

Deer Roadside Counts 2008

Deer counted per mile of roadside route were slightly (non-significantly, $P > 0.05$) lower in 2008 than in 2007. The non-significant increases in deer counted per mile 2007-2008 from the 2006 low density reflect the non-significant increases in deer density since 2006.

Roadside counting effort in 2008 (Table 6) was consistent with levels in previous years: miles of roadside counts driven and number of times routes were driven were not significantly different ($P > 0.5$) from previous years. There were significantly fewer deer counted per mile driven in 2008 than in 2001 ($P = 0.07$). For all other comparisons, number of deer per mile driven in 2008 was not significantly different from other years. Deer counted per mile driven in 2001 was the highest, and was significantly higher than in 2005-2008 ($P \leq 0.06$).

Table 6. Comparison of roadside count data.

2001				
Route	Miles	Times run	No. deer	Deer/mile
ANF East	93.2	6	67	0.72
ANF West	226.7	6	129	0.57
Chapel Fork	87	6	36	0.41
Collins Pine	31	2	14	0.41
Kinzua Creek	135.9	6	51	0.57
Bradford Watershed	123	8	38	0.30
Sums	696.8	34	335	
Averages	116.1	5.7	55.8	0.48
2002				
Route	Miles	Times run	No. deer	Deer/mile
ANF East	94.9	5	46	0.48
ANF West	154	7	78	0.51
Chapel Fork	83.4	6	23	0.28
Collins Pine	144.2	9	36	0.25
Kinzua Creek	93.7	7	36	0.38
Bradford Watershed	144	9	92	0.64
Sums	712.2	43	311	
Averages	118.7	7.2	51.8	0.44
2003				
Route	Miles	Times run	No. deer	Deer/mile
ANF East	132.7	7	91	0.69
ANF West	176.8	8	75	0.42
Chapel Fork	83.3	6	19	0.23
Collins Pine	126.9	8	45	0.35
Kinzua Creek	161	7	39	0.24
Bradford Watershed	144	9	86	0.60
Sums	824.7	45	355	
Averages	137.5	7.2	59.3	0.43
2004				

Route	Miles	Times run	No. deer	Deer/mile
ANF East	86.8	5	35	0.40
ANF West	153.3	7	60	0.39
Chapel Fork	99.3	7	13	0.13
Collins Pine	126.4	7	26	0.24
Kinzua Creek	153	6	24	0.16
Bradford Watershed	112	7	74	0.66
Sums	730.8	39	232	
Averages	121.8	6.5	38.7	0.32
2005				
Route	Miles	Times run	No. deer	Deer/mile
ANF East	53.5	3	5	0.09
ANF West	176	8	47	0.27
Chapel Fork	105	7	11	0.10
Collins Pine	103.4	7	11	0.11
Kinzua Creek	168	6	22	0.13
Bradford Watershed	112	7	48	0.43
Sums	717.9	38	144	
Averages	119.7	6.3	24.0	0.20
2006				
Route	Miles	Times run	No. deer	Deer/mile
ANF East	109.9	5	17	0.15
ANF West	155.4	7	18	0.12
Chapel Fork	104.2	7	6	0.06
Collins Pine	109.9	7	14	0.13
Kinzua Creek	156	6	5	0.03
Bradford Watershed	128	8	39	0.30
Sums	763.4	39	99	
Averages	127.2	6.5	16.6	0.13
2007				
Route	Miles	Times run	No. deer	Deer/mile
ANF East	76.3	4	10	0.13
ANF West	199.8	9	57	0.29
Chapel Fork	98.4	7	2	0.02
Collins Pine	78	5	5	0.06
Kinzua Creek	165	6	24	0.15
Bradford Watershed	112	7	52	0.45
Sums	729.5	38	151	
Averages	121.6	6.3	25.2	0.21
2008				
Route	Miles	Times run	No. deer	Deer/mile
ANF East	74.8	4	30	0.40
ANF West	176.8	8	25	0.14
Chapel Fork	98.7	7	2	0.02
Collins Pine	93.6	6	6	0.06
Kinzua Creek	146.2	6	26	0.18

Bradford Watershed	112	7	44	0.39
Sums	702.1	38	133	
Averages	117.0	6.3	21.3	0.19

Trend lines for deer density derived from pellet group counts and deer counted per 100 miles roadside counts were nearly identical (Fig. 17) and significantly correlated ($P < 0.001$).

