POPULATION PARAMETERS AND HARVEST CHARACTERISTICS OF BLACK BEARS IN GEORGIA

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Abstract: Throughout Georgia, bear populations are stable to increasing in size. Bait station surveys were conducted to determine distribution and population trends of bears in north and south Georgia during July of 2002. Results of these surveys, expressed as percent bait station hits, were 53.7% and 32.3% for stations in north and south Georgia respectively, continuing the overall trend of increasing visitation rates. Concurrently, bear harvest in the north, central, and south Georgia populations were 212, 0, and 50 bears respectively.

The black bear (*Ursus americanus*) symbolizes the wild qualities of Georgia. Prior to the eighteenth century bears were common in Georgia. However, habitat loss, unrestricted hunting and overall degradation of habitat due to human development contributed to a serious population decline. Georgia Department of Natural Resources wildlife management practices have contributed to the recovery of bears to the present populations found in north Georgia associated with the Appalachian Mountains, Central Georgia around the Ocmulgee River drainage, and South Georgia in and around the Okefenokee Swamp (Fig. 1). All three populations are stable or slightly increasing.

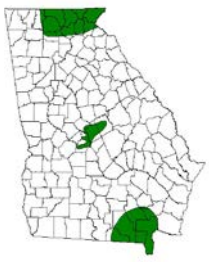


Fig. 1 – Black Bear Distribution and Range in Georgia.

The bear population in north Georgia has been steadily increasing for at least the past 25 years. Most suitable bear habitat

in north Georgia is presently occupied with bears while human population growth in north Georgia is dramatic. As a consequence, bears frequently are found in nuisance situations that oftentimes result in threatening situations for humans and/or bears. Educational efforts have increased to help minimize human/bear conflicts. The bear population in north Georgia is now at a level where stabilization needs to occur. Harvest regulations have continued to become more liberal to facilitate bear population stabilization.

The bear population in Central Georgia seems to be stable to slightly increasing. Centered around the Ocmulgee River in Twiggs County, the population is dispersing eastward and southward with movement to the north and west limited by increased urbanization.

The South Georgia bear population appears to be stable to increasing. All primary bear habitat is occupied with the major portion of their range protected by state and federal land holdings. In 1990 the U.S. Fish and Wildlife Service (Service) was petitioned to list the Florida black bear as threatened under the provisions of the 1973 Endangered Species Act. In December 1998 the Florida black bear (*U. a. floridanus*) was removed from the endangered species candidate list following a status review which found that listing the bear as endangered or threatened was not warranted at that time (Bentzien 1998). Because of an appeal by the petitioners, the threatened status of the Florida black bear is currently under judicial review (Kasbohm pers. comm.).

Effective monitoring of the density and/or trends of these black bear populations remains a vital concern if we are to adequately manage and evaluate the effects of hunting, poaching, and land use changes on Georgia's bear populations. The objectives of this study are twofold: 1.) Determine distribution and population trends of black bears in Georgia. 2.) Monitor and evaluate

harvest trends of black bears in Georgia.

STUDY AREA

Bait Station Survey

North Georgia. – Bait station surveys were conducted in 11 counties and on 10 wildlife management areas (WMAs) covering approximately 280 linear miles of bear habitat throughout their range in the Chattahoochee National Forest and associated contiguous habitat. Physiographic types comprising this range include Blue Ridge Mountains, Ridge and Valley, and Upper Piedmont.

South Georgia. – The study area is found in the Okefenokee Swamp region of southeastern Georgia. The main survey was conducted on the 156.4 km^2 Dixon Memorial WMA (DMWMA) in Ware and Brantley Counties, Georgia. This area is found on the northeastern portion of the Okefenokee Swamp and is comprised of several physiographic types including Okefenokee basin, Trail Ridge, Vidalia Upland, and Coastal Marine Flatwoods. Trail Ridge, the natural sill for the Okefenokee Swamp, bisects the WMA. Elevation on the area ranges from near 27.4 m to 36.6 m above sea level.

Habitat on the upland portions of DMWMA is managed as commercial forest and ranges from ridge hardwoods to lowland flatwoods. Principal understory is fire controlled palmetto - gallberry but the total understory varies from wiregrass on xeric sites to titi on wet sites. Swamp acreage retains much of its ecological diversity. A total of 48.7 km^2 of flowing and non-flowing types are found on the WMA including: creek swamp, bay heads, Carolina bays, cypress ponds, blackgum ponds, shrub swamp, and open prairie.

