

Sydney Bainbridge (Partner: Connor Jones)

0554990

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Riverview Park and Zoo: How body size affects the popularity of mammalian exhibits

Abstract

Even though zoos are controversial due to ethical and humane reasons, they allow humans to get close to wild animal that they would typically never encounter in their life (Clayton et al. 2008). This up-close and personal interaction with the animal helps to build a connection with it and in turn, people feel the need to protect its natural environment and in general, the environment itself (Clayton et al. 2008) However there is an assumption that people favor certain species over others. In this study we wanted to determine if body size of mammals related to the number of visitors it receives and the length of time they stay at the exhibit. It was clear that the large mammal species received the longest visits compared to the small mammal exhibits. Although not supported by our predictions, on average, the small mammal exhibits had the highest number of visitors.

Introduction

Societies' output on wildlife enclosures have been controversial in the past and still is today due to various ethical and humane reasons. Some believe that wild animals should not be kept in enclosures because it is not their natural environment. Although, zoo's enable people to get close to wild animals and experience their habitat, possibly building a type of connection and in turn, these people will want to help conserve its natural environment (Clayton et al. 2008). Without zoo's, many people would never have this chance. The goal of zoos is to promote animal welfare, conservation, educate the public, research and entertainment, however the first four are the most important (Fernandez et al. 2009). Entertainment is part of the aspect that brings visitors to the zoo and draws them to come back or recommend it to other people (Fernandez 2009). The more visitors a zoo receives, as well as the duration of their visit reflect the income of the zoo generated that can be put towards conservation and protection of wild animals (Fernandez 2009). Due to the wide range usually seen in animal species of zoos, it is assumed that some species will

be viewed more often than others (Moss and Esson 2010). For this reason, it is sometimes difficult to determine which species will help to draw visitors and lead to the want to protect animals and the environment. Factors such as animal activity, size, proximity and visibility, presence of an infant and the appearance of the species habitat have been documented to affect the duration of visitors (Bitgood et al. 1988).

For this study we wanted to use visitor patterns of small and large animal exhibits to determine whether popularity of zoo animals is related to their size. In order to test this, we recorded how long individuals would remain at the enclosure. In addition to this, we recorded the sex and age of the visitor. We hypothesized that body size will affect the number of visitors and duration of how long they will stay, observing the animal. It was predicated that the larger the body size, the more visitors an exhibit will receive, as well as duration of visits will increase.

Methods

We examined the popularity of large and small mammals at the Riverveiw Park and Zoo, Peterborough, ON, on three separate occasions (November, 5, November 6 and November 13). 3 small mammal exhibits (*Macropus rufogriseus*, *Suricata suricatta*, *Saimiri sciureus*) and 3 large mammal exhibits (*Bos grunniens*, *Ammotragus lervia*, *Rangifer tarandus*) were used. Recordings occurred on weekends, in the afternoon (12:00pm-2:00pm) when it is presumed to be the busiest. Visitor behavior was recorded in 30-minute intervals, recording the time that the individual arrived at the exhibit and left. In addition to this, the sex (male/female) and age (adult/child) was recorded for each individual.

In order to analyze the data, it was converted from minutes to seconds for all the data sets. The data was manipulated in a way to average the duration of stay for all the data and males, females, adults and children separately based on small and large animal species. The averages were taken for each day that visitor behavior was recorded on. The resulting values were grouped

together into small and large mammals, then taking the averages of those values. These averages were used in a two-way T-test to determine the T-critical value and the relationship between variables.

Results

When taking all the data into account, the average time spent at each species exhibit (seconds) was the highest for the large mammal species compared to the small species (fig. 1). *A. lervia* had the greatest visitor duration for large animals, and *S. suricatta* had the greatest visitor duration for small mammals. The average number of visitors was highest for small species compared to large species (fig. 2). In this case, *S. sciureus* had the highest number of visits in general and for small mammals, whereas *R. tarandus* had the highest number of visitors for large animals.

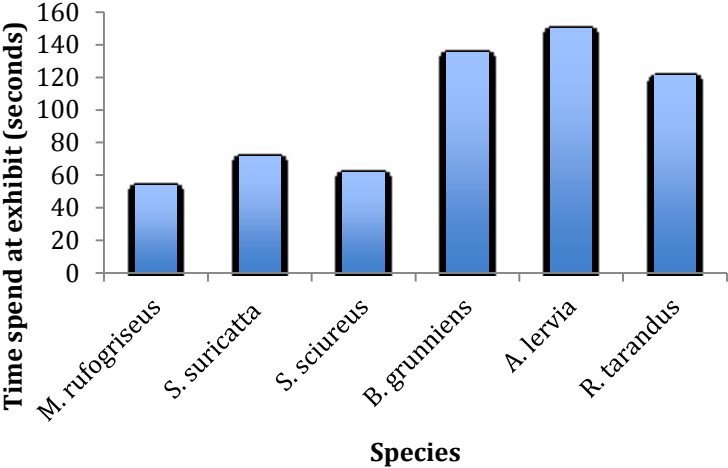


Figure 1: The average time spent at each species exhibit (seconds), recorded at the Riverview Park and Zoo on three occasions in November 2016.