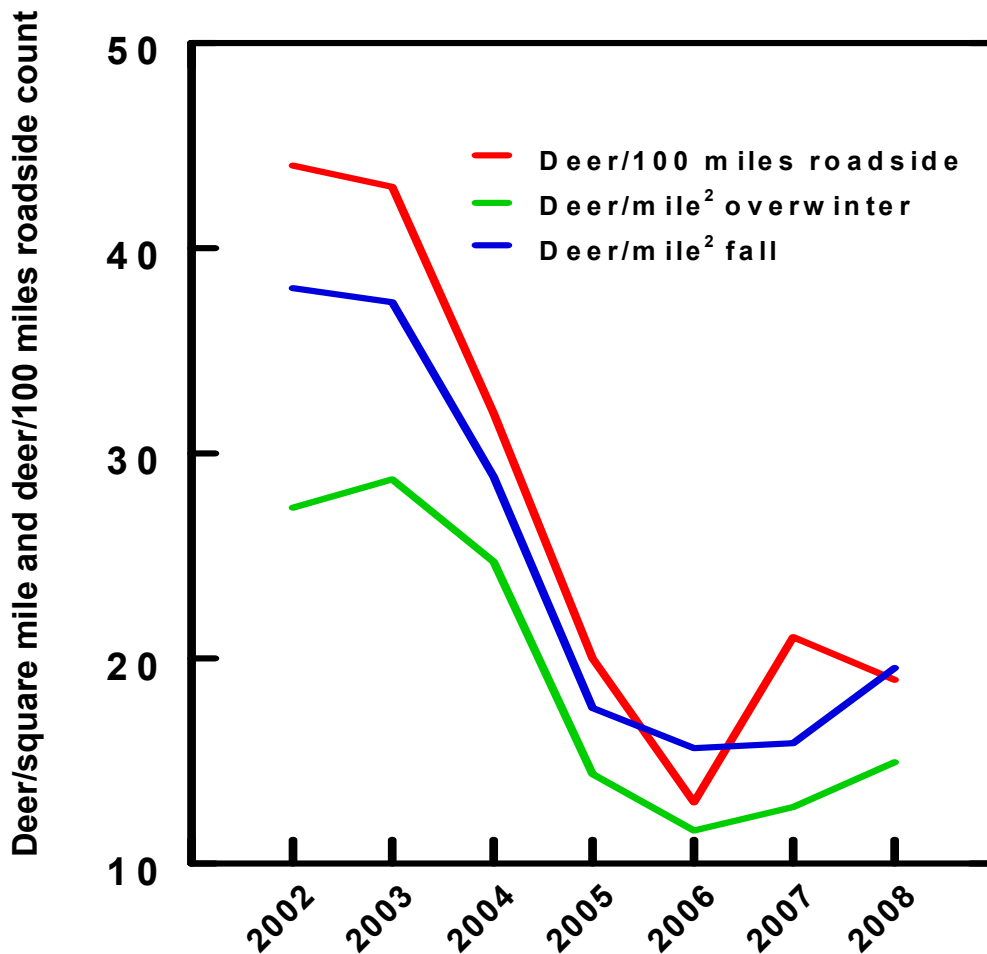


Figure 17. Relationship between trend lines for deer per mile from roadside counts and overwinter and fall abundance from pellet group counts.

Closest fit is between deer counted on roadside counts and estimated deer density in fall, which is an expected result as fall density estimates incorporate recruitment and would be expected to be more similar to roadside counts conducted during the same season.

Roadside counts and estimates of density from roadside counts are highly correlated (correlation coefficients are > 0.98) (Fig. 18). Correlation coefficients are lowest for overwinter density counts ($r = 0.995$) and slightly higher for fall density estimates ($r = 0.997$) (Fig. 16).

