Small Game

John C. Kilgo

Although small game currently is not harvested on the Savannah River Site (SRS) outside of the Crackerneck Wildlife Management Area and Ecological Reserve (CWMA), several species of small game occur on SRS. These include common snipe (*Gallinago gallinago*), American woodcock (*Scolopax minor*), mourning dove (*Zenaida macroura*), northern bobwhite (*Colinus virginianus*), eastern cottontail (see table 4.24 for scientific names of mammals), marsh rabbit, gray squirrel, and fox squirrel. Swamp rabbits are not known to occur at SRS (see chapter 5). Although representatives of this group occupy virtually every habitat on SRS, they vary in their seasonal occurrence and abundance. Some are resident (bobwhite and the mammals), and some are migratory (snipe, woodcock, and mourning dove); some are common (mourning dove and gray squirrel), and some are rare (snipe and marsh rabbit).

In general, little information is available on the status of these species on SRS, and limited research has been conducted on them there. The annual Christmas Bird Count, coordinated by the National Audubon Society and conducted by volunteers, provides the most useful data available on population trends of the birds since 1979. Although the Christmas Bird Count contains many inherent biases, it is the most uniform long-term dataset available for these species on SRS. A few community-level, breeding-season studies also have noted the birds. Similarly, various research projects have incidentally noted some of the mammals, particularly the squirrels. The annual furbearer census from 1954 to 1982 (see "Furbearers" section in this chapter) occasionally recorded eastern cottontails and gray squirrels, but none of these surveys were designed to assess their populations. Harvest records from CWMA may reflect population trends for that area, but small game hunting is not intensive there, and harvests generally are very low. Therefore, much of the information contained herein is anecdotal or based on general knowledge of the species, obtained from beyond the SRS.

Common Snipe

The common snipe occurs at SRS from fall through spring, arriving from northern breeding grounds in early October and departing in early May (Norris 1963; Mayer et al. 1997). It uses shallow wetlands, including

Table 6.8 Christmas Bird Count data for small game birds at the Savannah River Site, 1979–2002

	Species			
Year	Common snipe	American woodcock	Mourning dove	Northern bobwhite
1979			13	57
1980			17	46
1981			55	6
1982			1	1
1983		1	22	6
1984	2		65	2
1985		1	33	24
1986	1		65	10
1987			41	
1988			39	37
1989	1		64	2
1990			232	54
1991	2		30	
1992	1	1	72	9
1993			472	5
1994	10	3	75	24
1995	11	11	99	
1996	8	4	157	cw[a]
1997	12	5	64	18
1998	2	5	110	18
1999	5	3	43	cw
2000	3		75	5
2001	5	2	38	
2002		1	50	32

[a] Species detected during the week of the count but not on the count day.

marshes and wet, herbaceous meadows (Arnold 1994), and probably Carolina bays with herbaceous cover. No reliable information is available on continental or regional population status or trends (Arnold 1994). Norris (1963) characterized snipe as "fairly common" at SRS. In recent years, the Christmas Bird Count has recorded snipe regularly, but from 1979 to 1993, they were recorded in only five years (table 6.8). However, the recent increase in observations more likely reflects an increase in survey effort than an actual population trend. Snipe have been neither observed nor harvested at CWMA, most likely because suitable habitat there is extremely limited (M. Caudell, South Carolina Department of Natural Resources, pers. comm.).

American Woodcock

Although no nesting records exist for SRS, woodcock breed locally within South Carolina (Post and Gauthreaux 1989). Occasional breeding at SRS may occur, as woodcock have appeared there during summer (M. Caudell, pers. comm.). During fall and winter, more northerly migrants augment southern breeding populations. Norris (1963) considered woodcock rare on SRS during the 1950s, citing an individual killed on South Carolina Highway 125 as the only record. The Christmas Bird Count recorded woodcock in only three years prior to 1994 but recorded them in every year since, except 2000 (table 6.8). No woodcock were harvested at CWMA between 1984 (the first year harvest was monitored) and 1991, but they have been harvested in five of the twelve years since (table 6.9). They are common on CWMA during winter, but few hunters pursue the species (M. Caudell, pers. comm.). However, as with snipe, it is doubtful that these patterns reflect an increase in the wintering population of woodcock on SRS, as the species experienced annual declines of 2.5 percent region-wide (eastern United States) between 1968 and 1996 (Brugginck 1996). Mayer et al. (1997) still considered woodcock rare at SRS in the mid-1990s.

