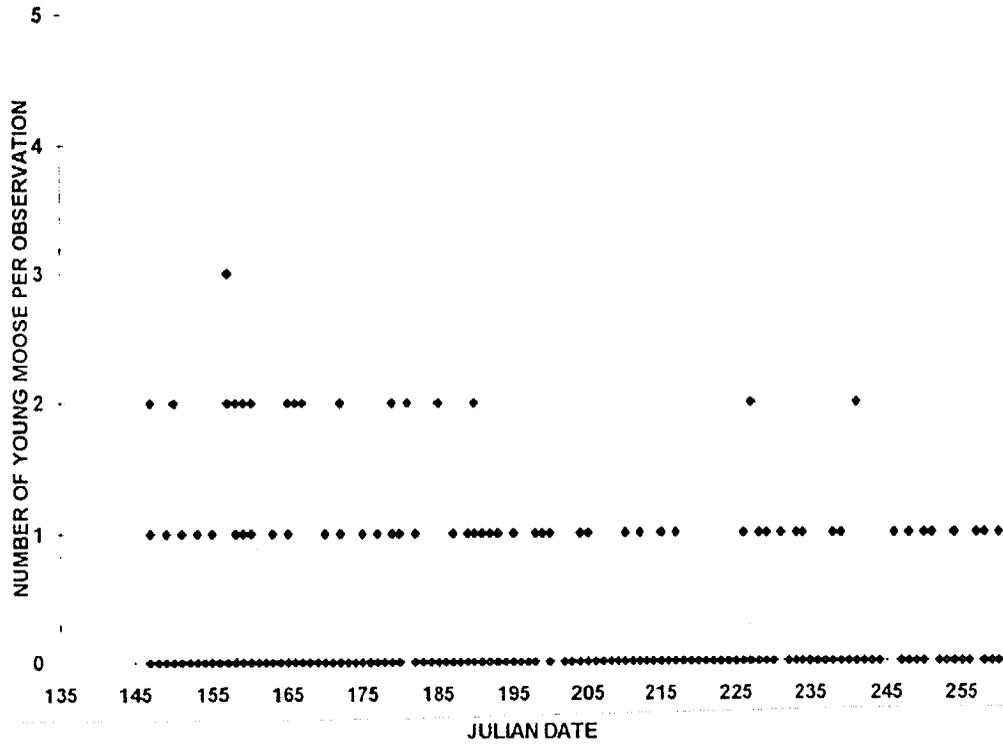


FIG. 172. NUMBER OF YOUNG MOOSE PER OBSERVATION BY HOUR OF