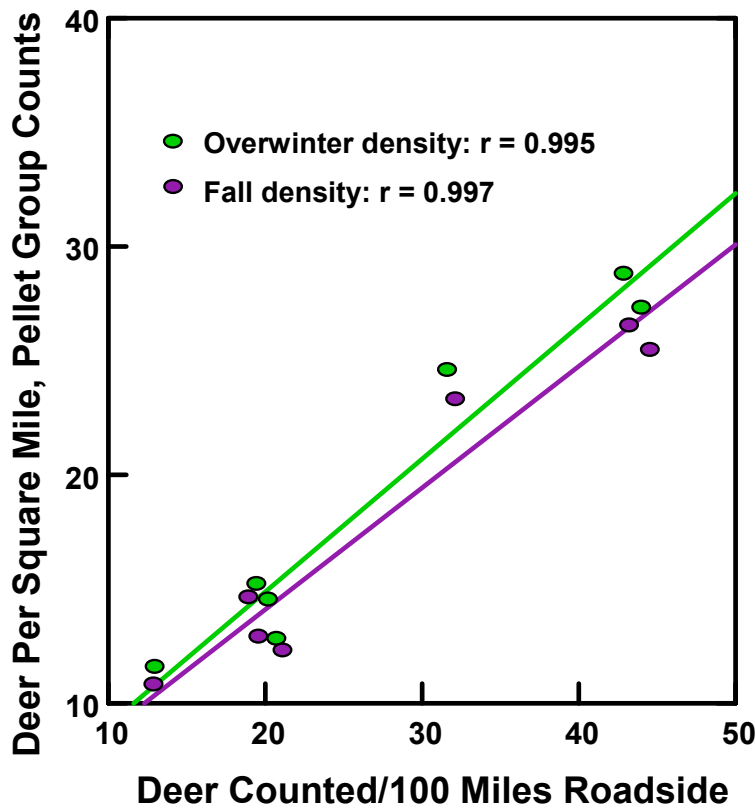


Figure 18. Correlation between deer per mile from roadside counts and overwinter and fall abundance from pellet group counts.

Effect of cover type, route, period, and time of day. – Relative proportions of does, fawns, spike bucks, older bucks, and unknown deer were similar among cover types (Fig. 19). Number of unknown deer counted was proportionately higher in the closed cover type than other classes of deer: this cover type was the hardest to discriminate among deer classes so it is to be expected that most of the unknown deer would be counted in this cover type. Proportions of cover types existing on the project are unknown, so it cannot be determined whether deer used habitats in proportion to their relative abundance.