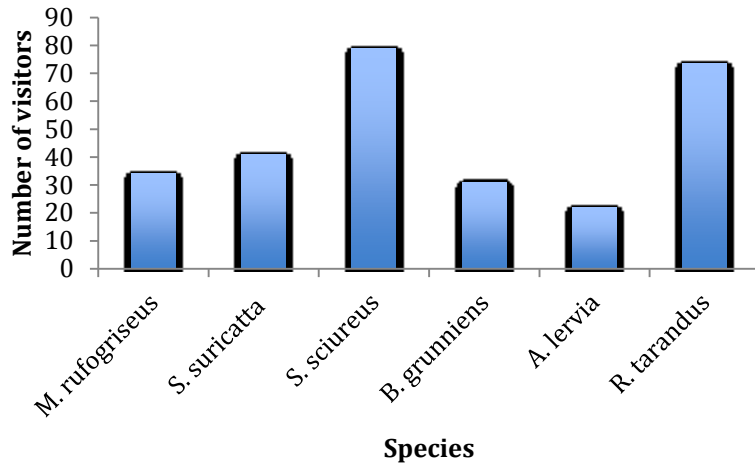


Figure 2: The average number of visitors at each species exhibit from three days of recording visitor patterns at the Riverview Park and Zoo in November 2016.

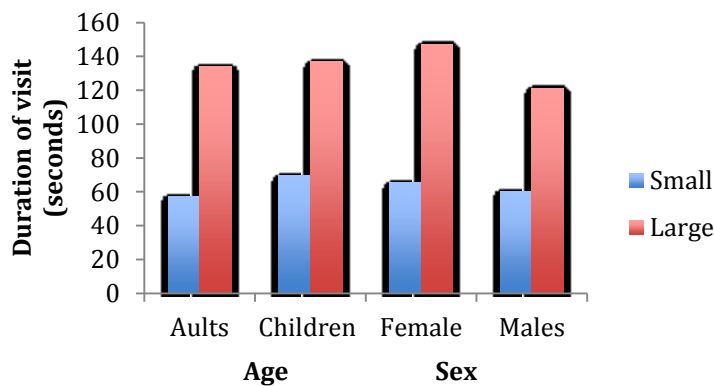


Figure 3: Comparing the duration of visit (seconds) of age (adult/children) and sex (males/females) to small (*Macropus rufogriseus*, *Suricata suricatta*, *Saimiri sciureus*) and large (*Bos grunniens*, *Ammotragus lervia*, *Rangifer tarandus*) mammal species recorded in November 2016.

Comparing only males to females, females had a higher visit duration when viewing large mammals (fig. 3). Females also had slightly longer visits for small mammals. Children had longer observed visits compared to adults for small mammals, however to a small extent (fig. 3). The difference between observed adults and children for large mammals was very miniscule.

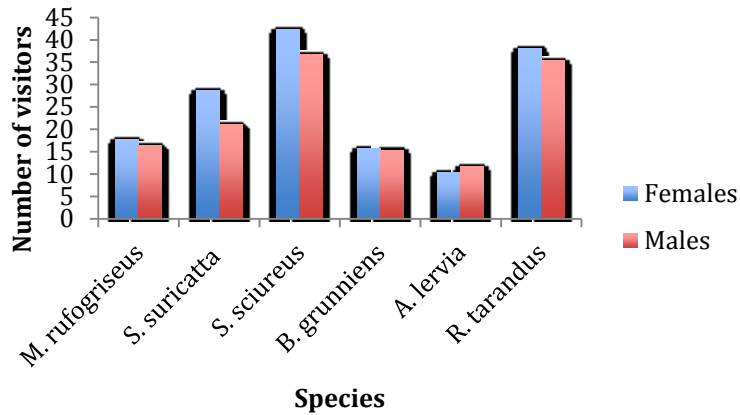


Figure 4: The average number of females and males that visited different species exhibits, recorded on three occasions in November 2016.