The survey area also included the Okefenokee National Wildlife Refuge (ONWR) which encompasses 1,501.4 km^2 of the 1,772.5 km^2 Okefenokee Swamp and index lines established on privately owned property on the periphery of the refuge. The periphery lines were in Brantley, Charlton, Clinch, Echols, and Ware Counties. Habitat descriptions for these areas follow those given for DMWMA.

Harvest Survey

North Georgia. – Bear hunting is permitted in 16 counties and on 19 wildlife management areas. WMAs totaled 398,000 acres of available land. Counties and WMAs open for bear hunting are located within the Blue Ridge Mountain, Ridge and Valley, or Upper Piedmont physiographic region.

Central Georgia. – One day of managed firearms bear hunting is permitted on Ocmulgee WMA during December of each year. No counties or other WMAs currently permit bear hunting.

South Georgia. – Bear hunting in south Georgia is allowed in Brantley, Echols, Charlton, Clinch, and Ware Counties and on DMWMA during the last Friday and Saturday of September and the first 2 Fridays and Saturdays in October. Additionally, there is a special deer/bear hunt on DMWMA during November. Dogs are permitted for hunting bears in the 5 counties listed above but not on DMWMA.

METHODS

Bait Station Surveys

Bait station surveys are used as the primary method in determining distribution and relative density trends in black bear populations in both north and south Georgia. Conducted

annually in July, baits (3 partially opened cans of sardines) are spaced approximately 0.81 km on both study areas.

North Georgia. – Bait station sites were established along paved and gravel roads, major trails, and wooded paths. Baits were hung from small diameter trees or trees with smooth bark and left for five nights. Bait sites were checked by either GA DNR or U.S. Forest Service personnel, visitation activity was recorded and bait site debris was removed following examination. Visitation was recorded as no activity, bear hit, or bait taken by another animal. If the bait was taken by another animal, then that station was not used in the calculation of the final visitation rate. Z-statistic analyses were performed to test for differences in visitation rates between years. Chi-square analyses were used to detect differences in visitation rates based on road or trail type.

South Georgia. – Bait station sites, no closer than 0.81 km from each other, were established along roads, access trails, and firebreaks on DMWMA (60 stations), SCWMA (20 stations), ONWR (32 stations) and the swamp perimeter (80 stations). Bait station site locations were established during a previous study and reported by Abler (1994).

Partially opened sardine baits were nailed to trees in mid-July as described by Abler (1991). Baits were checked, bear visits recorded, and cans and nails removed from all trees after an 8 day interval. ONWR stations were set up and run by ONWR personnel, all other stations were run by DNR personnel.

Elementary proportional statistics were performed on visitation data to calculate percent visitation rates since 1992. Z-statistic analyses were performed to test for differences in visitation rates between five survey-years beginning in 1997. A Pearson's r correlation

coefficient was calculated to test the linear relationship between percent hits at bait stations and annual bear harvest.

Harvest Survey

To reach harvest objectives, bear hunting is permitted in the fall of each year, under different regulations, in each of the three Georgia bear populations. Currently, there is a statewide limit of one bear per hunter per year and the harvest of females with cubs or bears under 75 pounds live-weight as well as the use of bait for taking bears is prohibited statewide. There is no spring bear hunting season.

Following harvest, hunters are required to check bears within 24-hours of kill. Bears harvested on WMAs must be tagged prior to departing from the area. In north Georgia, county harvested bears can either be taken to check stations open for a managed hunt or arrangements can be made between DNR personnel and the hunter to check the bear at a specified location. In south Georgia, bears must be checked at one of four check stations open from 12 noon until 9:00pm on the hunt days. Biological data including sex, age, and weight as well as hunter information, location of harvest, and bear dogging information (south Georgia) are recorded for each bear harvested.

North Georgia. - Bear hunting was permitted in counties with bear seasons beginning September 14, 2002 using archery equipment, October 12, 2002 using muzzleloading firearms, and November 2, 2002 using modern firearms weapons. All seasons lasted until December 1, 2002. Bear hunting on wildlife management areas was permitted within the same general timeframe as county bear hunting, however hunting opportunities were more restrictive. Individual WMAs offered between 13 and 65 days of bear hunting with a cumulative total of 656

days of archery, 34 days of muzzleloading firearm, and 179 days of modern firearm hunting on wildlife management areas. The use of dogs was prohibited

Central Georgia. - Bear hunting was limited to a 1-day firearms hunt on the Ocmulgee Wildlife Management Area. The use of dogs was prohibited.

South Georgia. - Except for DMWMA, there are no specific archery or primitive weapons seasons for bears in south Georgia. Dogs may be used to pursue bears in the counties open for bear hunting but may not be used on DMWMA.