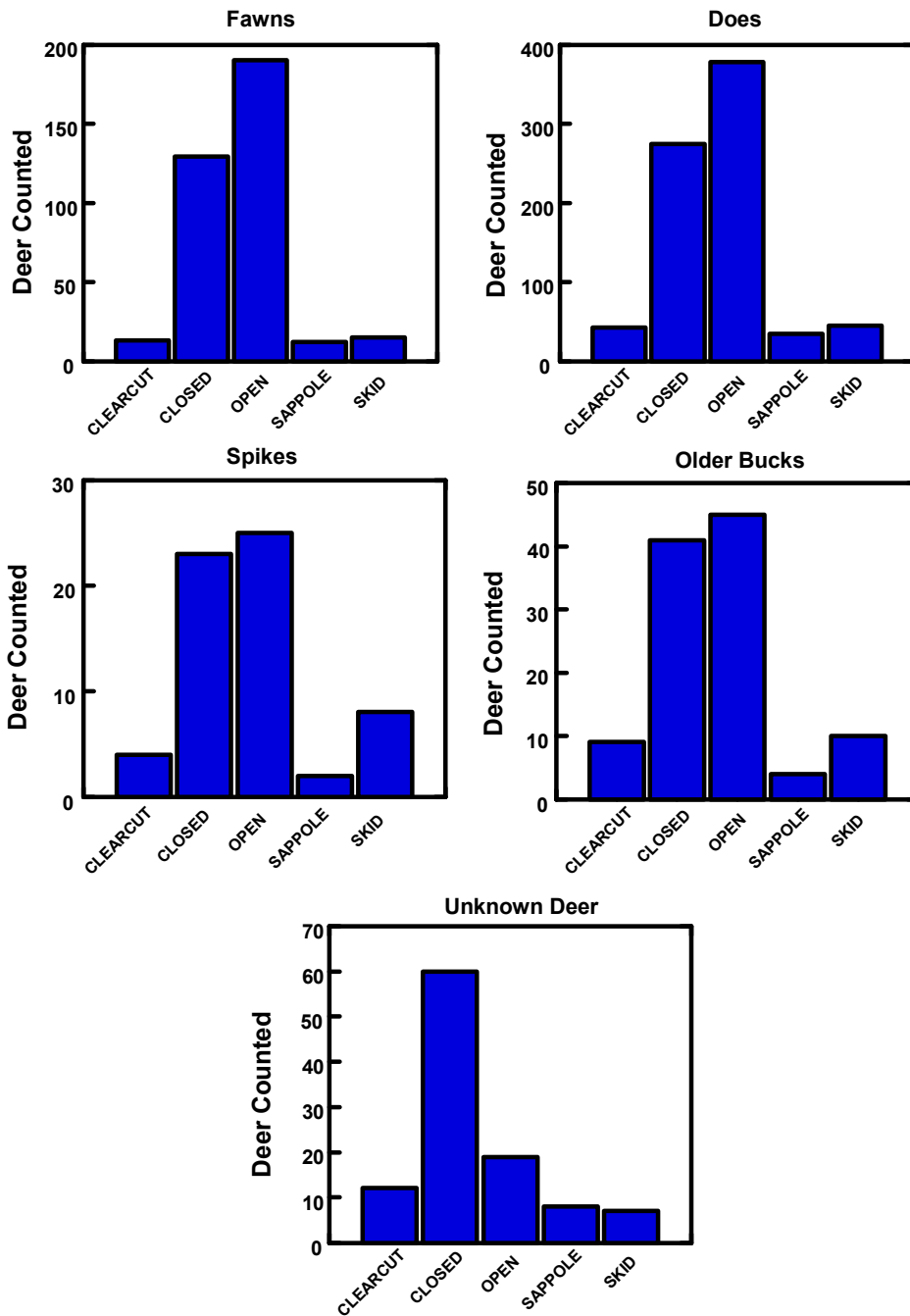


Figure 19. Counts of deer by sex/age groups by forest cover type observed in and pooled across years 2001-2008.

Relative proportions of does, fawns, spike bucks, older bucks, and unknown deer were similar among routes when pooled across years and cover types (Fig. 20).

