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CHARACTERIZATION OF WILD PIG-VEHICLE COLLISIONS

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Abstract: Wild pig (*Sus scrofa*) collisions with vehicles are known to occur in the United States, but only minimal information describing these accidents has been reported. In an effort to better characterize these accidents, data were collected from 179 wild pig-vehicle collisions from a location in west central South Carolina. Data included accident parameters pertaining to the animals involved, time, location, and human impacts. The age structure of the animals involved was significantly older than that found in the population. Most collisions involved single animals; however, up to seven animals were involved in individual accidents. As the number of animals per collision increased, the age and body mass of the individuals involved decreased. The percentage of males was significantly higher in the single-animal accidents. Annual attrition due to vehicle collisions averaged 0.8 percent of the population. Wild pig-vehicle collisions occurred year-round and throughout the 24-hour daily time period. Most accidents were at night. The presence of lateral barriers was significantly more frequent at the collision locations. Human injuries were infrequent but potentially serious. The mean vehicle damage estimate was $1,173.

Key Words: boar, feral hog, road kills, *Sus scrofa,* vehicle collisions, wild pig

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INTRODUCTION

Vehicle collisions with big game mammals in both North America and Eurasia increased during the past century. This phenomenon coincided with increases in both traffic speed/volume and wildlife population sizes. Although only accounting for a minor part of the annual mortality of these wildlife species, such accidents represent a major safety hazard, resulting in economic loss from both personal injury and property damage. These accidents have involved both native and introduced/exotic species of big game (Puglisi et al. 1974, Groot Bruinderink and Hazebroek 1996, Danielson and Hubbard 1998, Goulding 2003).

Since the late 1980s, populations of introduced wild pigs (*Sus scrofa*) have expanded their distribution in the United States from 19 up to at least 38 states. Recent estimates have these animals in this country numbering up to five million individuals. Once established, populations of this largely destructive invasive species are very difficult to either control or eradicate (Mayer and Brisbin 1991, Hutton et al. 2006).

Wild pig collisions with vehicles are known to occur in the United States (Thompson 1977, Bach and Conner 1993, Synatzske 1993, Texas Parks and Wildlife Department 1994, Mayer 2005). However, data characterizing these collisions have not been reported to date in the scientific literature. Some information on vehicle collisions in native portions of the species range in Eurasia has been reported (e.g., Okarma et al. 1995, Groot Bruinderink and Hazebroek 1996, Inbar et al. 2002). Road-kill characteristics of other big game species have been shown to vary significantly with sex, age class, and season (e.g., Jahn 1959, Bellis and Graves 1971, Puglisi et al. 1974, Reilly and Green 1974, Allen and McCullough 1976). This lack of information for wild pigs creates a void in the ability to estimate annual attrition for this species. Such information would be useful for both population modeling and the assessment of potential impacts of building roads through areas inhabited by this introduced species. In addition, a better understand such characteristics would increase the ability to either reduce or possibly even prevent such accidents and their impacts in areas of high wild pig densities.

The purpose of this study was to characterize wild pig–vehicle collisions. To better understand this growing threat to road safety, this study looked at various characteristics of the accidents associated with the animals involved, times, locations, and impacts to humans.

Study Area

The study was conducted on the Savannah River Site (SRS), an 800 km^2 federal nuclear facility, located in Aiken, Barnwell and Allendale counties, South Carolina. Approximately 95 percent of the lands encompassed by the SRS are undeveloped. Managed pine plantations dominate the SRS land use practices. The site is transected by several stream drainage corridors occupied by bottomland hardwood forest and forested swamp. In addition, pockets of upland hardwood forest and mixed pine/hardwood forest are scattered throughout the site (Workman and McLeod 1990). A wild pig population has been present on this site since before the land was acquired by the federal government in 1951 (Mayer 2005). During the period of data collection, the number of site workers varied between 7,500 to over 25,000 employees (Reed et al. 2002, Blake et al. 2005). A total of 225 km of maintained primary roads and 2,253 km of secondary roads or jeep trails traverse the study area (Blake et al. 2005). The site roadway network has remained essentially unchanged from the mid 1960s through the present. Posted speed limits do not exceed “55 mph” onsite.

