

SRS Ecology

Environmental Information Document

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Development and Industrialized Subhabitat Utilization

Most of these species were found to use developed subhabitats with landscaping away from buildings and other structures. As the developed aspect of a subhabitat became more complex, the species diversity of urban wildlife decreased. Of the eight subhabitats surveyed, landscaped areas away from buildings had the most use by the broadest (69%) number of species (Table 3-18). The 186/183 basins had the lowest use (5%), based on the number of species recorded. The most common use of the urban subhabitats was for foraging and feeding (99% of the species). The least frequent use was for reproduction (courting or mating; 29% of the species) (Table 3-19).

Summary of Potential Impacts

The potential impacts from the presence of urban wildlife within developed areas can be either positive or negative, and can affect either humans or the wildlife. The potential impacts to humans from wildlife in urban subhabitats include contaminant transport; physical harm, disease transmission, and destruction of property. The potential impacts to wildlife include physical harm and contaminant exposure (Mayer and Wike 1997).

Commercial and Recreational Fishery of the Savannah River

Biota Found on SRS

Although aquatic and semiaquatic species of commercial or recreational importance exist in SRS waters, public use of SRS resources is not allowed. In addition to potentially valuable fisheries resources, the SRS also supports populations of alligators, bullfrogs, and several species of turtles (softshell, slider, Florida cooter, and snapping turtle) that could have some commercial or recreational value.

Biota Found in the Savannah River

The Savannah River supports both commercial and sports fisheries. Table 3-20 lists the species and catches of fish taken commercially from the river between 1970 and 1979. (Common and scientific names of all fish are given in Table 3-31.) Many of these fisheries are confined to the marine and brackish waters of the coastal regions of South Carolina and Georgia. Table 3-21 lists the total weight of shellfish caught in the lower Savannah River and adjacent coastal waters between 1972 and 1979.

Commercial Fishing

Introduction

The commercial fishes of significance near SRS are American shad (*Alosa sapidissima*), channel catfish (*Ictalurus punctatus*), and Atlantic sturgeon (*Acipenser oxyrinchus*). These

Table 3-18. Summary of Wildlife Use of SRS Urban Subhabitats

SRS Urban Subhabitat	Percent of Each Taxa				
	Amphibians (N=15)	Reptiles (N=22)	Birds (N=87)	Mammals (N=20)	Total (N=144)
Interiors of buildings and structures	6.7	68.2	10.3	50.0	24.3
Exteriors of buildings and structures	13.3	72.7	31.0	55.0	38.9
Landscaped areas around buildings and structures	20.0	90.9	42.5	75.0	52.1
Landscaped areas and lawns	13.3	95.5	67.8	85.0	68.8
Construction laydown yards or salvage storage areas	0.0	27.3	10.3	25.0	13.9
Roads and parking lots	13.3	31.9	37.9	60.0	37.5
All terrestrial subhabitats	11.1	64.4	40.0	70.0	47.1
Storm water runoff or drainage ditches	26.7	9.1	13.8	30.0	16.7
Storm water runoff retention basins	93.3	22.7	27.6	20.0	32.6
Settling and seepage basins	40.0	18.1	25.3	0.0	22.2
Reactor 183/186 basins	0.0	0.0	8.0	0.0	4.9
All aquatic subhabitats	40.0	12.5	18.7	12.5	19.1

Source: Mayer and Wike 1997.

Table 3-19. Summary of Specific Types of Use Observed for SRS Urban Wildlife

Type of Use	Percent of Each Taxa				
	Amphibians (N=15)	Reptiles (N=22)	Birds (N=87)	Mammals (N=20)	Total (N=144)
Foraging, feeding	100.0	100.0	98.9	95.0	98.6
Shelter	100.0	86.4	48.3	80.0	63.9
Courting, mating	100.0	13.6	16.1	50.0	29.2
Denning, nesting, egg-laying	100.0	9.1	18.4	55.0	30.6
Rearing or development of young	100.0	9.1	18.4	55.0	30.6
Loafing, resting, perching, roosting	100.0	27.3	71.3	60.0	66.0
Transient, dispersal	100.0	86.4	77.0	85.0	81.9
Presence only, no documented specific use	0.0	0.0	1.2	0.0	0.7

Source: Mayer and Wike 1997.