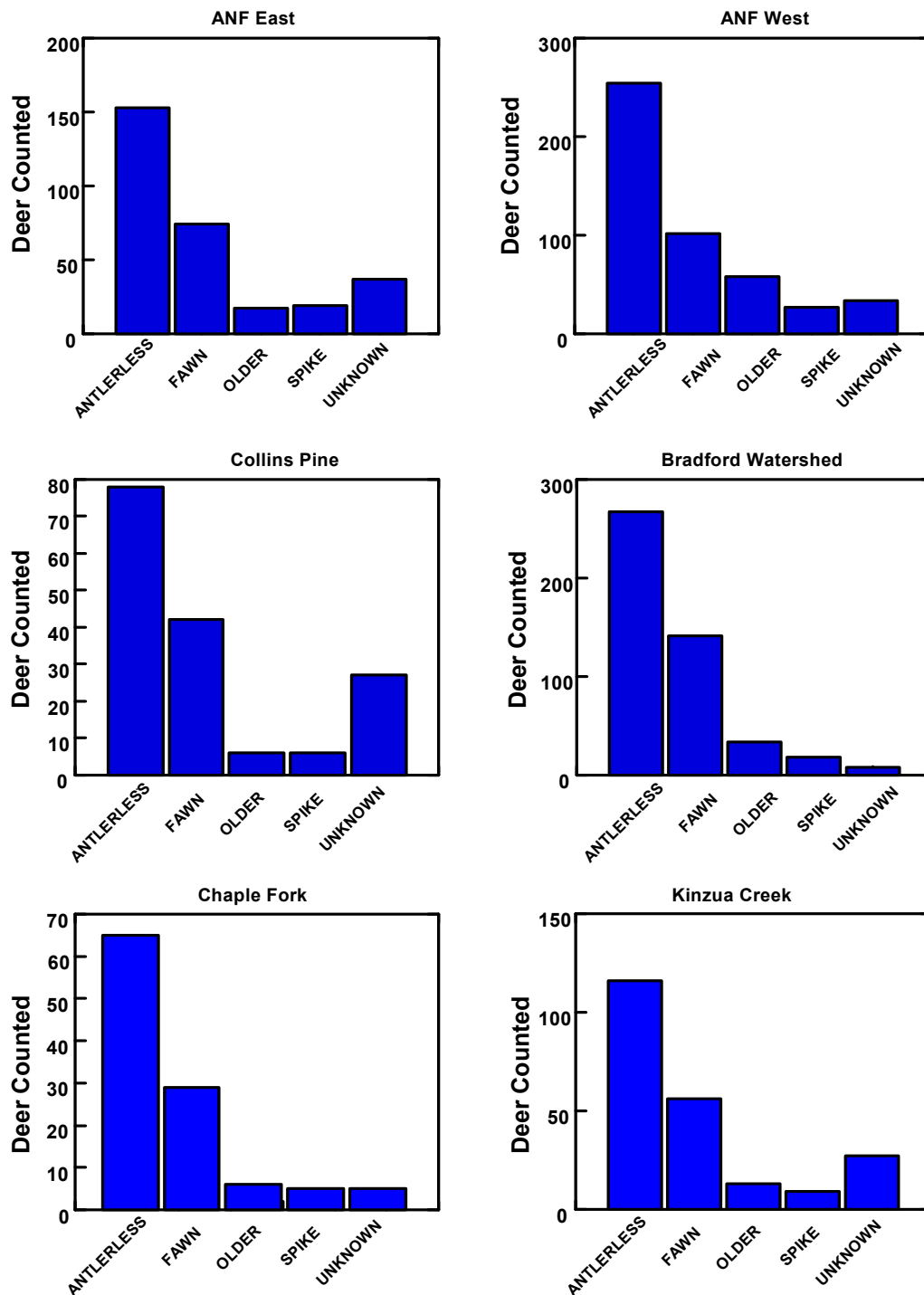


Figure 20. Counts of deer by sex/age groups by roadside route observed in and pooled across years 2001-2008.

Relative proportions of does, fawns, spike bucks, older bucks, and unknown deer were similar among periods (August 1-August 15; August 16-August 31; September 1-September 15) when pooled across years, routes, and cover types (Fig. 21).

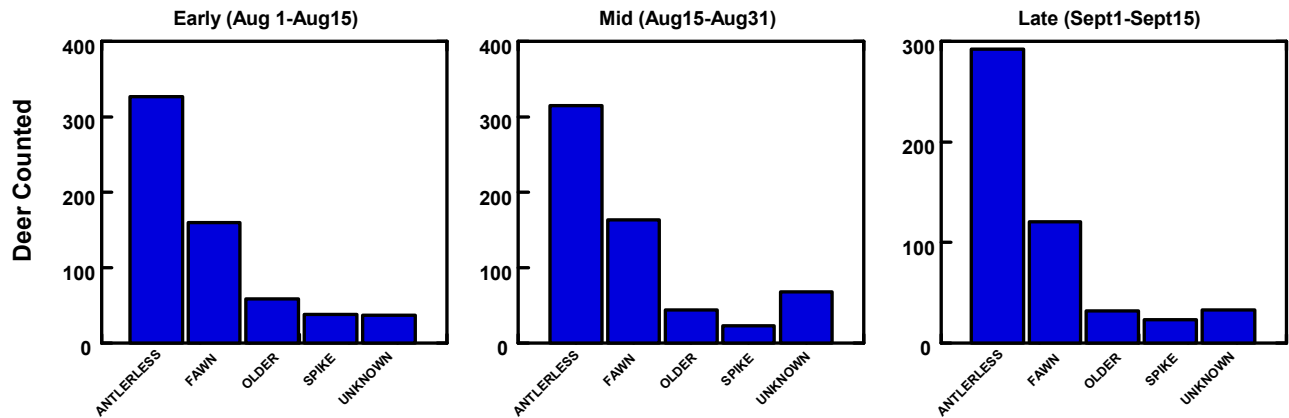


Figure 21. Counts of deer by sex/age groups by observation period (early – August 1-August 15; mid – August 16 – August 31; late – September 1 – September 15), pooled across years, cover types, and routes.

Finally, relative proportions of does, fawns, spike bucks, older bucks, and unknown deer were similar among times of day routes were run (morning and evening) when pooled across years, routes, and cover types (Fig. 22). Most observers had to work during the day, so most of the routes were run in the evening and most of the deer counted were observed in the evening.