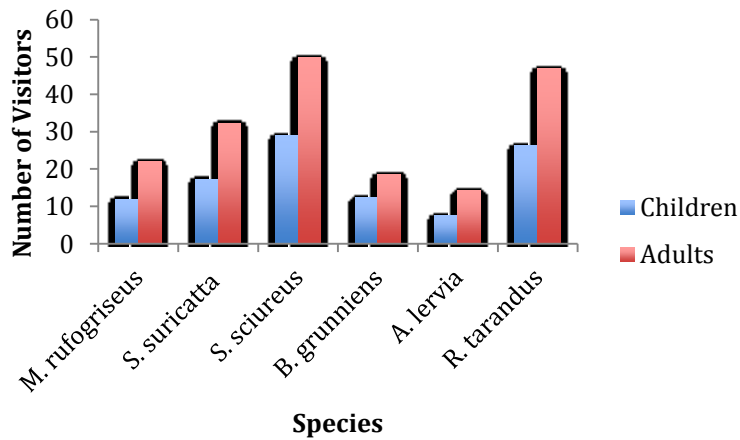


Figure 5: The average number of children and adults that visited different species exhibits, recorded on three occasions in November 2016.

The average number of visitors for females and males differed throughout species (fig. 4). However there was not a large difference observed between males and females when comparing them between each other. There was more adults, on average that visited each species exhibit compared to children (fig. 5). Every species, with the exception of *B. grunniens*, the average number of adults almost doubles the average number of children.

Table 1: Summary of a two-way T-test for large and small mammals between all the data, males, females, adults and children.

	All data	Males	Females	Adults	Children
Ave diff or d	73.95	61.16	81.90	61.69	67.48

Var	168.14	3.97	393.25	645.54	103.07
SD	12.97	1.99	19.83	25.41	10.15
SE	7.49	1.15	11.45	14.67	5.86
T	9.88	53.17	7.15	4.21	11.51
TCrit	0.01	0.002	0.02	0.05	0.006
N	3				
df	2				

After grouping the data into different categories to perform the two-way T-test, it was found that between each variable, there was a difference between small and large mammals (table 1).

Discussion

The relationship between number of visitors an exhibit receives, as well as duration of visit, was tested between three small mammals and three large mammals. It was clear that the larger the animal in each exhibit, the longer the duration of visit. This is consistent with previous studies (Ward 1998). Although, the total number of visitors each exhibit received based on small and large animals was not consistent. There were a large number of visitors observed *S. sciureus* and *R. tarandus*. Thus our hypothesis was supported, however not all our predictions were. The effects of males and females on visitor patterns did not seem to have an impact on overall findings, since they were very similar. There were more adults visiting each exhibit throughout all of the species, compared to children.

In a study that incorporated 13 zoos across the United States, compared body size to the duration that visitors remained, observing the animal for (Bitgood et al. 1988). Visitors stayed at pachyderms the longest, followed by great apes, bears, large cats, then, small primates (Bitgood et al. 1988). However they found that hoofed animals received the lowest viewing time, which is not consistent with our results (Bitgood et al. 1988). Although, there were limited large animal species at this zoo, with most of them being hoofed. This indicates that even though they had the

monkey, hooved animals, which were the largest in the zoo, still received longer visits, thus further supporting evidence that the largest animals will receive longer visits. The possible reason for *M. rufogriseus* receiving similar visitor numbers as the larger species could be because of activity level and visibility. For most of the time, *M. rufogriseus* were difficult to view because they were far from the fence, as well as they rarely moved while recording visitor activity. Activity and visibility of the animal has been shown to affect visitor patterns in other studies (Bitgood et al. 1988; Moss and Esson 2010). It has been suggested that humans favor species that they can relate to the most such as primate species (Clayton et al. 2008). For this reason, *S. sciureus* might have received the most visitors.

Moss et al. (2010) suggest that body size is a predictor of visitor patterns because they are the traditional zoo “experience,” and it is what people expect. As well as, some of the world's most well known zoos compose their websites of mostly, if not all large animal species, indicating zoos want to be known more for these types of animals (Moss et al. 2010). Moss et al. (2008) suggests that the larger viewing areas reflect the likelihood of visitors stopping and observing the exhibit. In general, the larger the animal, the larger the exhibit should be, therefore these two factors should be tested against each other. In addition, they mention that the area accessible to view the animals is smaller for smaller enclosures, and vice versa for larger enclosures (Moss et al. 2008). This would in turn, effect the duration of visits, especially if other visitors are waiting to observe the animal as well. This might have been the case for the shorter durations of small animal species and longer for large animal species. The possible reason for the large number of visitors for *R. tarandus* compared to the other large species could have been due to the layout of the zoo. The *R. tarandus* were situated in the middle of the zoo on the main path, thus having to walk past them in order to access the main entrance/exit.