Table 3-20. Commercial Landing Data for Fish Taken From Savannah River, 1970-1979

Species	Combined Catches in Georgia and South Carolina									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
carp	0	250	252	1,503	590	998	136	453	136	363
catfish	544	157	222	518	726	1,814	1,043	1,043	363	1,043
black drum	0	0	0	0	0	227	272	0	0	0
red drum	0	0	0	0	45	0	181	499	136	0
hickory shad	318	384	291	725	91	227	91	136	181	91
spotted sea trout	0	0	0	324	227	2500	1800	181	181	0
American shad	43,591	25,568	25,439	33,912	26,263	20,412	8618	20,820	54,432	57,607
sturgeon	726	23	1967	551	136	45	363	862	454	227
suckers	0	0	0	0	0	0	91	0	0	0
common eels	0	0	0	0	0	91	0	45	0	45
mullet	0	0	0	0	0	227	0	91	0	0
striped bass	816	735	1,013	1,071	0	0	0	0	0	0

Source: du Pont 1983.

Table 3-21. Commercial Landing Data for Shellfish Taken from Coastal Regions of Savannah River, 1972-1979

Year	Shellfish Catch (kg)			
	Clams	Blue Crabs	Oysters	Shrimp
1972	-	419,489 ^a	1,451 ^b	115,940 ^b
1973	862 ^c	543,957 ^a	2,858 ^b	222,128 ^b
1974	-	1,252,072 ^d	6,804 ^d	1,141,530 ^d
1975	-	17,237 ^a	3,447 ^d	1,264,818 ^d
1976	-	-	-	-
1977	-	63,504 ^a	19,051 ^d	626,286 ^d
1978	1,860 ^c	68,040 ^a	-	731,475 ^d
1979	454 ^c	104,781 ^a	9072 ^a	-

Sources: DOE 1984.

^aWassaw Sound plus Ossabaw Sound.^bDOE 1982.^cSavannah River landings.^dNorthern District, Georgia.

species, except for sturgeon, are exploited to a limited degree by nonprofessional, local fishermen. Commercial and recreational fisheries for blueback herring (*Alosa aestivalis*) exist in South Carolina (Ulrich et al. 1978), but none is taken commercially in Georgia because of state netting restrictions.

American Shad

American shad stocks appear to be healthy and productive in the Savannah River. Music (1981) reported that commercial catches in 1980 in the Savannah River represented 51% of Georgia shad landings in that year; yet only 13% of Georgia's commercial shad fishermen operated in the Savannah River. Thus, American shad stocks in the Savannah River may be less heavily exploited and relatively more abundant than stocks in other Georgia rivers. Additionally, Schmitt and Hornsby (1985) reported the development of a previously undocumented sport fishery for American shad in the vicinity of the New Savannah Bluff Lock and Dam.

Striped Bass

Less is known concerning the status of striped bass (*Morone saxatilis*) in the Savannah River. Researchers have documented spawning upstream of tidally influenced regions of the river (Paller et al. 1984, 1985, 1986). Nevertheless, Gilbert et al. (1986) suggested that striped bass spawning occurs primarily in the tidally influenced portions of the river. It is not clear whether the current spawning of striped bass in upstream regions of the river represents a reestablishment of a spawning stock in this area or is a result of the increased intensity of sampling efforts during 1982-1985 relative to earlier sampling programs.

Sport Fishing

Introduction

Sport fishermen are the principal consumers of river fishes, mostly sunfish (*Lepomis* spp.) and crappie (*Pomoxis* spp.). Striped bass, which is classified as a game fish in South Carolina and Georgia (Ulrich et al. 1978), is a favorite quarry of fishermen in the Augusta area.