BUS DEPARTURE, 1988

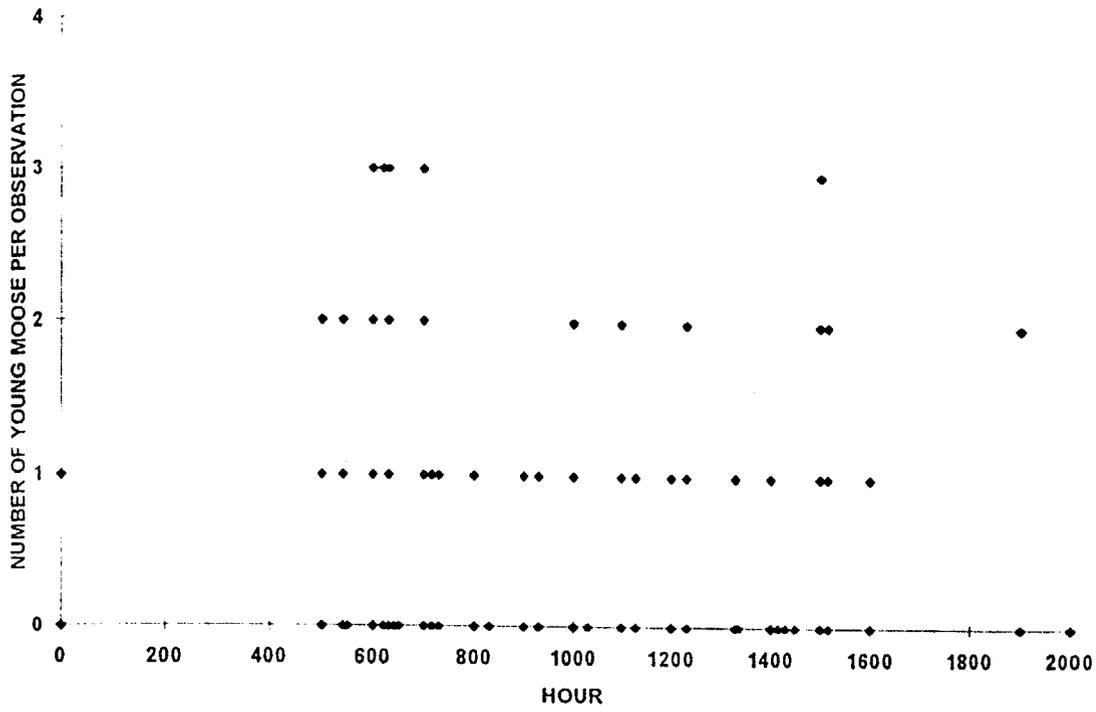
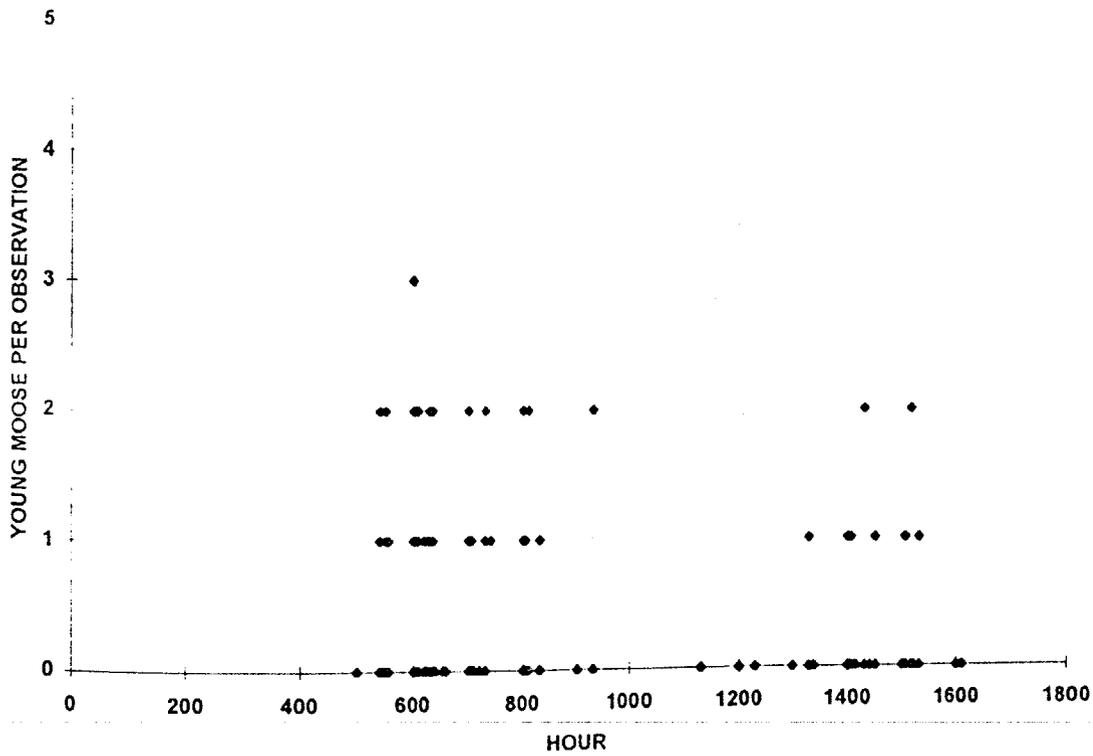