METHODS

Between 1968 and 2006, data were collected from 179 wild pig-collisions on the SRS. These accidents collectively involved a total of 212 wild pigs. For each of these accidents, the following data were variously recorded: animals involved - sex, age class (i.e., piglet, juvenile, yearling, subadult and adult), total body mass (to nearest 0.5 kg), and number of the animal(s); timing of the accident - date and time of day; location - specific SRS road, road type (i.e., primary or secondary), number of traffic lanes, surface type (i.e., paved or unpaved), overall width of the maintained right-of-way (ROW), posted speed limit, general adjacent habitat, distance to wetland habitat, and presence and type of lateral barriers; and impacts to humans - any injuries to drivers and passengers, type of vehicle, and estimated vehicle damage. Age class categories were based on erupted dental patterns as described in Mayer and Brisbin (1991). The overall width of the maintained ROW was measured in m from the edge of the maintained ROW or adjacent lateral barrier. The general adjacent habitat was characterized into one of the following types: bottomland hardwoods, upland hardwoods, mixed pine/hardwood, pine plantation, swamp, and industrialized/developed areas. Distances to the nearest wetland habitats were determined later using the site GIS database. Physical lateral barriers were defined as man-made or natural features present at the accident location that would prevent the animal from easily leaving the roadway (i.e., steel guardrails, concrete bridge walls, wire fences, steep embankments, concrete drainage ditches, and open water). Information on injuries to humans, vehicle type and vehicle damage estimate was taken from the reports completed by the site traffic officers with Wackenhut Services, Inc., who investigated these accidents on SRS. It should be noted that complete data were not available for all of the collisions included in this study; however, all available data were analyzed in order to glean the maximum characterization information possible.

Data associated with the animal(s) involved were analyzed for variation due to sex, age class and total body mass. These data were compared to the comparable parameters from the population as a whole (J. J. Mayer, unpublished data). The number of animals involved in these collisions was analyzed for variation as well as correlations with the sex and age of these individuals. The number of wild pig road kills was further compared with the estimated population size (i.e., based on the site population model, PIGPOP) from 1991 through 2006. This timeframe was used since all onsite wild pig road kills were accounted for during that period.

The data associated with the timing of the accident were compared to the expected frequencies for season, month, day of the week, and time of day. In addition, the data were divided into three daily time periods: day – one hour after sunrise until one hour before sunset; night - one hour after sunset until one hour before sunrise; and dawn/dusk – combined period of one hour before and after sunrise and sunset, respectively. The accident frequency was compared against an equal occurrence among these three periods.

Roadway data from the collision locations were statistically summarized to characterize the typical location parameters. To analyze the roadway characteristics of these accidents to the site roadways, data from the four longest roads on SRS were compared to the collision locations (N=106) along those same site roads. To accomplish this comparison, every 0.16 km (0.10 mi) along the four roadways (N=557) was characterized by the same parameters compiled for the collision locations. The difference variables were then compared between these two collective data sets.

Descriptions of any reported injuries to drivers and passengers in the vehicles involved in these collisions were compiled for a narrative characterization. The numbers of vehicle types in these accidents were compared to the observed frequency for the site traffic. The mean and observed range of the estimated damage costs to these vehicles were calculated.

All statistical analyses were performed using the JMP® Version 5 software package (SAS Institute Inc. 2002). Differences in the frequencies of different variables were compared using a Chi-square analysis. Continuous variables were tested for normality using a Shapiro-Wilk W test. A *t* Test was used to evaluate differences between comparable variables. An Analysis of Variance was used to determine a regression effect between groups of variables. Statistical significance was accepted at $p<0.05$.

RESULTS

The SRS wild pigs involved in vehicle collisions encompassed both sexes and all five age classes. The breakdown of the sex and age classes of these animals (N=199) is illustrated in Figure 1. Although there was a slightly higher percentage of males than females (i.e., 57.9% male compared to 42.1% female), this did not differ significantly from the sex ratio estimated for the population as a whole (i.e., 53.1% male to 46.9% female). In general, wild pigs involved in these vehicle collisions were predominately older, with more yearlings, subadults and adults, and less piglets and juveniles than would have been predicted based on the general population age structure. The age classes represented in the road-killed sample differed significantly ($\chi^2=184.58$, $df=4$, $p<0.0001$) from the proportions of these groupings estimated in the site population. Within each sex, the most frequent age class involved was the yearlings (Figure 1). This pattern decreased overall toward the younger and older age classes for both sexes. However, within the male sample, this frequency trend decreased in the next oldest age class (i.e., subadults) and then increased slightly in the adult age class. The frequency decrease with age in the female sample was so great that the adult female grouping was second only to the piglet females as the smallest age class involved in vehicle collisions. It should also be noted that there were no individuals that would have been specifically classified as neonatal (as defined in Mayer et al. 2002).