Schmitt and Hornsby (1985) evaluated the sport fishery resources in the Savannah River downstream of the New Savannah Bluff Lock and Dam during 1980-1982. The average annual sport-fishing harvest from the freshwater portions of the river (approximately River Mile 21-187 [River Km 34-300]) was estimated to range from 171,561 fish/yr in 1982 to 550,282 fish/yr in 1980 (3 yr average = 305,778 fish/yr). The dominant species in the sport harvest were redbreast sunfish (*Lepomis auritus*) (27.2%) and bluegill (*L. macrochirus*) (24.1%, Table 3-22). The composite category of "bream" (sunfishes) accounted for 64% of the total angler catch. The composite category of "catfish" also represented a substantial portion of the sport harvest (14.6%), with bullhead (*Ameiurus* spp.) (8.2%) the major reported taxon within this category. Crappie (8%) represented a substantial component of the sport harvest and was comparable to warmouth (*L. gulosus*) (7.3%). No other species (or species group) represented greater than 5% of the sport harvest. Notably, anadromous species (striped bass, 0.2%; American shad, 1.7%) did not contribute substantially to the angler's harvest. However, the authors noted that the American shad harvest may be underestimated because of the development of a fishery for this species near the New Savannah Bluff Lock and Dam, while the assessment for this species emphasized downstream areas of the river.

Table 3-22. Fish Species Preferred and Caught by Savannah River Sport Fishermen

Taxon	Percent Angler Effort	Percent Angler Catch
bream	24.9	64.0 ^a
redbreast sunfish	8.7	27.2
bluegill	1.0	24.1
warmouth	0.1	7.3
redecor sunfish	0.4	4.4
largemouth bass	25.7	3.2
crappie	10.7	8.0
yellow perch	1.3	3.0
catfish	7.0	14.6 ^a
bullhead spp.	0.4	8.2
channel catfish	<0.1	4.2
white catfish	0.5	2.1
chain pickerel	0.5	0.9
american shad	7.8	1.7
striped bass	4.7	0.2
hybrid bass	4.4	0.3
other	1.9	4.1
Total	100.0	100.0

Sources: DOE 1988 adapted from Schmitt and Hornsby 1985.

^aSum of taxa within category.

Angler Preferences

Anglers in the freshwater section of the Savannah River fish predominantly for bream and largemouth bass (*Micropterus salmoides*) (Schmitt and Hornsby 1985). Based on electro-fishing studies, the relative abundance of bream in the freshwater section of the river is high, as is the actual angler success rate. The lower abundance of largemouth bass in the freshwater section results in a relatively low angler harvest of this species (Figure 3-1). Anglers in the estuarine section of the Savannah River fish predominantly for sea trout (*Cynoscion* spp.) and striped bass, but success rates for these species are low (Figure 3-2).

Angler Harvests

Species Preference versus Catch

The ratio of species caught to angler preferences frequently was skewed. Approximately 35% of angler fishing effort was directed toward bream (composite reporting category plus individual species), while 64% of the harvest was from this category (Table 3-22). The relationship between effort and harvest was even more disparate for largemouth bass; 25.7% of fishing effort was targeted toward this species, while it constituted only 3.2% of the catch. Overall, catfish (*Ictalurus* spp.) were not highly desired (approximately 7% of effort), but were caught in slightly greater proportion (14.6%). American shad (7.8% of effort) and striped bass (4.7% of effort) were caught in substantially lower abundances than desired by sport fishermen, the disparity being comparable to that exhibited for largemouth bass.