RESULTS

Bait Station Survey

North Georgia. – Visitation rates are steadily increasing with another record year in 2002 of 53.7% visitation based on 510 stations throughout primary bear habitat (Fig. 2). Visitation rates have shown a general upward trend from a low of 12.3% in 1983 during the first survey year to a high of 53.7% in 2002. Even though 53.7% was a new record high, this percentage was not statistically different than visitation rates of the two previous years (Table 1).

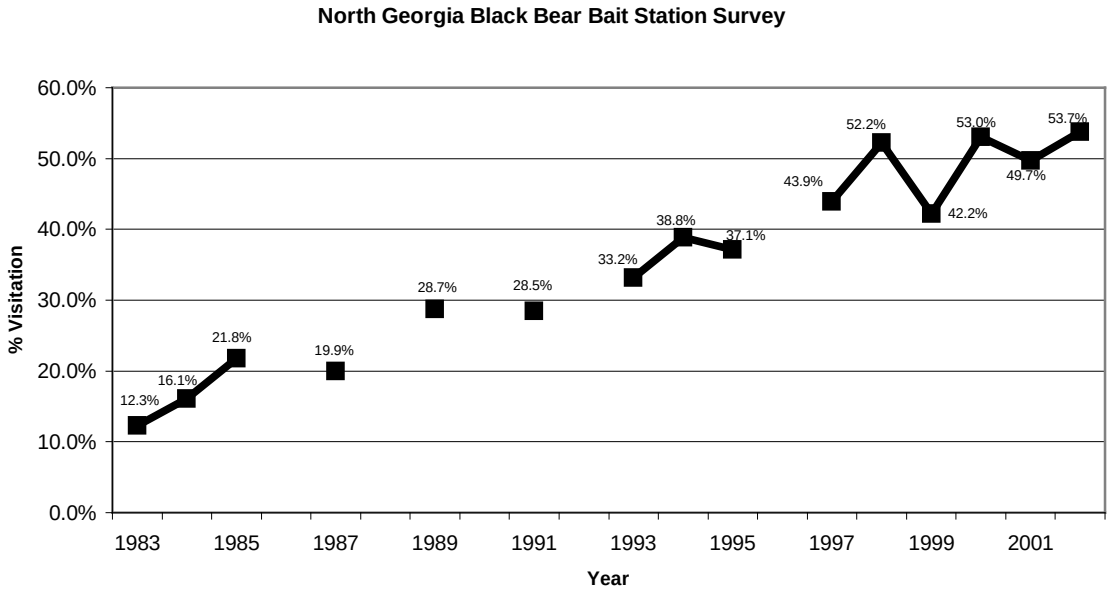


Figure 2. North Georgia black bear bait station survey results from 1983 through 2002.

Table 1. Calculated Z-values and P-values for North Georgia black bear bait station survey for last 5 years.

Year	1998	1999	2000	2001	2002
1997	2.73 (0.003)	0.55 (0.291)	2.98 (0.001)	1.91 (0.028)	3.18 (0.001)
1998		3.32 (0.000)	0.27 (0.394)	0.82 (0.206)	0.50 (0.309)
1999			3.56 (0.000)	2.48 (0.007)	3.76 (0.000)
2000				1.08 (0.140)	0.23 (0.409)
2001					1.30 (0.097)
	--Significant Increase				
	--Significant Decrease				

County level visitation rates in 2002 supported stable to increasing trends in all counties with rates ranging from 35.7% in Pickens County to 66.7% in Murray County (Table 2).

Table 2. North Georgia black bear bait station results by county from 1994 through 2002.