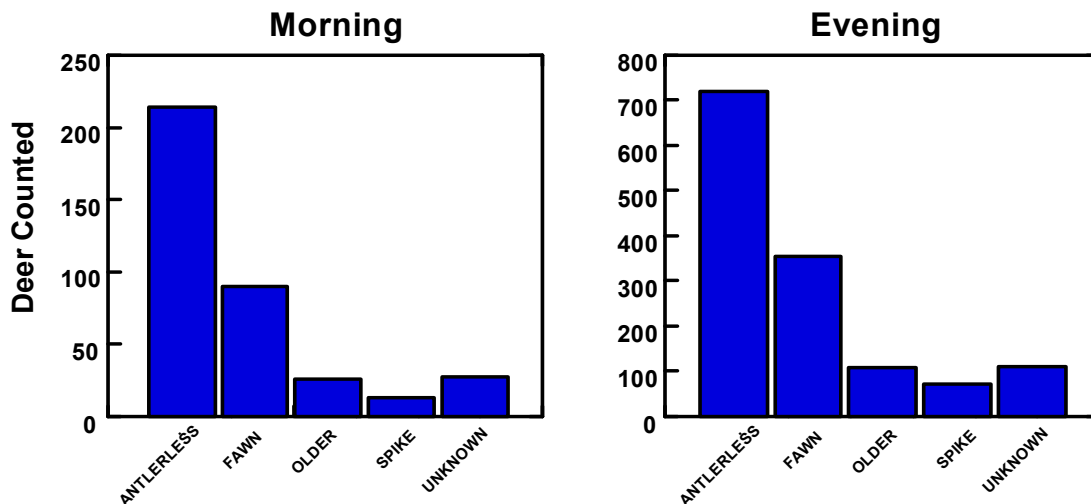


Figure 22. Counts of deer by sex/age groups by time of day (morning and evening), pooled across years, cover types, and routes.

Therefore, it is reasonable to conclude that cover type, roadside route, period of observation, and time of day do not influence the distribution of observed deer by sex/age category and that counts of deer may be pooled across route, time of day, period, and cover type without biasing the counts. This was done in 2008, as in previous years.

Relative proportions of does, fawns, spike, older, and unknown deer were consistent among years (Fig. 23). Highest number of deer counted was always does, and fawns were always the second-most deer observed. However, after the initiation of the 3-point antler rule in 2002, proportion of older bucks (branch-antlered) has been higher than proportion of spike bucks, excepting 2006.