During winter, woodcock use moist forests, typically bottomland hardwoods, with dense understories (Straw et al. 1994) for foraging during the day. Although some birds remain in forested habitat at night, they often move to open habitats. Berdeen and Krementz (1998) reported that approximately half of the nocturnal radio-locations of woodcock in the Georgia Piedmont were in one- to three-year-old clear-cuts or fallow fields; woodcock used those habitats more frequently than other open habitats. Woodcock preferred clear-cuts larger than 5.5 ha (13.6 ac) that had dense foliage at 0.8 to 2.0 m (2.6–6.6 ft) in height, combined with a high percentage of bare soil (Berdeen and Krementz 1998).

Mourning Dove

Among South Carolina hunters, the mourning dove is the second most popular species of choice behind white-tailed deer (Responsive Management 2001). The statewide harvest of doves during the 1999–2000 season was just under 1.5 million birds. Doves are common year-round on SRS (Mayer et al. 1997), nesting in nearly all upland habitats on site, though abundance is probably greatest during winter, when northern migrants join resident birds.

Table 6.9 Small game harvest at Crackerneck Wildlife Management Area and Ecological Reserve, Savannah River Site, 1984–2003

	Species					
Year	Woodcock	Mourning dove	Bobwhite	Rabbit	Gray squirrel	Fox squirrel
1984						
1985						
1986				1	105	
1987				2	103	6
1988					85	
1989			1		28	
1990			6		27	
1991			9		75	
1992	3		28	1	37	
1993			24	3	2	
1994			13		12	
1995	8		44	7	34	4
1996	2	1	49	2	37	
1997	8		12		35	
1998			8	2	56	
1999			13	1	38	
2000		1	17	5	66	
2001		2	18	6	232	
2002		36	17	30	47	
2003	3			11	121	

As granivorous ground feeders, mourning doves are typically most abundant in agricultural areas (Lewis 1993). During the breeding season, they are more than four times as abundant in the counties surrounding SRS than they are on SRS (Kilgo et al. 2000). However, with young pine plantations; road, railroad, and transmission line rights-of-way; and the lawns surrounding facilities, the amount of open habitat on SRS is adequate to maintain a substantial population. Despite their abundance on site relative to other game birds, only forty doves have ever been harvested at CWMA, thirty-six of which were in one year (see table 6.9). Doves are typically hunted around agricultural fields, and no managed dove fields currently exist on CWMA.

From 1991 to 1995, the partial drawdown of Par Pond for repairs to the retaining dam exposed sediments contaminated by low-level radiocesium (^{137}Cs). Doves and other wildlife foraged on vegetation that grew

on those sediments. Kennamer et al. (1998) analyzed the risk to a hypothetical hunter of consuming doves from Par Pond. Using the maximum concentration of ^{137}Cs observed in doves in the study, they calculated that a hunter would have to consume forty-one such doves per year to exceed the U.S. Environmental Protection Agency's action level of excess cancer risk. As only 1 of 102 doves collected from Par Pond exhibited the contamination level used in their calculation, Kennamer et al. determined that it was unlikely that the hypothetical hunter could have harvested and consumed more than 40 such doves, even if he or she harvested the entire legal season limit of 840 doves (12 per day × 70 days in the season), hunting only at Par Pond. Hunters in the vicinity of Jackson, South Carolina, immediately adjacent to SRS, would have to consume more than 3,800 doves per year to exceed the EPA risk-action level (Kennamer et al. 1998).

Northern Bobwhite

The northern bobwhite, or bobwhite quail, is resident at SRS year-round. Although it is still common (Mayer et al. 1997), its population on SRS has declined since 1950. Golley (1962) reported that bobwhite numbers increased by 100 percent from 1952 to 1961. Abundance on SRS in 1961 was comparable to that in Alabama and southwest Georgia (Jenkins and Provost 1964) where intensive management for the species occurred. Covey size averaged seventeen birds in 1960–1961 (Jenkins and Provost 1964). The population apparently peaked in 1961 and declined thereafter, as the extent of pine plantations increased on SRS.