North Georgia Bait Station Survey Results By County

	Visitation Within 5 Days (Number of Sites)							
County*	1994	1995	1997	1998	1999	2000	2001	2002
Dawson	6.3% (16)	18.8% (16)	64.7% (17)	16.7% (18)	38.9% (18)	12.5% (16)	16.6% (18)	26.7% (15)
Fannin	33.1% (121)	40.5% (121)	40.3% (124)	51.6% (124)	35.2% (122)	55.7% (115)	51.3% (117)	66.1% (112)
Gilmer	39.0% (59)	51.7% (60)	46.7% (60)	61.7% (60)	20.1% (49)	55.1% (49)	54.2% (48)	59.2% (49)
Habersham	50.0% (14)	78.6% (14)	57.1% (14)	78.6% (14)	71.4% (14)	78.6% (14)	42.9% (14)	64.3% (14)
Lumpkin	44.4% (72)	13.5% (74)	22.4% (76)	42.1% (76)	28.6% (77)	55.4% (74)	38.3% (60)	37.7% (69)
Murray	37.8% (45)	35.6% (45)	40.0% (45)	48.9% (45)	33.3% (45)	53.3% (45)	48.9% (45)	66.7% (45)
Pickens	20.0% (15)	40.0% (15)	76.9% (13)	28.6% (14)	35.7% (14)	50.0% (14)	42.9% (14)	35.7% (14)
Rabun	40.0% (65)	36.9% (65)	52.3% (65)	57.8% (64)	50.8% (65)	50.8% (61)	47.7% (65)	57.8% (64)
Towns	42.4% (85)	27.9% (86)	36.0% (86)	46.5% (86)	45.4% (86)	51.3% (80)	53.0% (81)	47.4% (76)
Union	29.8% (131)	28.5% (130)	29.8% (131)	37.7% (130)	39.4% (132)	46.4% (125)	52.5% (122)	40.8% (98)
White	67.9% (53)	42.6% (54)	38.9% (54)	77.8% (54)	51.0% (55)	72.2% (54)	61.4% (44)	50.0% (54)
Totals	**37.7% (562)**	**36.5% (564)**	**40.2% (569)**	**50.1% (569)**	**41.2% (558)**	**50.4% (560)**	**49.7% (537)**	**53.7% (510)**

Visitation rates on WMAs ranged from 34.2% on Swallow Creek to 83.3% on Warwoman (Table 3).

Table 3. North Georgia black bear bait station results by county from 1994 through 2002.

Visitation Within 5 Days (Number of Sites)								
Wildlife Management Area*	1994	1995	1997	1998	1999	2000	2001	2002
Blue Ridge	20.8% (77)	25.0% (76)	30.0% (80)	36.3% (80)	21.8% (80)	52.5% (80)	40.5% (79)	53.6% (79)
Chattahoochee	68.2% (44)	63.6% (44)	53.5% (43)	69.8% (43)	54.8% (42)	79.5% (44)	83.3% (42)	65.1% (44)
Chestatee	56.3% (32)	18.8% (32)	17.6% (34)	60.6% (33)	32.4% (34)	64.7% (34)	56.5% (24)	36.4% (34)
Cohutta	49.5% (91)	51.7% (91)	41.8% (91)	65.9% (91)	50.5% (91)	62.6% (91)	58.2% (91)	82.2% (90)
Coopers Creek	6.0% (50)	14.3% (49)	19.6% (51)	17.6% (51)	33.3% (51)	23.5% (51)	35.4% (51)	33.3% (28)
Dawson Forest	12.5% (8)	12.5% (8)	62.5% (8)	12.5% (7)	42.9% (8)	0.0% (8)	25.0% (8)	28.6% (8)
Lake Burton	38.7% (31)	32.3% (31)	41.9% (31)	60.0% (30)	58.6% (31)	30.0% (30)	38.7% (31)	51.6% (31)
Rich Mountain	50.0% (36)	63.9% (36)	47.2% (36)	75.0% (36)	62.5% (24)	66.7% (24)	75.0% (24)	66.7% (24)
Swallow Creek	36.6% (41)	28.6% (42)	28.6% (42)	40.5% (41)	40.0% (42)	31.0% (42)	42.5% (42)	34.2% (42)
Warwoman	16.7% (6)	0.0% (6)	83.3% (6)	0.0% (6)	50.0% (6)	0.0% (6)	66.7% (6)	83.3% (6)
Totals	**39.7% (416)**	**39.5% (415)**	**38.9% (422)**	**44.8% (420)**	**43.2% (407)**	**51.3% (390)**	**53.0% (379)**	**59.0% (367)**

Bait sites ranged in elevation from 1309 feet to 4600 feet with most sites (68%) between 2600 feet and 3800 feet. Seven percent of baits were above 3800 feet and 25% were below 2600 feet. The average elevation of all sites (549) was 2948 feet while the average elevation of sites with baits taken (266) was 2897 feet (Table 4).

Table 4. North Georgia black bear bait station survey results by elevation from 1997 through 2002.