In general, the total body mass of the animals involved in vehicle collisions ranged from 5.5 to 113.5 kg. Collectively, the sample of animals involved in the vehicle collisions were heavier (i.e., mean = 47.5 kg) than animals from the population as a whole (i.e., mean = 36.6 kg); however, this was the result of the older age structure of the animals involved in these accidents. When compared on a specific sex and age class basis to the population (Table 1), the only differences that were significant were for the yearlings of both sexes.

One hundred and sixty-two or 76.4% of the animals were killed as solitary individuals in the vehicle collisions. This involved 90.5% of the total accidents. The remaining fifty animals were killed during seventeen separate collisions, averaging 2.9 animals per incident and ranging from 2 to 7. The largest number of animals (i.e., seven 7-11 kg piglets) was involved in a collision with a semi tractor-trailer. As the number of animals involved per accident increased, both the mean age and total body mass of these individuals decreased. An average of 0.84 vehicle collisions occurred for every involved animal. The percent of males was higher (i.e., 61.1%) in the single-animal accidents, while the percent of females involved was higher (i.e., 56.0%) in the multiple-animal accidents. In comparison to the percentages of each sex within the population as a whole, the single-animal collisions were significantly different (χ^2=3.97, df=1, p<0.05), but the multiple-animal collisions were not.

Losses to traffic accidents were only a minor part of the annual mortality among the SRS wild pigs. Between 1991 and 2006 the mean annual loss of the estimated population to vehicle collisions was 0.80 percent, and varied from 0.10 to 2.52. The annual number of these accidents and estimated population size appeared to be somewhat correlated (i.e., the number of wild pig-vehicle collisions generally tracked changes in the population size) until 2002 (Figure 2). In that year, the population grew slightly, but the number of vehicle collisions with wild pigs increased to a record level. An increased frequency of these accidents was also observed in 2003 and 2006.

Wild pigs were involved in vehicle collisions during every month, every day of the week, and throughout the 24-hour time period. On a seasonal basis, the highest frequency (i.e., 30.2%) of accidents took place during the summer months. This ordered percent frequency was then followed by winter (i.e., 26.2%), fall (i.e., 23.5%), and finally spring (i.e., 20.1%); however, these differences were not significant from equity among the seasons. These seasonal frequencies were also not significantly different from equity when broken down by sex, age class or single/multiple animal collisions. On a monthly basis, the highest frequency was in August and the least was in November (Figure 3). The monthly frequency of wild pig collisions was significantly different from equity (χ^2=29.3, df=11, p<0.002). Weekly, the highest daily frequency was on Wednesday and the lowest on Sunday (Figure 3). The pattern increased from Sunday to Wednesday, and then decreased to Saturday. The frequency of occurrence was significantly different from equity (χ^2=23.9, df=6, p<0.0005). On an hourly basis, the most frequent accident time was from 0600 to 0659 hours (Figure 3). A general pattern appeared to have a peak slightly before and then into dawn (i.e., from 0400 until 0759 hours), with a second, smaller peak during and after dusk (i.e., from 1800 until 2259 hours). This hourly frequency was significantly different from equity (χ^2=87.0, df=23, p<0.0001). When grouping the accident times into day, night, and dawn/dusk, the highest frequency was at night (i.e., 45%). This frequency of occurrence decreased to dawn/dusk (i.e., 38%) and then to day (i.e., 17%). This difference in frequency was significantly different from an equal distribution (χ^2=18.3, *df*=2, *p*<0.0001).

Based on the roadway characteristics from the collision locations, most (i.e., 93%) of these accidents occurred on primary asphalt-paved roads, with the remainder taking place on unpaved secondary roads or jeep trails (i.e., with surfaces of either compacted soil or gravel). The collision locations most frequently were comprised of two lanes (i.e., 65 percent), had a posted speed limit of 55 mph (i.e., 75 percent), and had no lateral barriers (i.e., 55 percent). The mean ROW width was 24 m. The most common (63 percent) adjacent habitat type was pine plantation. The mean distance to the nearest wetland habitat was 220 m.