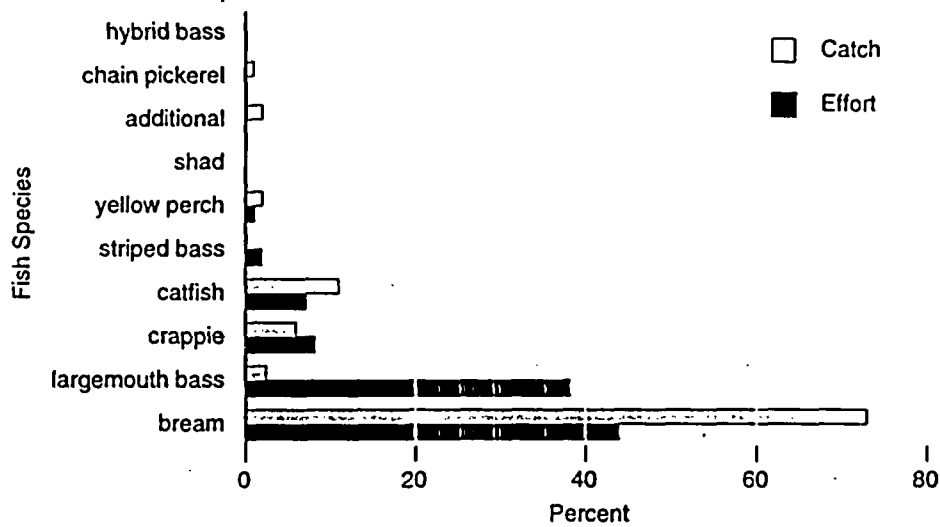


Figure 3-1. Comparison of Freshwater Angler Fishing Effort and Fish Harvest by Species (Source: Mackey et al. 1983)

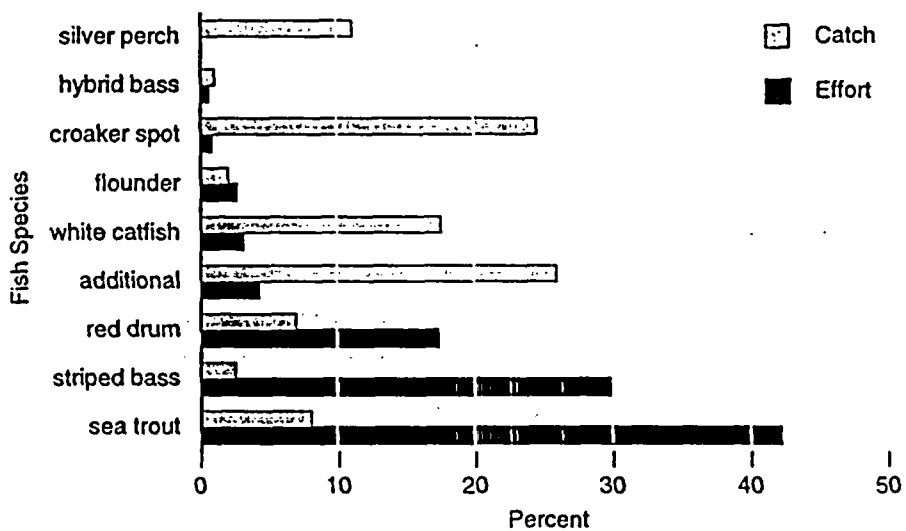


Figure 3-2. Comparison of Estuarine Angler Fishing Effort and Fish Harvest by Species (Source: Mackey et al. 1983)

Catch Versus Availability

Fish species caught by anglers in the Savannah River represent an extremely limited set of available species. Electrofishing collections by Schmitt and Hornsby (1985) throughout the freshwater sections of the lower Savannah River indicated that the taxa caught by anglers represented only 33.1% of the relative abundance (numerical) collected in their electrofishing effort. Similarly, those species that constitute 95.8% of the angler catch constitute only 27.8% of total impingement at the SRS intakes. The species caught by anglers represent 59.8% of the numbers of fish caught by electrofishing and 86.9% of hoopnet sampling from the Savannah River near SRS intakes. However, Paller and Osteen (1985) noted that the electrofishing collections near SRS do not accurately reflect the abundance of minnows and other small species; the same caution applies to hoop-net collections because the hoop nets used for the SRS collections had a maximum mesh size of 37 mm. Savannah River standard electrofishing results for 1993 and 1996 are presented in Table 3-23. No comparable angler information is available.