North Georgia Bait Station Results by Elevation

Elevation	1997	1998	1999	2000	2001	2002
≤1999	38.1%	55.6%	34.1%	66.7%	51.2%	53.9%
	42	45	41	42	41	39
2000 - 2249	30.8%	51.7%	26.7%	27.6%	42.9%	60.9%
	26	29	30	29	28	23
2250 - 2499	37.8%	30.4%	18.8%	38.3%	40.0%	52.6%
	45	46	48	47	50	38
2500 - 2749	48.3%	59.0%	44.3%	48.3%	54.4%	42.9%
	58	61	61	58	57	56
2750 - 2999	53.5%	51.4%	41.9%	50.7%	40.0%	47.7%
	71	70	74	67	70	65
3000 - 3249	51.8%	52.1%	49.2%	59.8%	45.6%	57.8%
	112	117	120	117	114	109
3250 - 3499	30.0%	47.7%	77.8%	58.1%	58.1%	59.7%
	60	65	64	62	62	62
3500 - 3749	37.0%	60.3%	50.0%	54.5%	55.4%	56.7%
	65	68	64	66	65	67
3750 - 3999	38.5%	48.0%	37.5%	54.2%	66.7%	60.9%
	26	25	24	24	24	23
≥4000	68.4%	70.0%	65.0%	55.0%	70.0%	57.9%
	19	20	20	20	20	19
Totals	**40.2%**	**50.1%**	**41.2%**	**50.4%**	**49.7%**	**53.7%**
	(569)	**(569)**	**(558)**	**(560)**	**(537)**	**(510)**

Differences in visitation based on road or trail type (Woods, Major Trail, Gravel, Unimproved, Paved) were not significant ($X^2_{Calculated}$=7.294, $X^2_{Critical}$=7.815, P=0.05).

South Georgia. – The visitation rate for all sites combined (192 stations) of 32.3% was lower than that for 2001 but higher than all other years of the study (Table 5) and continued a general upward trend (Fig. 3). Z-statistic comparisons for all sites (Table 6) indicated that visitation rates were significantly lower in 1997 (P=0.023) than they were in 2002. There were no significant

differences between surveys conducted in 2002 and those in 1998, 1999, 2000, or 2001.

The visitation rate for DMWMA stations was 55.0% and 18.8% for ONWR stations (Table 6). Z-statistic comparisons indicated that there were no significant differences between visitation rates in 2002 and the other 5 survey-years for either DMWMA or ONWR stations.

The visitation rate for SCWMA stations (20 stations) was 10.0% (Table 5). Z-statistic comparisons (Table 6) indicated that there were no significant differences between surveys conducted in 2002 and those in 1997, 1999, 2000, or 2001. The visitation rate in 2002 was significantly lower than the rate in 1998 ($P = 0.010$)

The visitation rate for 40 East Perimeter stations was 25.0% (Table 5). Z-statistic comparisons (Table 6) indicated that visitations in 2002 were significantly higher than those in 1997 ($P = 0.015$), 1998 ($P = 0.036$), or 1999 ($P = 0.036$). There were no significant differences between rates in 2002 and those in 2000 or 2001.

The visitation rate for 40 West Perimeter stations was 27.5% (Table 5). Z-statistic comparisons (Table 6) indicated that visitations in 2002 were significantly higher in 2002 than they were in 1997 ($P < 0.002$), or 2000 ($P = 0.007$). There were no significant differences between rates in 2002 and 1998, 1999, or 2001.

Table 5. Percent visitation rates of black bears utilizing sardine bait stations in the Southeastern Georgia survey area.

	Percent Visitation Rates									
Year	All Sites	DMWMA	ONWR	SCWMA	EN LINE	ES LINE	East Perimeter	WN LINE	WS LINE	West Perimeter
1992	13.4	64.3	12.3	5.7	0.0	0.0	0.0	0.0	0.0	0.0
1993	27.4	70.8	14.9	40.0	0.0	0.0	0.0	15.0	15.0	15.0
1994	14.7	41.7	3.1	2.9	0.0	15.0	7.5	15.0	5.0	10.0
1995	27.2	65.0	17.6	20.0	5.0	25.0	15.0	5.0	0.0	2.5
1997	23.5	60.0	13.1	15.0	5.0	10.0	7.5	0.0	10.0	5.0
1998	29.1	45.0	8.3	40.0	10.0	10.0	10.0	35.0	15.0	25.0
1999	28.9	61.7	22.0	5.0	20.0	0.0	10.0	20.0	15.0	17.5
2000	26.3	58.3	6.7	5.0	5.0	40.0	22.5	10.0	5.0	7.5
2001	35.1	65.0	22.6	0.0	15.0	25.0	20.0	55.0	10.0	32.5
2002	32.3	55.0	18.8	10.0	20.0	30.0	25.0	20.0	35.0	27.5