In comparing the four longest roads on SRS to the collision locations, the only parameter that was significantly different between the two data sets was the presence of lateral barriers (χ^2=7.5, *df*=2, *p*<0.02). A further comparison as to the types of lateral barriers between these two data sets revealed that the frequency of steel guardrails (χ^2=7.9, *df*=1, *p*<0.01) and concrete bridge walls (χ^2=5.8, *df*=1, *p*<0.02) were significantly higher at the collision locations.

With respect to the human impacts, both injuries to drivers and property damage to the vehicles involved were reported. Three collisions (6.1 percent) resulted in reported human injuries. Two were minor (i.e., a motorcycle driver suffered minor lacerations; a car driver suffered injuries to the left arm and was transported to the site medical facilities). Although not the result of the initial accident, a site security officer was fatally injured in a secondary crash associated with the collision with a large adult boar. A percent breakdown of the types of vehicles involved in these collisions was as follows: cars – 67, vans - 4, pickup trucks/SUVs - 23, motorcycles – 2, light/medium trucks - 2, and semi tractor-trailers – 2. This frequency did not differ significantly from the composition of the observed traffic on site. Estimated cost of reported vehicle damage ranged from $0 to $4,000, and averaged $1,173. The highest damage amount was to the one motorcycle involved in a collision with a wild pig. In addition, only one vehicle (i.e., a 4-door sedan) was reported to have been totaled.

DISCUSSION

As determined in the European studies (Okarma et al. 1995, Groot Bruinderink and Hazebroek 1996), wild pigs involved in vehicle collisions on the SRS included both sexes and all age classes. However, unlike these other studies, the age structure of the animals involved in these accidents did not reflect the population structure. This increased incidence of older/larger animals (i.e., yearlings, subadults and adults) could be the result of the overall increased movement patterns exhibited by these animals as compared to the younger/smaller ones (Saunders and McLeod 1999). The absence of neonates and very small piglets (i.e., <2 kg) in the sample of wild pigs involved in vehicle collisions is not unexpected. Although some sows have been documented build their farrowing nests in very close proximity to SRS roads, these young piglets are very sedentary in their movements, remaining largely in or very close to the nest during the first few weeks of life (Mayer et al., 2002). Because of this, it would be unlikely that their restricted movements would lead to encounters with vehicles traversing the site.

Overall, the total body mass data from the wild pigs killed by vehicles was consistent with that observed in the population as a whole. The exception was for both sexes in the yearling age class, averaging smaller than would be expected. On a monthly basis, the means of the yearling animals involved in the collisions were lower than the monthly population means for that age class for eleven of the twelve months. A specific cause for this difference remains unidentified.

Typically, only one wild pig is involved in most collisions with vehicles. However, like most large mammals that form social groups of several individuals (Allen and McCullough 1976), vehicle collisions with wild pigs can involve two or more animals. The occurrence of multiple-animal collisions with this species has been reported previously by the news media (http://mosnews.com/news/2006/03/14/driveoverboars.shtml). At SRS, the mean number of animals involved in multiple-animal accidents (i.e., 2.9) was smaller than the average multiple-animal social group size seen on the SRS (i.e., mean = 4.9, range = 2-22; J. J. Mayer, unpublished data). This would suggest that only a portion of such groups are being struck by vehicles. In a number of cases, the animal involved in a collision with a vehicle was reported to be only one of several wild pigs observed at the scene. Groups of four to nine wild pigs have been observed using primary road ROWs on the SRS. It is also likely that some of these wild pigs were hit by motor vehicles and only injured or crippled. Such situations are known to occur, and animals with healing injuries consistent with this type of collision or trauma have been harvested during the SRS Fall Public Hunts. In some cases, the injured animals have been crippled to the point that they could not move way from the road ROW. Such animals were euthanized at the scene.

The annual population attrition resulting from collisions with vehicles on the SRS is consistent with similar data reported for wild pig populations elsewhere. For example, Groot Bruinderink and Hazebroek (1996) reported the annual percentage of the spring population lost to vehicle collisions in four European countries as: Austria – 0.7; Germany – 3.0; Netherlands – 5.0; and Sweden – 0.5. Okarma et al. (1995) estimated that the annual percent attrition to vehicle accidents within the wild boar population in the Bialowieza Primeval Forest, Poland, for three years as: 0.23, 0.39, and 0.41. Groot Bruinderink and Hazebroek (1996) noted further that the losses in spring to these accidents were a higher percentage of the population than during other times of the year.