Bream represent the largest component of the anglers' catch in the Savannah River. Although centrarchids were a substantial component of SRS impingement collections, the species impinged were not predominantly those caught by anglers (Figure 3-3). Although redbreast sunfish are abundant in creel censuses (27.1%) and in the river near the SRS intakes (26.7%), they represented only 5.5% of fish impinged. Bluegill also show a much higher relative abundance in the anglers' catch than in the river (all methods) and impingement samples. Among the bream caught by anglers, only the spotted sunfish (*L. punctatus*) represents a higher relative abundance in impingement (3.5%) than in creels (1.1%), but the species relative abundance in impingement is less than the relative abundance in electrofishing collections (5.2%).

Table 3-23. Standard Electrofishing Results From all Regions of the Savannah River, 1993 and 1996

Species	1993			1996		
	Total Number	Percent of Total	CPUE	Total Number	Percent of Total	CPUE
Chain pickerel	31	3.30	1.72	27	1.4	1.52
Channel catfish	36	3.83	2.00	110	5.8	6.20
Redbreast sunfish	245	26.06	13.61	624	32.9	35.15
Warmouth	14	1.49	0.78	61	3.2	3.44
Bluegill	127	13.51	7.05	443	23.4	24.96
Redear sunfish	73	7.77	4.06	169	8.9	9.52
Spotted sunfish	61	6.49	3.39	119	6.3	6.70
Largemouth bass	281	29.89	15.61	202	10.6	11.38
Black crappie	28	2.98	1.56	55	2.9	3.10
Yellow perch	44	4.68	2.44	33	1.7	1.86
White catfish	0			49	2.6	2.76
Stripped bass	0			1	0.1	0.06
Flier	0			1	0.1	0.06
Pumpkinseed	0			1	0.1	0.56
Smallmouth bass	0			1	0.1	0.56
Southern flounder	0			1	0.1	0.56

Source: Barrett 1997.