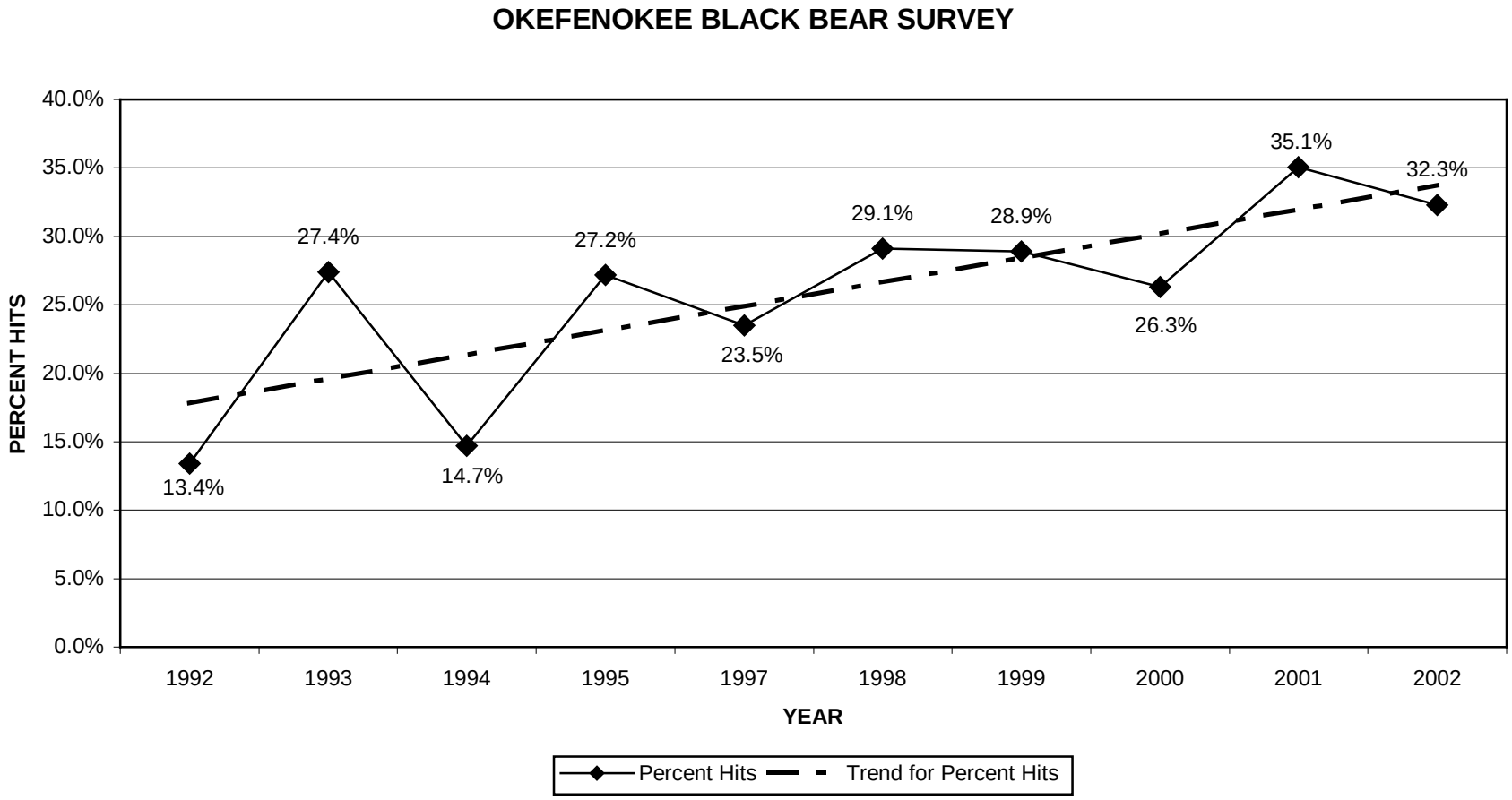


Fig. 3. South Georgia black bear bait station survey results from 1994 through 2002.

Table 6. Five-year Z-statistic comparisons of bear bait visits in the Southeastern Georgia study area: 1997 - 2002.