Based on the SRS data, the annual numbers of wild pig-vehicle collisions did not appear to be solely correlated with population size. Both Okarma et al. (1995) and Groot Bruinderink and Hazebroek (1996) stated that the number of wild boar road kills were positively correlated to the population numbers. Further, Thompson (1977) reported that, for areas with high wild pig densities that are bisected by heavily used roads, if the numbers of wild pigs increases, so do the accidents between these animals and vehicles. However, Groot Bruinderink and Hazebroek (1996) went on to state that animal-vehicle accident rates were not related simply to animal numbers, and neither do they relate solely to traffic volume. The increased frequencies of these collisions on the SRS in 2002-2003 coincided with the last two years of a five-year drought, which was the most severe drought in the area for the past fifty years. Anecdotal reports indicated that the site's wild pigs had increased their movement patterns during this period of time, and were seen in places on site that had heretofore never been occupied by these animals. This combined with high population numbers (i.e., 1,000+ animals) could explain these increased accident frequencies. Although not an extended period, rainfall in first half of 2006 was lower than usual. This also coincided with an estimated increase in population size.

As elsewhere, wild pig-vehicle collisions on the SRS occurred year-round and throughout the 24-hour daily time period. Most wild pig-vehicle collisions in Eurasia were reported to occur in the fall-winter months and during the night (Groot Bruinderink and Hazebroek 1996, Inbar et al. 2002, Goulding 2003). Increased periods of movement activity (e.g., during the peak breeding) would probably result in an increase frequency of collisions with vehicles. Both Hartwig (1991) and Groot Bruinderink and Hazebroek (1996) noted a peak in wild boar-vehicle collisions during the breeding season. Although wild pig breeding occurs year-round on the SRS, the peak of conception is from August to October with a smaller peak in December-January (J. J. Mayer, unpublished data). The start of each of these peak breeding periods is consistent with the highest peaks in vehicle collisions.

Consistent with the SRS traffic patterns, collisions occurred during every day of the week, with the highest number of accidents during the weekdays. However, the peak accident occurrence on Wednesday does not reflect the site’s daily traffic volumes. The site traffic volume peaks on Monday, and then steadily decreases to Sunday. The reasons for the significant difference between the weekday accident frequency and the traffic flows have not been determined at this time.

The hourly pattern of these collisions is probably related to several factors primarily including traffic flows and visibility, as well as the behavioral patterns of the site’s wild pigs. The early morning peak (i.e., 0400 until 0759 hours) coincides with the site’s morning commuters. The smaller early evening peak (i.e., from 1800 until 2259 hours) occurs during a period of both decreasing visibility/light and increased movement rates among the site’s wild pigs (Crouch 1983). Although showing a similar high frequency for accidents at night, Groot Bruinderink and Hazebroek (1996) reported the peak hourly period of wild boar-vehicle collisions to be 2200-2400 hours. Inbar et al. (2002) stated that all of the collisions with wild boar in their study occurred during the nighttime hours. No information was provided by the authors of either of those studies as to the traffic flow patterns.

No roadway characteristics associated with wild pig-vehicle collisions have been reported previously. The attractiveness of the ROW for foraging by wild boar has been suggested as a causal factor for these collisions (Briedermann 1986, Groot Bruinderink and Hazebroek (1996).

As with data for white-tailed deer (Allen and McCullough, 1976; Jahn, 1959), fewer vehicle accidents involving wild pigs occurred on unpaved roads. However, this is more likely indicative of the traffic volumes on the primary versus secondary roads on the SRS as opposed to the road surface. The availability of water near the road has also been suggested to be a possible increased risk of collisions with this species (Groot Bruinderink and Hazebroek 1996). In the comparison of the roadway parameters between the four SRS roads and the combined collision locations, the distance to the nearest wetland was not significantly different. This, however, may be more a result of the fact that wetland habitats on the SRS are both widespread and constitute a major portion (i.e., 25 percent) of the site, rather than a lack of importance of nearby wetlands to the collision locations. The presence of lateral barriers would appear to constitute an obstacle to the ability of wild pigs to exit the roadway in the face of oncoming traffic. Long stretches of roads on the SRS with continuous guardrails constitute areas of high frequencies of wild pig-vehicle collisions. One such stretch of SRS roadway, crossing a wide (i.e., 1.5 kilometer) bottomland hardwood area (i.e., preferred wild pig habitat, Crouch 1983), is an elevated road bounded on both sides by a reinforced steel girder guardrail with concrete bridge walls at the stream crossing itself. This has been and continues to be one of the portions of site roadways that see the highest incidence of vehicle collisions with wild pigs.