Some studies (Moss and Esson 2010; Clayton et al 2008) have expressed the importance of education on species in the zoos as a part of the experience in efforts to make individuals want to help conserve their habitats. It is easier to promote learning of species when individuals have a personal interest in the species (Moss and Esson 2010). This might affect the species that zoo's house in order to attract visitors. Trainer learning sessions are a useful tool to engage visitors in learning and show the interactions of species and humans (Anderson et al. 2003).

Implications that occurred during this study included the fact that some of the species shared an enclosure with other species. The *S. sciureus* shared with a sloth and the *M. rufogriseus* shared with *Dromaius novaehollandiae*. It was difficult to determine which species was being watched in the case of the *S. sciureus*. However, the *D. novaehollandiae* was much more active than *M. rufogriseus* thus drawing attention to them instead of *M. rufogriseus*. In addition, people were able to feed *D. novaehollandiae*, further attracting attention to them instead of *M. rufogriseus*. Similarly, *A. lervia* was beside the camel, which seemed to be another popular species, which also had a seating area. It is not known whether this affected the high duration of visits to *A. lervia*, based on other studies that found comfort from standing on padded flooring attracted more visitors (Ross 2008). Other factors that could have been taken into account was the duration of visit effects of families, couples, friends and individuals that visit the zoo.

Zoos should aim to help conserve biodiversity, in regards to breeding and release programs and animal research. In addition, they need to attract the attention of humans to generate money in order to accomplish its goals. Because of this, zoos should be appealing in terms of species that people want to see and the general appearance of the zoo. If these factors are met, individuals might be more inclined to help save their habitats and in turn, the environment. Therefore studies on what draws visitors to zoos and brings them back should be continually studied.

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Appendix

Table 2: The recordings of wallaby's on each of the three days

VisitorNumber	5-Nov-16				6-Nov-16				13-Nov-16						
	ArriveTime	LeaveTime	VeilingTime	Age(adult/child)	Sex(M/F)	ArriveTime	LeaveTime	VeilingTime	Age(adult/child)	Sex(M/F)	ArriveTime	LeaveTime	VeilingTime	Age(adult/child)	Sex(M/F)
1	184	200		16 Adult	M	25	71		46 a	F	3	107		104 c	F
2	184	200		16 Adult	F	25	71		46 a	F	3	107		104 c	M
3	270	275		5 Adult	M	25	71		46 a	F	3	107		104 a	F
4	270	275		32 Child	F	242	285		43 c	M	3	107		104 a	M
5	448	480		32 Child	M	242	285		43 c	M	69	154		85 c	F
6	448	480		32 Child	F	242	285		43 c	M	69	154		85 a	M
7	448	480		32 Child	F	242	348		106 a	M	69	154		85 a	F
8	448	480		32 Adult	M	242	348		106 a	F	236	282		46 a	F
9	448	480		32 Adult	M	300	330		30 a	F	236	282		46 a	F
10	618	637		19 Adult	F	300	330		30 c	M	271	313		42 a	F
11	618	637		19 Adult	F	387	395		8 c	M	271	313		42 a	M
12	1563	1606		43 Child	M	387	395		8 a	M	346	375		29 a	F
13	1563	1610		47 Child	M	549	600		51 c	M	522	602		80 a	M
14	1563	1610		47 Adult	M	549	600		51 a	F	522	602		80 c	F
15	1563	1610		47 Adult	M	588	700		112 a	F	522	602		80 c	M
16	1690	1800		110 Adult	F	588	700		112 a	F	522	602		80 c	M
17	1690	1800		110 Child	F	588	700		112 a	M	522	602		80 a	F
18	1690	1800		110 Child	M	588	700		112 a	F	522	602		80 c	M
19						588	700		112 a	F	624	638		14 a	F
20						661	709		48 a	M	624	638		14 a	F
21						661	709		48 c	M	624	638		14 a	M
22						714	790		76 a	F	636	679		43 c	M
23						714	790		76 a	M	636	679		43 c	M
24						766	793		27 a	M	636	679		43 c	M
25						766	793		27 c	F	636	679		43 a	F
26						999	1080		81 a	F	694	711		17 a	M
27						999	1080		81 a	M	710	781		71 a	M
28						999	1080		81 c	F	765	850		85 c	F
29						999	1080		81 c	F	765	850		71 c	M
30						999	1080		81 a	F	765	850		85 a	F
31						1048	1106		58 a	F	1052	1123		71 c	M
32						1048	1106		58 a	M	1179	1231		52 a	F
33						1048	1106		58 c	M	1179	1231		52 a	F
34						1048	1106		58 a	F	1426	1475		49 a	M
35						1048	1106		58 a	F	1426	1475		49 c	M
36						1200	1248		48 a	M	1619	1652		33 c	F
37						1200	1248		48 a	F	1619	1652		33 a	F
38						1200	1248		48 a	F	1680	1737		57 a	M
39						1200	1248		48 a	F	1680	1737		57 c	F
40						1200	1222		22 c	M					
41						1200	1222		22 a	M					
42						1473	1480		7 a	F					
43						1590	1635		45 a	F					
44						1590	1635		45 a	F					
45						1590	1635		45 a	M					