All Sites				**SCWMA**				**DMWMA**			
Years Tested	z	*P*		Years Tested	z	*P*		Years Tested	z	*P*	
1997 vs. 1998	1.25	=0.106	N	1997 vs. 1998	1.84	=0.033	S	1997 vs. 1998	1.66	=0.049	S
1997 vs. 1999	1.26	=0.104	N	1997 vs. 1999	1.07	=0.142	N	1997 vs. 1999	0.19	=0.425	N
1997 vs. 2000	0.65	=0.258	N	1997 vs. 2000	1.07	=0.142	N	1997 vs. 2000	0.19	=0.425	N
1997 vs. 2001	2.58	=0.005	S	1997 vs. 2001	1.88	=0.030	S	1997 vs. 2001	0.57	=0.284	N
1997 vs. 2002	1.99	=0.023	S	1997 vs. 2002	0.479	=0.316	N	1997 vs. 2002	0.56	=0.288	N
1998 vs. 1999	0.90	=0.181	N	1998 vs. 1999	2.92	=0.019	S	1998 vs. 1999	1.86	=0.031	N
1998 vs. 2000	0.58	=0.281	N	1998 vs. 2000	2.92	=0.019	S	1998 vs. 2000	1.47	=0.071	N
1998 vs. 2001	1.23	=0.109	N	1998 vs. 2001	3.65	<0.001	S	1998 vs. 2001	2.25	=0.012	S
1998 vs. 2002	0.67	=0.251	N	1998 vs. 2002	2.34	=0.010	S	1998 vs. 2002	1.10	=0.136	N
1999 vs. 2000	0.56	=0.288	N	1999 vs. 2000	0.00	=0.500	N	1999 vs. 2000	0.37	=0.356	N
1999 vs. 2001	1.32	=0.093	N	1999 vs. 2001	1.03	=0.152	N	1999 vs. 2001	0.38	=0.352	N
1999 vs. 2002	0.74	=0.230	N	1999 vs. 2002	0.60	=0.274	N	1999 vs. 2002	0.74	=0.230	N
2000 vs. 2001	1.86	=0.031	S	2000 vs. 2001	1.03	=0.152	N	2000 vs. 2001	0.75	=0.227	N
2000 vs. 2002	1.29	=0.100	N	2000 vs. 2002	0.60	=0.274	N	2000 vs. 2002	0.37	=0.356	N
2001 vs. 2002	0.58	=0.281	N	2001 vs. 2002	1.49	=0.068	N	2001 vs. 2002	1.12	=0.131	N

S -- difference tested significant

N -- difference tested not significant

Table 6. Five-year Z-statistic comparisons of bear bait visits in the Southeastern Georgia study area: 1997 - 2002 (continued).

ONWR				East Perimeter				West Perimeter			
Years Tested	z	*P*		Years Tested	z	*P*		Years Tested	z	*P*	
1997 vs. 1998	0.53	=0.298	N	1997 vs. 1998	0.40	=0.345	N	1997 vs. 1998	2.61	=0.005	S
1997 vs. 1999	1.14	=0.127	N	1997 vs. 1999	0.40	=0.345	N	1997 vs. 1999	1.81	=0.035	S
1997 vs. 2000	1.03	=0.152	N	1997 vs. 2000	1.92	=0.028	S	1997 vs. 2000	0.46	=0.323	N
1997 vs. 2001	1.09	=0.138	N	1997 vs. 2001	1.65	=0.050	S	1997 vs. 2001	3.37	<0.001	S
1997 vs. 2002	0.69	=0.245	N	1997 vs. 2002	2.18	=0.015	S	1997 vs. 2002	2.86	=0.002	S
1998 vs. 1999	1.33	=1.090	N	1998 vs. 1999	0.00	=0.500	N	1998 vs. 1999	0.82	=0.206	N
1998 vs. 2000	0.18	=0.429	N	1998 vs. 2000	1.54	=0.062	N	1998 vs. 2000	2.18	=0.015	S
1998 vs. 2001	1.30	=0.097	N	1998 vs. 2001	1.27	=0.102	N	1998 vs. 2001	0.74	=0.230	N
1998 vs. 2002	0.99	=0.161	N	1998 vs. 2002	1.80	=0.036	S	1998 vs. 2002	0.25	=0.401	N
1999 vs. 2000	1.94	=0.027	S	1999 vs. 2000	1.54	=0.062	N	1999 vs. 2000	1.37	=0.085	N
1999 vs. 2001	0.06	=0.486	N	1999 vs. 2001	1.27	=0.102	N	1999 vs. 2001	1.57	=0.058	N
1999 vs. 2002	0.34	=0.367	N	1999 vs. 2002	1.80	=0.036	S	1999 vs. 2002	1.08	=0.140	N
2000 vs. 2001	1.81	=0.038	S	2000 vs. 2001	0.27	=0.394	N	2000 vs. 2001	2.94	0.002	S
2000 vs. 2002	1.46	=0.072	N	2000 vs. 2002	0.26	=0.397	N	2000 vs. 2002	2.44	=0.007	S
2001 vs. 2002	0.38	=0.352	N	2001 vs. 2002	0.54	=0.295	N	2001 vs. 2002	0.49	=0.312	N