Wild pigs are large animals with a heavy body mass (e.g., 200+ kg) and a relatively low center of gravity. This represents an increased safety hazard for vehicle collisions (Briedermann 1986). In collisions with wildlife in Israel, 78 percent of the accidents that resulted in human injuries and casualties involved wild boar (Inbar et al. 2002). In West Germany, personal injury involving collisions with wild boar encompassed 12.8 percent of the total accidents with big game animals (Briedermann 1986). As with the deer-vehicle collisions, some property damage does occur with wild pig-vehicle collisions. The average vehicle damage estimate from the present study (i.e., $1,173) was less than the averages cited for deer-vehicle collisions in the United States, which range from $1,303 to $2,389 (Schwabe et al. 2002).

Due to the lack of these data, no mean per accident cost estimate for personal injury/fatality was developed during this study. A comparable estimate for deer-vehicle collisions for this mean cost estimate was reported to be $173 (Schwabe et al. 2002). Assuming that this mean cost estimate for wild pig-vehicle collisions would be similar, that amount added to the mean property damage estimate from the present study would result in a total per accident mean cost of $1,346.

In addition to the risks of primary collisions, the presence of larger road-killed wild pigs can present a safety hazard because of their physical size. Several secondary accidents have also occurred on the SRS when motorists attempted to avoid hitting a dead wild pig blocking the traffic lane. The one human fatality associated with a wild pig-vehicle collision on the SRS was just such a secondary collision. Human injuries occurred in less than 4 percent of deer-vehicle collisions in Michigan and were usually the result of secondary collisions (Allen and McCullough 1976).

CONCLUSIONS

Similar to vehicle accidents with other big game species, vehicle collisions involving wild pigs on the SRS were found to vary with parameters associated with the animals involved, timing, and location. Such collisions, therefore, do not occur either randomly or without patterns. Further, as previously reported, human impacts in the form of personal injury and property damage do occur as a result of collisions with these animals.

The existence of the aforementioned patterns would indicate the potential for developing methods for reducing wild pig-vehicle collisions. For example, public/community education as to the times and places of greatest risk would be a viable option in areas of high densities of wild pigs. In addition, since the incidence of wild pig-vehicle collisions appears to be at least partly population density dependent, control through harvest would be another possible means of reducing these accidents.

Both wild pig numbers and distribution are projected to increase in the United States in the near future. Along with this species population trend, the potential for vehicle collisions with these animals will also go up. Using the current average population estimate for wild pigs in the United States (i.e., 4 million animals), and the means for the annual population attrition from vehicle collisions (i.e., 0.8 percent), number of vehicle collisions per animal involved (i.e., (0.84) and total cost estimate per collision (i.e., $1346), as determined in this study, the potential total annual cost of wild pig-vehicle collisions in the United States would be approximately $36 million. As populations of this invasive species continue to increase, this potential economic impact to the nation could become substantial.