Table 3: The recordings of Meerkats on each of the three days

VisitorNumber	5-Nov-16					6-Nov-16					13-Nov-16				
	ArriveTime	LeaveTime	VeilingTime	Age(adult/child)	Sex(M/F)	ArriveTime	LeaveTime	VeilingTime	Age(adult/child)	Sex(M/F)	ArriveTime	LeaveTime	VeilingTime	Age(adult/child)	Sex(M/F)
1	0	17		17 Adult	M	0	55		55 Child	F	2	62		60 A	F
2	0	28		28 Adult	F	0	55		55 Child	F	2	62		60 C	F
3	0	43		43 Adult	F	0	55		55 Adult	F	12	55		43 C	M
4	0	43		43 Child	F	0	88		88 Adult	F	12	89		77 A	F
5	0	43		43 Child	M	0	88		88 Child	M	12	89		77 C	F
6	402	446		44 Child	F	562	602		40 Adult	F	594	701		107 C	M
7	402	446		44 Adult	M	562	602		40 Adult	M	594	701		107 A	F
8	496	546		50 Adult	F	590	709		119 Child	M	594	701		107 C	M
9	496	546		50 Adult	F	590	709		119 Child	M	594	701		107 A	M
10	496	540		44 Adult	F	590	709		119 Adult	F	701	713		12 A	F
11	496	536		40 Adult	M	590	709		119 Adult	M	701	713		12 C	M
12	496	540		44 Adult	M	652	747		95 Adult	F	736	751		15 A	F
13	542	578		36 Adult	M	652	747		95 Adult	M	736	751		15 A	F
14	542	578		36 Adult	M	677	690		13 Adult	M	736	751		15 C	M
15	542	584		42 Adult	F	677	690		13 Adult	F	774	825		51 A	F
16	542	584		42 Adult	F	677	690		13 Child	M	774	825		51 A	M
17	542	584		42 Child	M	677	690		13 Child	F	774	870		96 A	F
18	840	930		90 Child	M	677	690		13 Child	F	889	933		44 A	M
19	867	1008		141 Child	M	690	775		85 Adult	F	889	933		44 C	F
20	867	1008		141 Child	M	690	775		85 Child	M	929	933		4 C	M
21	867	922		55 Child	M	720	754		34 Adult	F	929	933		4 A	M
22	867	935		68 Adult	F	870	918		48 Adult	F	1101	1145		44 C	F
23	880	905		25 Adult	M	870	918		48 Child	M	1101	1145		44 A	F
24	903	946		43 Child	M	927	953		26 Adult	F	1101	1145		44 A	F
25	903	946		43 Adult	F	927	953		26 Adult	M	1101	1145		44 A	M
26	867	922		55 Adult	F	1033	1085		52 Child	F	1311	1322		11 A	M
27	867	935		68 Adult	F	1033	1085		52 Adult	M	1311	1322		11 C	M
28	904	1274		370 Adult	F	1089	1142		53 Adult	F	1311	1322		11 A	F
29	904	1274		370 Child	M	1089	1142		53 Adult	M	1311	1322		11 A	F
30	904	1274		370 Child	F	1089	1140		51 Child	F	1319	1322		3 C	F
31	1008	1118		110 Adult	M	1089	1142		53 Child	F	1319	1322		3 A	M
32	1008	1118		110 Adult	F	1247	1250		3 Adult	F	1322	1363		41 A	F
33	1074	1140		66 Child	F	1247	1250		3 Adult	M	1322	1363		41 A	M
34	1083	1140		57 Adult	M	1247	1250		3 Child	F	1452	1613		161 A	M
35	1087	1140		53 Child	F	1248	1340		92 Adult	F	1452	1613		161 C	M
36	1087	1140		53 Child	M	1248	1340		92 Adult	F	1452	1613		161 A	F
37	1382	1450		68 Adult	M	1248	1340		92 Adult	F	1549	1613		64 A	F
38	1382	1516		134 Adult	F	1248	1340		92 Adult	M	1549	1613		64 A	M
39	1382	1516		134 Adult	F	1290	1340		50 Adult	F	1622	1778		156 A	F
40	1382	1509		127 Adult	F	1290	1340		50 Adult	F	1622	1778		156 C	F
41	1423	1555		132 Adult	F	1290	1340		50 Adult	F	1719	1800		81 C	F
42	1432	1555		123 Child	M	1290	1340		50 Child	M	1719	1800		81 A	M
43	1432	1555		123 Adult	F	1540	1570		30 Adult	M					
44	1432	1516		84 Child	M	1540	1570		30 Adult	M					
45	1627	1676		49 Adult	M	1540	1570		30 Adult	F					
46	1627	1676		49 Adult	F	1540	1570		30 Adult	F					
47	1639	1680		41 Adult	F	1540	1570		30 Adult	F					
48	1639	1680		41 Adult	M	1540	1570		30 Adult	F					
49	1710	1800		90 Adult	M	1540	1570		30 Adult	F					
50	1710	1800		90 Adult	F	1595	1800		205 Adult	F					
51	1710	1800		90 Child	M	1595	1800		205 Adult	F					
52	1710	1800		90 Child	F	1595	1800		205 Child	F					
53						1595	1800		205 Child	F					
54						1595	1800		205 Child	F					
55						1595	1800		205 Child	F					