FIG. 173. NUMBER OF YOUNG MOOSE PER OBSERVATION BY HOUR OF BUS DEPARTURE, 1989

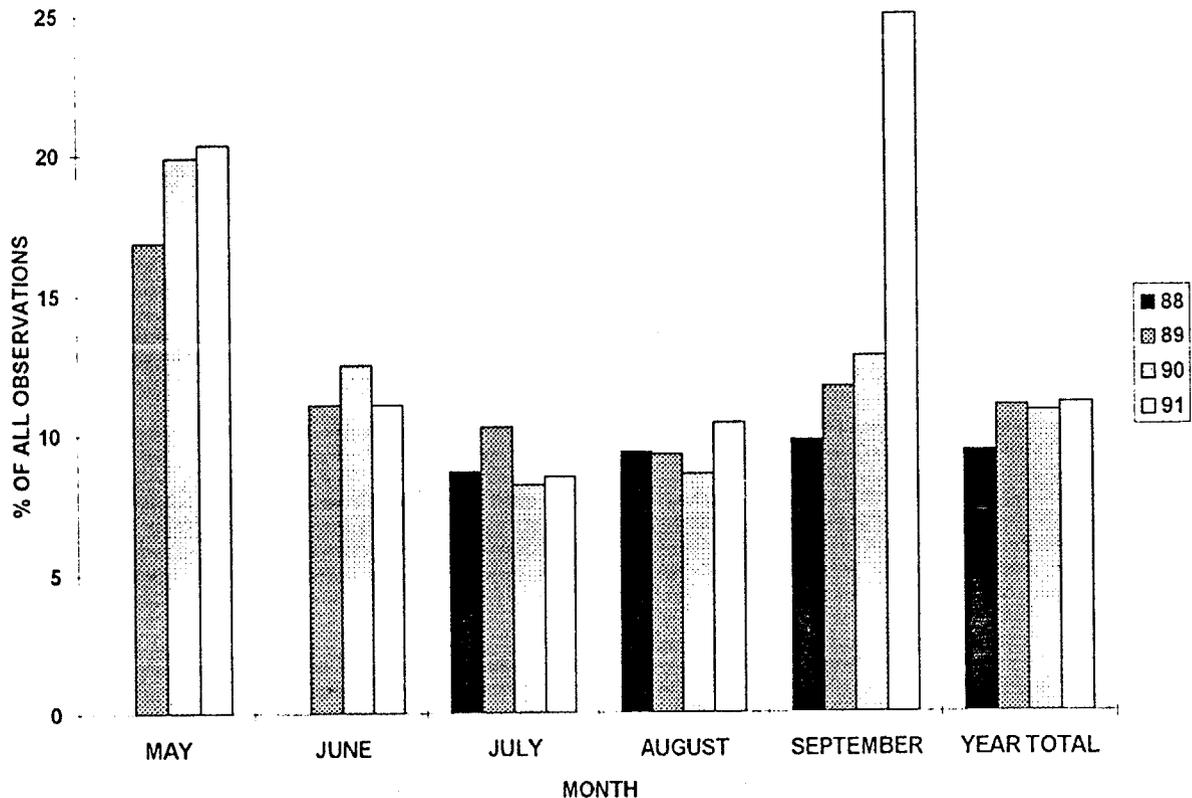


The number of young moose recorded by hour of bus departure stayed relatively constant during 1988 and 1989, indicating there is no advantage to early or late departures for observing young moose (Figs. 172 & 173).

The percentage of young moose compared to adults was graphed by month and year (Fig. 174). With one exception, a highest per cent of young occurred in May each year, when moose calves made up 17-20% of all moose observations. The percentage dropped during June, July, and August and rose slightly during September. The highest percentage of young moose observed during any one month was September 1991 when 25% of moose observations were of young animals.

Percentage young moose varied between 10-13% by year, with no detectable trend (Fig. 174).

FIG. 174. % YOUNG MOOSE BY MONTH AND YEAR



Construction of the Denali visitors Center at milepost 0.7 raised concern about the impact of construction and subsequent activity on moose calves. The mean number of young moose present by month within Management Zone 0-15 (milepost 0-15) were compared for 1989 and 1991 (Fig. 175). Although more moose calves were

present in the management zone during pre-construction (1989) than during first year post-construction (1991), there was no significant difference in the totals (Kuskal-Wallis 1-Way ANOVA, Chi Square .099, 1 df).

FIG. 175 MEAN NUMBER OF YOUNG MOOSE PER MONTH AND YEAR IN MANAGEMENT UNIT 0-15