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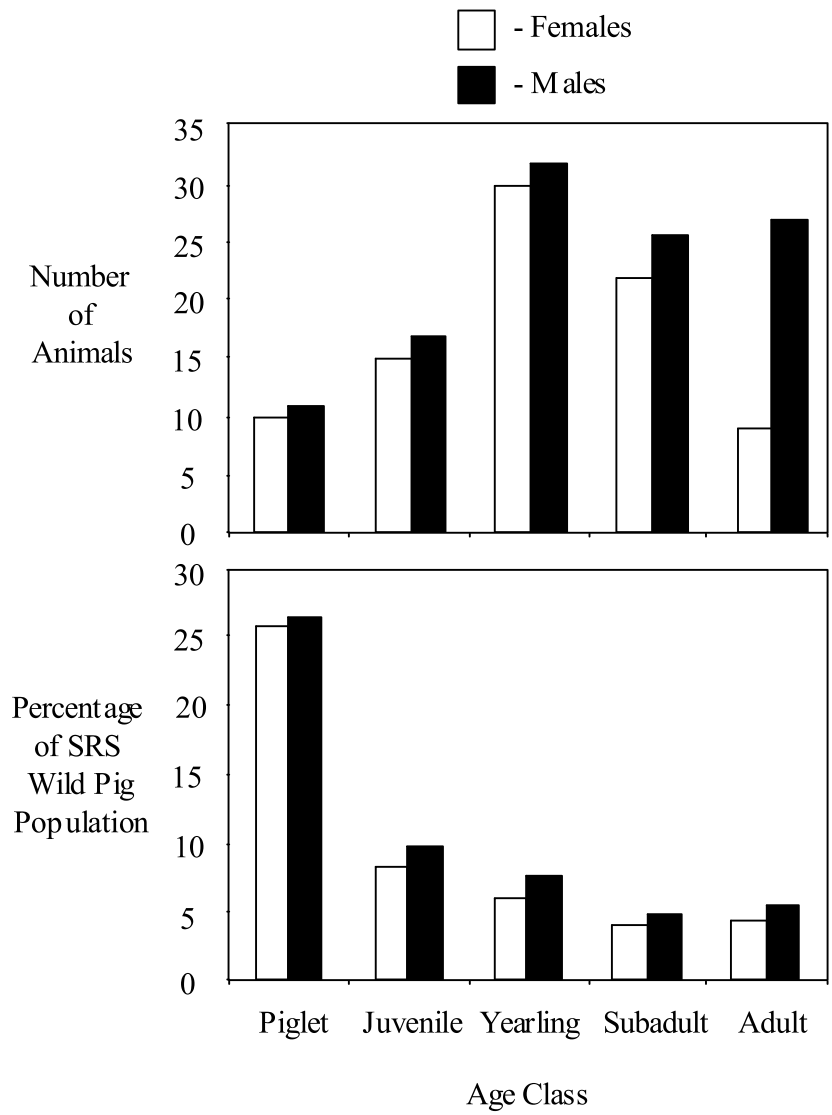
Figure Legends

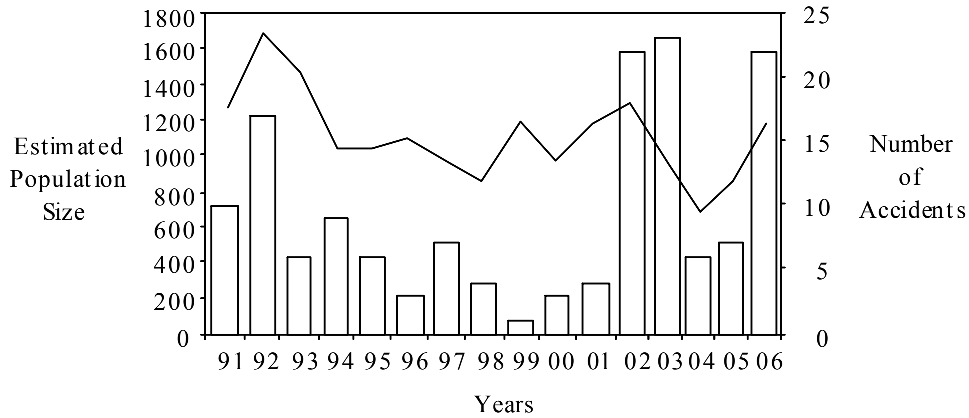
Figure 1. Histograms comparing the sex/age class frequency of the wild pigs involved in vehicle collisions (above) and the overall percent composition of these same groupings estimated to exist in the SRS wild pig population (below).

Figure 2. Annual comparison of the estimated size of the SRS wild pig population (solid line) and the number of the wild pig-vehicle collisions (histogram bars) between 1991 and 2006.

Figure 3. Monthly, weekday and hourly frequencies of the number of the wild pig-vehicle collisions. A running mean has been superimposed over the different histograms to highlight a pattern.



- Females
- Males
Number of Animals
35
30
25
20
15
10
5
0
30
25
20
15
10
5
0
Percentage of SRS Wild Pig Population
Piglet
Juvenile
Yearling
Subadult
Adult
Age Class



Estimated Population Size
Number of Accidents
Years
0
200
400
600
800
1000
1200
1400
1600
1800
0
5
10
15
20
25
91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06