Table 4: The recordings of squirrel monkey on each of the three days.

VisitorNumber	5-Nov-16				6-Nov-16				13-Nov-16			
	ArriveTime	LeaveTime	VeivingTime	Age(adult/Sex(M/F))	ArriveTime	LeaveTime	VeivingTime	Age(adult/Sex(M/F))	ArriveTime	LeaveTime	VeivingTime	Age(adult/Sex(M/F))
1	24	110	86	Child M	0	22	22	Adult M	3	45	42	A M
2	46	113	67	Adult M	0	22	22	Adult F	3	45	42	A F
3	53	113	60	Adult M	0	22	22	Child M	27	33	42	C M
4	240	384	144	Child M	0	22	22	Child F	169	186	42	C F
5	280	384	104	Child F	27	32	5	Adult M	176	212	17	A M
6	280	384	104	Child M	173	187	14	Adult F	176	212	36	A F
7	282	384	102	Adult F	117	123	6	Adult F	189	216	36	C F
8	431	502	71	Adult F	163	197	34	Adult M	189	216	36	C M
9	431	502	71	Adult M	163	197	34	Child F	228	241	36	A M
10	498	500	2	Adult F	163	197	34	Child F	228	241	27	C M
11	498	500	2	Adult F	172	206	34	Child F	271	279	27	A F
12	498	500	2	Adult M	172	206	34	Adult M	271	279	13	A F
13	498	500	2	Adult F	216	241	25	Adult M	271	279	13	A M
14	498	500	2	Adult F	216	241	25	Child M	296	359	8	C F
15	476	516	40	Adult M	232	276	44	Adult F	296	359	8	A F
16	476	516	40	Adult F	232	276	44	Adult M	313	357	8	C M
17	520	549	29	Adult M	232	276	44	Child F	313	357	63	A M
18	520	549	29	Adult F	274	296	22	Adult F	313	357	63	A M
19	522	640	118	Adult F	274	296	22	Adult M	342	384	44	C F
20	522	652	130	Adult M	303	357	54	Adult F	342	384	44	A M
21	522	652	130	Child M	303	357	54	Adult M	342	384	44	A M
22	522	640	118	Child F	303	357	54	Child M	342	384	42	C F
23	522	652	130	Adult M	340	371	31	Adult F	391	466	42	A M
24	790	878	88	Child M	340	371	31	Adult M	391	466	42	C F
25	790	878	88	Adult F	340	371	31	Child F	605	652	42	C M
26	808	948	140	Child M	340	371	31	Child F	605	652	75	A F
27	808	900	92	Child F	381	469	88	Adult F	605	652	75	A M
28	828	948	120	Adult M	381	469	88	Adult M	654	674	47	A F
29	828	945	117	Child M	547	656	109	Adult F	763	883	47	C F
30	828	948	120	Child F	547	656	109	Adult M	763	883	47	A M
31	830	854	24	Adult F	547	656	109	Adult F	763	883	20	A F
32	868	955	87	Adult M	547	656	109	Child F	896	979	120	C M
33	925	936	11	Adult F	736	883	147	Adult M	896	979	120	C M
34	1130	1196	66	Child F	736	883	147	Adult F	896	979	120	A M
35	1130	1196	66	Adult F	893	954	61	Adult M	913	979	83	A M
36	1242	1410	168	Adult F	893	954	61	Child F	913	1076	83	A F
37	1242	1410	168	Adult F	891	921	30	Child M	1003	1127	83	A F
38	1242	1410	168	Adult F	891	921	30	Child F	1003	1127	66	A M
39	1217	1410	193	Child M	891	921	30	Adult M	1003	1127	163	C F
40	1217	1240	23	Child F	1000	1038	38	Adult F	1003	1127	124	A F