Deer Counted on Roadside Counts

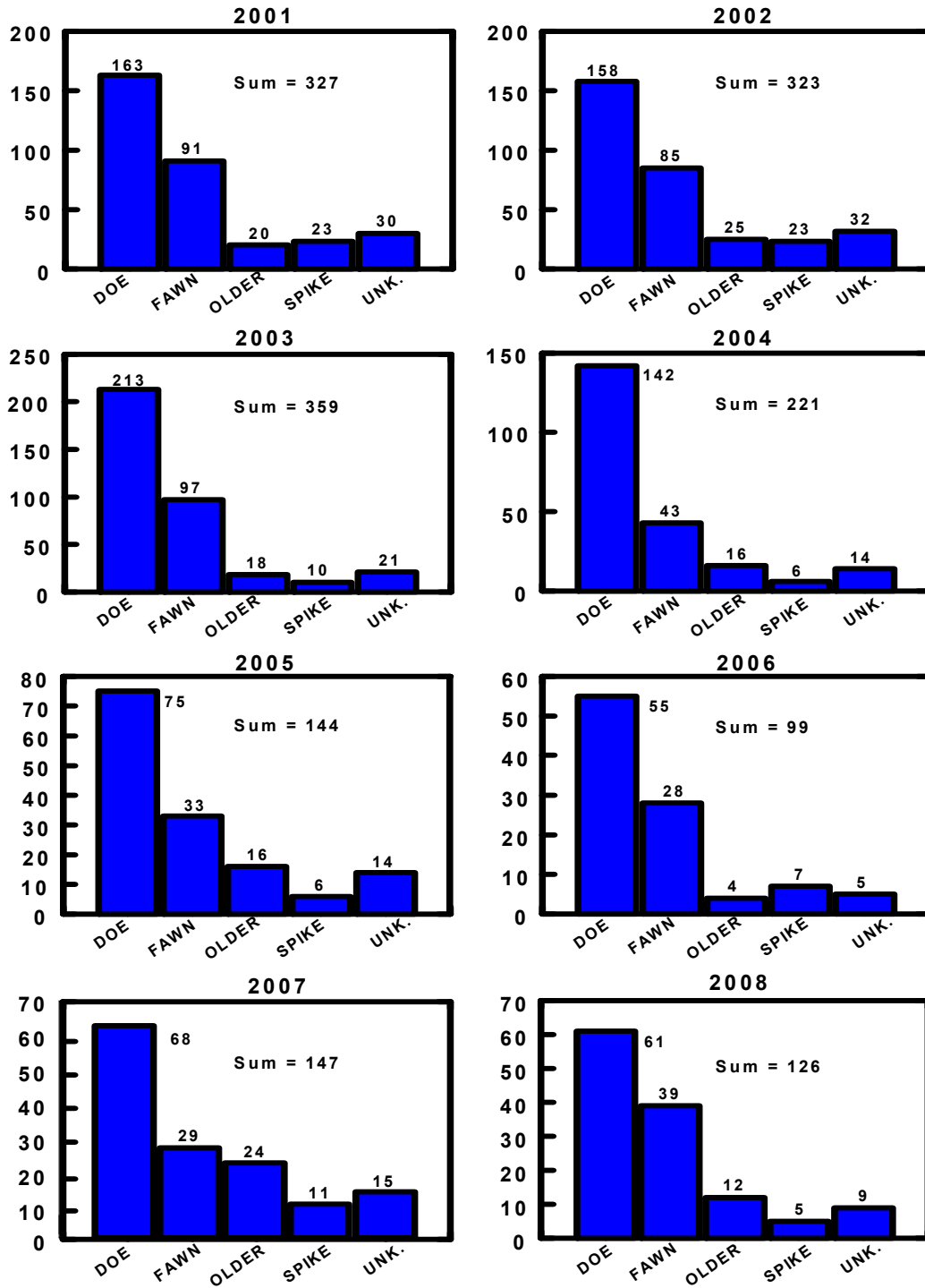


Figure 23. Counts of deer pooled across roadside routes, time of day, time of season, and cover type.

Ratios: fawn/antlerless deer; buck/antlerless deer. - Ratio of fawn:antlerless deer increased in 2008 (Table 7) over 2007 and was the highest on record. Fall fawn recruitment (50.0%) was the highest since the inception of the program

Research conducted by the Pennsylvania Game Commission and Pennsylvania State University suggests that predators (primarily black bear and coyotes) kill about

half of the fawns prior to fall. If one assumes that a similar predation rate exists on the KQDC, fawn doe ratio without predation would have approximated 1.3, which is closer to the desired 1-2 fawns per doe but still low enough to suggest that overwinter nutrition for does may not be adequate for optimize fawning rate and recruitment.

Ratio of older bucks:does declined from 2007 to 2008 but was still among the top three years. Ratio of spike bucks:does in 2008 was lower than the previous two years, possibly a function of the lower fawn recruitment rate in 2007. Ratio of all bucks combined:does increased in 2008 from 2007: there were proportionately fewer antlered deer observed relative to does in 2008. The two-year period (2003-2004) when hunters brought more does than bucks to check stations reversed in 2005-2007 as hunters brought more bucks than does to check stations. As hunters once again selectively harvested more bucks than does, and as the overall deer population declined in abundance after 2003, antlered bucks made up increasingly larger proportions of the harvest.

Table 7. Ratios of fawns:does; older bucks: does; spike bucks: does; recruitment rates.

Year	Fawns:Does	Fall Fawn Recruitment	Older Bucks:Does	Spike Bucks:Does	Bucks:Does
2001	1:1.8	44.1%	1:6.9	1:7.2	1:3.5
2002	1:1.8	48.4%	1:7.8	1:20.2	1:5.6
2003	1:2.2	40.6%	1:11.7	1:21.1	1:7.5
2004	1:3.3	23.7%	1:11.3	1:12.9	1:6.0
2005	1:2.3	34.0%	1:4.8	1:15.2	1:3.6
2006	1:1.9	42.4%	1:13.5	1:7.7	1:4.9
2007	1:2.3	28.2%	1:2.8	1:6.2	1:1.9
2008	1:1.6	50.0%	1:5.1	1:12.2	1:3.6

Other wildlife counted during roadside counts. - Numbers of other wildlife observed on roadside counts exhibited large year-to-year fluctuations (Table 8). Year-to-year changes in combined counts of turkeys and grouse were inversely proportional to changes in numbers of coyotes and bobcats: as combined counts of the two predators increased, turkey and grouse numbers declined and vice-versa (left graph, Fig. 24). Large annual fluctuations in turkey and grouse populations are well-documented, but similarly large annual fluctuations in coyotes and bobcats are not. If changes in predators are affected by abundance of prey, there generally is a one-year lag between change in prey abundance and change in predator abundance, which was not the case with observations on the Project Area.

However, highs and lows of predator counts occurred within the same year as lows and highs of turkey and grouse counts. And, primary prey species of coyotes and bobcats include rabbits, hares, smaller mammals such as mice and shrews, and other ground-nesting birds as well as live and scavenged deer, so coyotes and bobcats are not reliant on turkeys and grouse for survival. It is far more likely that the large annual fluctuations in bobcats and coyotes are caused by large annual fluctuations in recruitment of coyote pups and bobcat kits, which is directly related to overwinter nutritional status of pregnant coyotes and bobcats. Young bobcats and coyotes disperse in their first year, so large annual fluctuations are to be expected. It is possible that with large annual changes in bobcats and coyotes, there might be similarly large

fluctuations in numbers of turkeys and grouse killed by these predators in the same years.