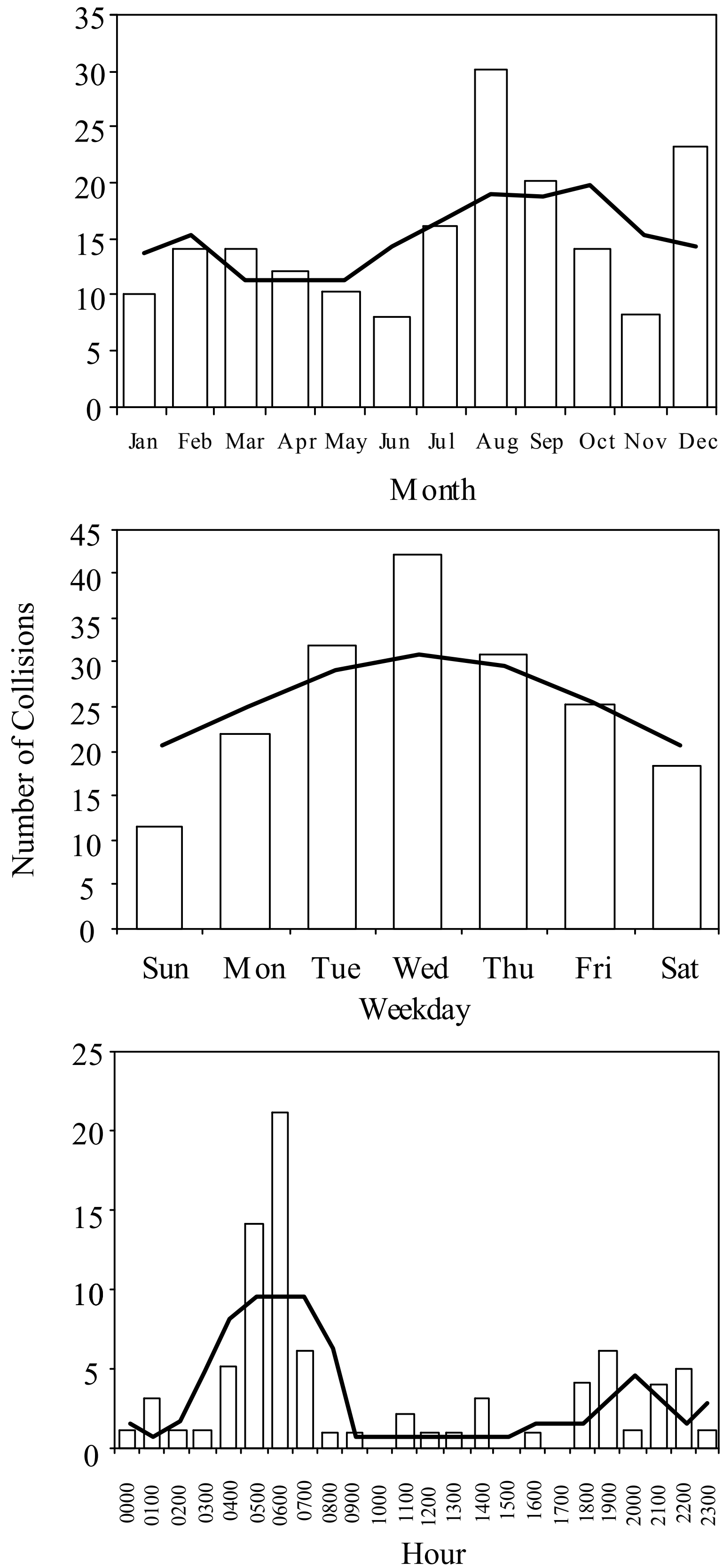

Number of Collisions
35
30
25
20
15
10
5
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Month
45
40
35
30
25
20
15
10
5
0
Sun Mon Tue Wed Thu Fri Sat
Weekday
25
20
15
10
5
0
0000 0100 0200 0300 0400 0500 0600 0700 0800 0900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300
Hour

Table 1. Comparison of total body mass means (in kg) for wild pigs involved in vehicle collisions and from the SRS population as a whole. Date were segregated by sex and age class.

Sex	Age Class	Total Body Mass Means (sample size)		*t* Test Results - $p \leq$[a]
		Vehicle Collisions	SRS Population	
Female	Piglet	7.7 (10)	6.0 (1,892)	0.43
	Juvenile	21.7 (15)	25.6 (718)	0.12
	Yearling	39.2 (29)	45.4 (769)	0.006
	Subadult	55.5 (20)	59.7 (660)	0.30
	Adult	79.6 (9)	78.4 (744)	0.97
Male	Piglet	8.0 (11)	6.1 (2,064)	0.42
	Juvenile	23.0 (17)	27.0 (824)	0.36
	Yearling	41.9 (30)	49.2 (755)	0.005
	Subadult	71.1 (24)	67.7 (633)	0.27
	Adult	84.0 (27)	91.5 (1,004)	0.13

[a] Differences are considered to be significant at $p<0.05$