41	1217	1240	23	Child F	1000	1038	38	Child F	1003	1136	124	A F
42	1233	1238	5	Adult F	1000	1038	38	Child F	1003	1136	124	C M
43	1277	1280	3	Adult M	1000	1038	38	Child M	1065	1091	124	A F
44	1277	1280	3	Adult M	1000	1038	38	Adult M	1065	1091	133	A F
45	1277	1280	3	Adult F	1030	1111	81	Child F	1105	1164	133	A M
46	1277	1280	3	Adult F	1030	1111	81	Child F	1105	1164	26	A F
47	1340	1360	20	Adult M	1030	1111	81	Adult M	1105	1164	26	C F
48	1340	1360	20	Child F	1030	1111	81	Adult F	1171	1183	59	A F
49	1373	1375	2	Child F	1101	1144	43	Adult M	1171	1213	59	A M
50	1373	1386	13	Child M	1101	1144	43	Adult F	1171	1214	59	C F
51	1373	1386	13	Adult F	1162	1183	21	Adult M	1171	1316	12	A F
52	1373	1386	13	Adult M	1162	1183	21	Adult F	1289	1316	42	A F
53	1454	1519	65	Adult F	1170	1213	43	Adult M	1289	1316	43	A M
54	1454	1519	65	Child M	1170	1214	44	Child M	1289	1411	145	A F
55	1480	1519	39	Adult F	1282	1316	34	Adult M	1313	1411	27	C M
56	1480	1519	39	Child F	1282	1316	34	Child M	1313	1411	27	C M
57	1480	1519	39	Adult F	1282	1316	34	Child F	1313	1411	122	A M
58	1504	1536	32	Adult F	1320	1411	91	Child M	1343	1569	98	C F
59	1504	1536	32	Adult F	1320	1411	91	Child F	1343	1569	98	A F
60	1565	1593	28	Adult F	1320	1411	91	Child M	1343	1569	98	C M
61	1565	1576	11	Adult M	1320	1411	91	Adult M	1426	1543	226	A M
62	1565	1582	17	Child F	1400	1455	55	Adult F	1426	1543	226	C F
63	1689	1727	38	Adult F	1426	1492	66	Adult F	1426	1543	226	C F
64	1689	1724	35	Adult M	1426	1492	66	Adult M	1498	1637	117	A F
65	1689	1727	38	Child F	1426	1492	66	Child M	1498	1637	117	A M
66	1743	1800	57	Adult F	1426	1492	66	Child M	1498	1637	117	A F
67	1743	1800	57	Child F	1426	1492	66	Adult F	1498	1637	139	A M
68	1743	1800	57	Child M	1493	1542	49	Adult M	1498	1637	139	C F
69	1788	1796	8	Adult M	1493	1542	49	Child M	1514	1598	139	A M
70	1788	1796	8	Adult F	1493	1542	49	Child M	1514	1598	139	A M
71	1788	1796	8	Adult F	1493	1542	49	Child M	1514	1598	139	A F
72					1493	1542	49	Adult M	1514	1598	84	C F
73					1530	1617	87	Child F	1606	1674	84	A M
74					1530	1617	87	Child M	1606	1674	84	A F
75					1530	1617	87	Adult M	1634	1755	84	C M
76					1606	1660	54	Adult F	1634	1755	68	A F
77					1654	1677	23	Adult F	1634	1755	121	A M
78					1654	1677	23	Child M	1727	1800	73	A M
79					1715	1744	29	Adult M	1727	1800	73	A F
80					1715	1744	29	Adult F	1764	1800	36	A F
81					1733	1794	61	Adult F	1764	1800	36	A F
82					1733	1794	61	Child M	1764	1800	36	C M
83					1733	1794	61	Child M	1783	1800	17	A F

Table 5: The recordings of the yak on each of the three days.