Declining trends have occurred throughout the southeastern United States during the past forty to fifty years. The primary cause of the declines has been the extensive land-use conversion in the region during that period. The invasion of the red imported fire ant (*Solenopsis invicta*) into the United States, as well as an increase in predators resulting from both raptor protection and a decline in commercial furbearer trapping, may have impacted quail production, especially in marginal habitats. Habitat loss has likely been an especially important factor at SRS, given the dramatic change in land use on site from a primarily agricultural to a primarily forested landscape (see chapter 1). As is the case with mourning doves, Kilgo et al. (2000) reported that quail were more than four times as abundant in the region surrounding SRS, where a significant component of the landscape remains agricultural, than on SRS. Fire ants and predators may also limit quail populations at SRS.

Quail use early-successional edge habitats and open woods (Mahan 1995). On SRS, they use recently regenerated pine plantations and rights-of-way (J. Dunning, Purdue University, unpublished data) because so little area remains in fields. Older, frequently burned pine forests with well-developed grass-forb layers constitute the most suitable quail habitat at SRS. Native legumes and grasses occurring in such stands provide the most important food resources for quail during much of the year (Landers and Johnson 1976). The CWMA plants bicolor lespedeza and manages food plots for quail. During the brood rearing period, quail make greater use of herbaceous cover in open habitats, which provides the invertebrate prey that constitutes more than 80 percent of the diet of young quail. The CWMA maintains areas with low herbaceous cover as brood habitat.

Quail call counts on CWMA from 1991 to 2001 indicate fluctuating numbers (South Carolina Department of Natural Resources, unpublished data), probably in response to localized timber harvest and quail habitat management activities occurring along the count route. The first quail was harvested at CWMA in 1989. Annual harvest generally increased until its peak in 1995 at forty-nine birds, likely reflecting increased hunter effort, but has declined since (table 6.9).

Eastern Cottontail

The eastern cottontail is abundant at SRS (Cothran et al. 1991). During the early 1960s, Jenkins and Provost (1964) estimated densities at 0.7 rabbits per ha (0.3 per ac), though numbers have likely declined, since their preferred habitat has diminished. Cottontails most commonly occur in thick grass and thickets in upland habitats on SRS, regardless of forest type. Lower densities occur in sandhills, and cottontails are virtually absent in extensive areas of bottomland habitat (Cothran et al. 1991), such as the Savannah River swamp and Upper Three Runs. Rabbits (both marsh and cottontail have been taken sporadically at CWMA, though harvest seems to have increased in recent years (table 6.9).

Marsh Rabbit

Marsh rabbits are primarily a coastal species, occurring in coastal lowlands and brackish marshes of the southeastern United States. They are considered uncommon on SRS, where they replace cottontails in bottomland habitat (Cothran et al. 1991). Little is known of their status on

SRS, though they likely constitute a significant portion of the harvest at CWMA, which includes extensive bottomland hardwood habitat.

Gray Squirrel

Gray squirrels are abundant on SRS. They occur most commonly in hardwood forests containing oaks and hickories, but they also use pine and mixed pine-hardwood forests (Cothran et al. 1991). Jenkins and Provost (1964) estimated densities in the Savannah River swamp at more than 2.5 per ha (1 per ac). Squirrel populations likely fluctuate annually with the abundance of mast crops. Gray squirrels were the fourth most popular species hunted in South Carolina in 1999–2000 (Responsive Management 2001). On CWMA, annual harvest of gray squirrels has averaged sixty-three since 1986 (table 6.9).

Fox Squirrel

Fox squirrels occur in both pine and upland hardwood habitat at SRS. Generally, they prefer habitats with large trees and sparse understories (Loeb and Moncrief 1993). The literature suggests limited use of bottomland hardwoods, primarily where they occur as stringers along small streams within an upland matrix (Edwards, Guynn, and Lennartz 1989; Loeb and Moncrief 1993). They are most common on the plateaus and upper terraces of SRS (Cothran et al. 1991). Fox squirrels have been declining throughout much of the Southeast, likely due to the loss of mature pine forest habitat through conversion to short-rotation silviculture (Weigl et al. 1989; J. Barnes, South Carolina Department of Natural Resources, pers. comm.). The longer-rotation management characteristic of much of the SRS (chapter 3) has probably benefited fox squirrels on site, though no long-term population data are available.

Waterfowl

Robert A. Kennamer

Waterfowl are among the most economically important wildlife occurring on the Savannah River Site (SRS). On an annual basis, three million people in the United States spend $700 million on sport hunting of migratory birds, with about one third of that activity directed toward duck and