The picture is similar concerning impact of bobcats, coyotes and bears on fawn recruitment (right graph, Fig. 24). The inverse relationship between counts of the three predators combined and fall fawn recruitment is similar to the one between bobcats and coyotes and grouse and turkeys in that responses of fall fawn recruitment occur in the same year as changes in predator counts, the one exception being in 2008 where a slight increase in combined predator counts is associated with a large increase in fall fawn recruitment. It seems to be a safe observation that predators on the Project Area can reduce turkey and grouse abundance, and can depress fall fawn recruitment.

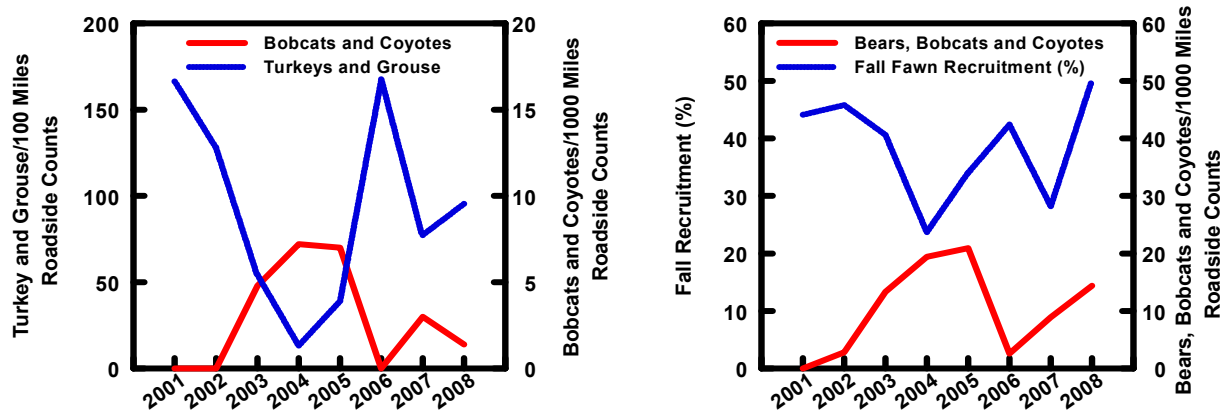


Figure 24. Comparisons of counts of turkeys and grouse with counts of bobcats and coyotes (left graph) and fawn fall recruitment and counts of all predators (right graph).

Table 8. Numbers of wildlife species observed during roadside counts.

	Route	Bear	Coyote	Bobcat	∑Predators	Rabbit	Turkey	Grouse	Other**
2001	BWA*	0	0	0	0	2	39	2	2
	KCRK	0	0	0	0	0	15	2	0
	CP	0	0	0	0	0	8	0	0
	ANFE	0	0	0	0	0	14	2	0
	ANFW	0	0	0	0	0	18	5	2
	CF	0	0	0	0	0	11	0	5
	∑	0	0	0	0	4	105	11	7
	/ 1,000 miles	0	0	0	0	5.7	150.7	15.7	10.0
2002	Route	Bear	Coyote	Bobcat	∑Predators	Rabbit	Turkey	Grouse	Other**
	BWA	1	0	0	1	3	56	1	2
	KCRK	0	0	0	0	0	1	0	1
	CP	1	0	0	1	0	0	1	0
	ANFE	0	0	0	0	1	11	1	1
	ANFW	0	0	0	0	0	17	0	0
	CF	0	0	0	0	0	3	0	0
	∑	2	0	0	2	4	88	3	4
/1,000 miles	2.8	0	0	2.8	5.6	123.6	4.2	5.6	
	Route	Bear	Coyote	Bobcat	∑Predators	Rabbit	Turkey	Grouse	Other**
	BWA	4	0	0	4	1	2	2	0

2008	ANFE	0	0	0	0	0	0	10	1***
	ANFW	2	0	0	2	0	18	1	0
	CF	1	1	0	1	1	17	2	0
	Σ	7	1	0	8	19	52	15	2
	/1,000 miles	10.0	1.4	0	11.4	27.1	74.0	21.4	2.8

*BWA=Bradford Water Authority; KCRK=Kinzua Creek; CP=Collins Pine;
ANFE=Allegheny National Forest East; ANFW=Allegheny National Forest East;
CF=Chapel Fork.

**Other = sum of woodchucks, raccoons, squirrels, skunks, fox, porcupine.

*** = Fisher