VisitorNumber	5-Nov-16					6-Nov-16					13-Nov-16				
	ArriveTime	LeaveTime	VeivingTime	Age(adult/child)	Sex(M/F)	ArriveTime	LeaveTime	VeivingTime	Age(adult/child)	Sex(M/F)	ArriveTime	LeaveTime	VeivingTime	Age(adult/child)	Sex(M/F)
1	91	460	369	A	M	19	227	208	A	M	19	227	208	A	M
2	91	460	369	A	F	19	227	208	A	F	19	227	208	A	F
3	165	215	50	A	M	441	496	55	A	M	91	460	369	A	M
4	165	215	50	A	M	441	496	55	A	F	91	460	369	A	F
5	165	215	50	C	M	441	496	55	C	M	165	215	50	A	M
6	486	614	128	A	F	612	643	31	A	M	165	215	50	A	M
7	486	614	128	A	F	612	643	31	A	F	165	215	50	C	M
8	486	614	128	C	F	822	926	104	A	M	441	496	55	A	M
9	486	614	128	C	F	822	926	104	A	F	441	496	55	A	F
10	577	764	187	C	F	822	926	104	C	M	441	496	55	C	M
11	577	764	187	C	M	822	926	104	C	F	612	643	31	A	M
12	577	764	187	A	F	896	1129	233	A	M	612	643	31	A	F
13	613	629	16	A	F	896	1129	233	C	M	759	1302	543	A	F
14	613	629	16	A	F	983	1024	41	A	M	759	1302	543	C	F
15	613	629	16	A	M	983	1024	41	A	F	759	1302	543	C	F
16	759	1302	543	A	F	983	1024	41	C	M	896	1129	233	A	M
17	759	1302	543	C	F	983	1024	41	C	F	896	1129	233	C	M
18	759	1302	543	C	F	1089	1174	85	A	M	983	1024	41	A	M
19	798	848	50	A	F	1089	1174	85	A	F	983	1024	41	A	F
20	798	848	50	A	F	1089	1174	85	C	M	983	1024	41	C	M
21	896	916	20	A	F	1121	1314	193	C	M	983	1024	41	C	F
22	896	916	20	C	F	1121	1314	193	A	M	1157	1273	116	C	M
23	896	916	20	C	F	1121	1314	193	A	F	1157	1273	116	A	F
24	896	916	20	A	M	1121	1314	193	A	M	1423	1499	76	A	F
25	896	916	20	C	M	1157	1273	116	C	M	1423	1499	76	C	M
26	1423	1499	76	A	F	1157	1273	116	C	M	1423	1499	76	C	M
27	1423	1499	76	C	M	1157	1273	116	A	F	1494	1589	95	A	F
28	1423	1499	76	C	M	1284	1347	63	A	M	1494	1589	95	C	F
29	1536	1607	71	A	F	1284	1347	63	C	M	1494	1589	95	C	F
30	1536	1607	71	A	M	1284	1347	63	A	M					
31	1649	1800	151	A	F	1499	1609	110	A	F					
32						1499	1609	110	C	F					
33						1499	1609	110	C	F					

Table 6: The recording of the Barbary sheep on each of the 3 days

VisitorNumber	5-Nov-16					6-Nov-16					13-Nov-16				
	ArriveTime	LeaveTime	VeivingTime	Age(adult/child)	Sex(M/F)	ArriveTime	LeaveTime	VeivingTime	Age(adult/child)	Sex(M/F)	ArriveTime	LeaveTime	VeivingTime	Age(adult/child)	Sex(M/F)
1	0	158	158	A	F	64	261	197	A	F	46	107	61	A	M
2	0	158	158	C	M	64	261	197	A	M	46	107	61	A	M
3	0	158	158	C	M	64	261	197	C	M	150	253	103	C	F
4	90	264	174	A	M	243	316	73	A	M	150	253	103	A	M
5	90	264	174	A	M	243	316	73	A	F	225	363	138	A	F
6	142	371	229	A	F	322	433	111	A	M	225	363	138	C	M
7	142	371	229	A	M	322	433	111	A	F	225	363	138	A	F
8	142	371	229	A	M	322	433	111	A	F	225	363	138	A	M
9	349	483	134	A	M	322	433	111	C	F	334	536	202	A	F
10	349	483	134	C	F	322	433	111	C	F	334	536	202	C	M
11	349	483	134	C	F	463	544	81	C	M	334	536	202	A	M
12	349	483	134	C	M	463	544	81	C	M	334	536	202	C	F
13	677	832	155	A	F	463	544	81	A	M	334	536	202	A	M
14	677	832	155	A	M	463	544	81	A	F	734	918	184	A	F
15	677	832	155	C	F	871	1176	305	A	F	734	918	184	C	M
16	789	946	157	A	F	871	1176	305	C	F	878	1061	183	A	F
17	789	946	157	A	M	1070	1196	126	A	M	878	1061	183	C	M
18	1401	1470	69	A	M	1070	1196	126	A	F	1370	1478	108	A	F
19	1401	1470	69	C	M	1070	1196	126	A	M	1370	1478	108	C	F
20	1401	1470	69	C	F	1070	1196	126	C	F					
21	1500	1674	174	A	F	1070	1196	126	A	M					
22	1500	1674	174	A	M	1286	1554	268	A	M					
23	1597	1742	145	A	M	1286	1554	268	A	F					
24	1597	1742	145	C	F										

Table 7: The recording of the reindeer on each of the 3 days