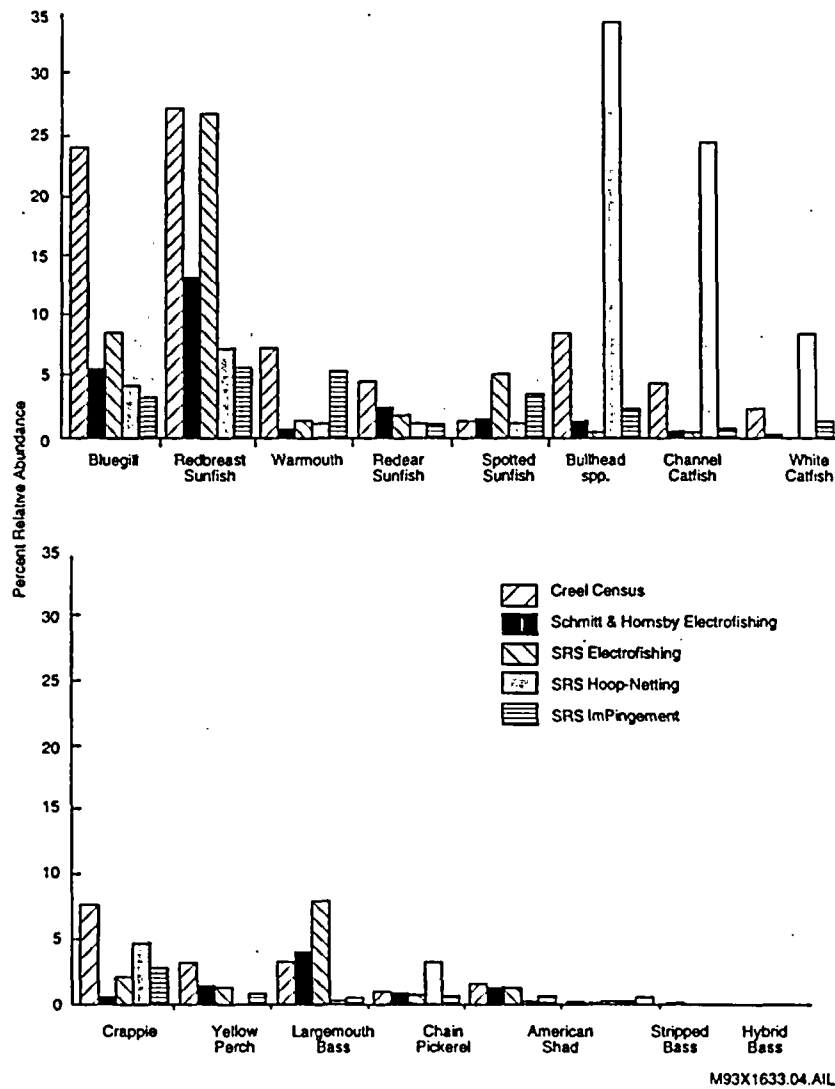


Figure 3-3. Relative Abundance of Fish Taxa in Creel, Electrofishing, Hoop-Net, and Impingement Collections

Crappie, Yellow Perch, and Largemouth Bass

Crappie, yellow perch (*Perca flavescens*), and largemouth bass all exhibit higher relative abundances in the creel (8.0%, 3.0%, and 3.2%, respectively) than on screen impingement (2.9%, 0.8%, and 0.5%, respectively [Figure 3-3]). All three species exhibit higher relative abundance in the river (by at least one collection method) than in impingement samples, and largemouth bass exhibited higher relative abundance in the river than in the creel. Chain pickerel (*Esox niger*) is a minor component of the creel (0.9%), with comparable abundance in impingement samples (0.7%).

Catfish

Impingement relative abundances for all taxa of catfish (*Ameiurus* spp. [2.1%], channel catfish [0.8%], and white catfish [*A. catus*] [1.3%]) were lower than relative abundances for those taxa in the creel (8.2%, 4.2%, and 2.1%, respectively [Figure 3-3]). However, the relative abundances of these taxa in hoop-net collections were substantially higher than for either impingement or angler catches. The disparity between relative abundances of catfish taxa in electrofishing and hoop-net collections suggests that catfish are a substantial component of the Savannah River ichthyofauna, and that electrofishing provides poor estimates of the abundance of these taxa.

American Shad, Striped Bass, and Hybrid Bass

American shad, striped bass, and hybrid bass were minor components in all of the collection methods (angling, electrofishing, hoop-netting, impingement [Figure 3-3]). The abundance of the anadromous American shad and striped bass in the Savannah River near the SRS was underestimated during the quarterly sampling program. Nevertheless, the low frequency of these species in impingement collections (approximately 100 collections throughout the year) is highly encouraging because it indicates adults and juveniles of these species are minimally influenced by impingement mortality associated with SRS operations.

Creel Surveys

During 1988, Schmitt (1989) monitored fishing activity from the New Savannah Bluff Lock and Dam downstream to the ocean using the same design as the previous study (Schmitt and Hornsby 1985). Another survey was done in 1994. Results of the surveys are presented in Table 3-24 through Table 3-28. Overall fishing pressure decreased between the studies, significantly in the estuarine area, but angler preference changed as indicated by fished-for effort (Table 3-24). Harvest rates were highest in 1988 and more fish were caught with less effort; however, most species were of lower average weights (Schmitt 1989). Total numbers for most freshwater species declined between the two early studies (Table 3-25), with the exception of crappie and channel catfish. Largemouth bass catch increased from 1988 to 1994, however the catch of most other species decreased. Significant declines in the estuarine harvest of striped bass, flounder (Bothidae), and black drum (*Pogonias cromis*) occurred. Take of silver perch (*Bairdiella chrysoura*) and spotted seatrout (*C. nebulosus*) increased (Table 3-26). Creel surveys were conducted in the estuarine areas of the Savannah and Ogeechee Rivers from October 1989 through March 1990