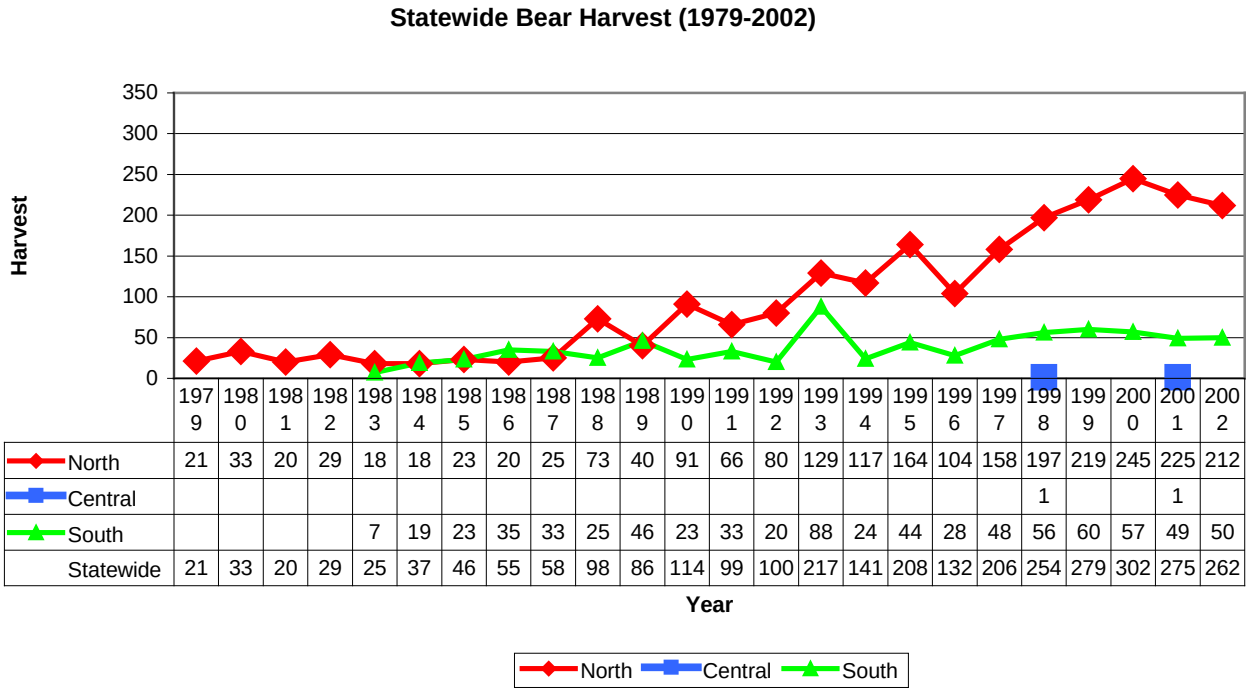
S -- difference tested significant

N -- difference tested not significant

Annual bait station data and the annual bear harvest for 1992 – 2002 were used to calculate a Pearson's r correlation coefficient to test for a linear relationship between percent bait station visits (independent variable) and annual bear harvest (dependent variable). The Pearson's r correlation coefficient (0.7956) indicated a significant (P = 0.018) linear relationship between these 2 variables. The linear regression equation from the 2001 test and the percent visitation rate for 2002 (32.3%) were used to predict a 2002 season bear harvest of 63 bears. The actual harvest for the 2002 season was 50 bears.

Harvest Data

Statewide, 262 bears were legally harvested during the 2002 fall hunting season (Fig. 4). An additional 31 known bears were killed either through illegal hunting (10) or auto collisions (21).



	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
North	21	33	20	29	18	18	23	20	25	73	40	91	66	80	129	117	164	104	158	197	219	245	225	212
Central																				1			1	
South					7	19	23	35	33	25	46	23	33	20	88	24	44	28	48	56	60	57	49	50
Statewide	21	33	20	29	25	37	46	55	58	98	86	114	99	100	217	141	208	132	206	254	279	302	275	262

Figure 4. Georgia statewide bear harvest statistics from 1979-2002.

North Georgia. – A total of 212 bears were harvested in north Georgia during the 2002 fall hunting season, down from the previous three years (Fig. 4). Harvests totals by method of hunting were 51 (24%) archery, 25 (12%) primitive weapons, and 136 (64%) firearms, similar to 2001's harvest totals by method. During 2002, 92 (43%) females were taken as part of the overall harvest. Since 1997, females have comprised 45.7% of the harvest.

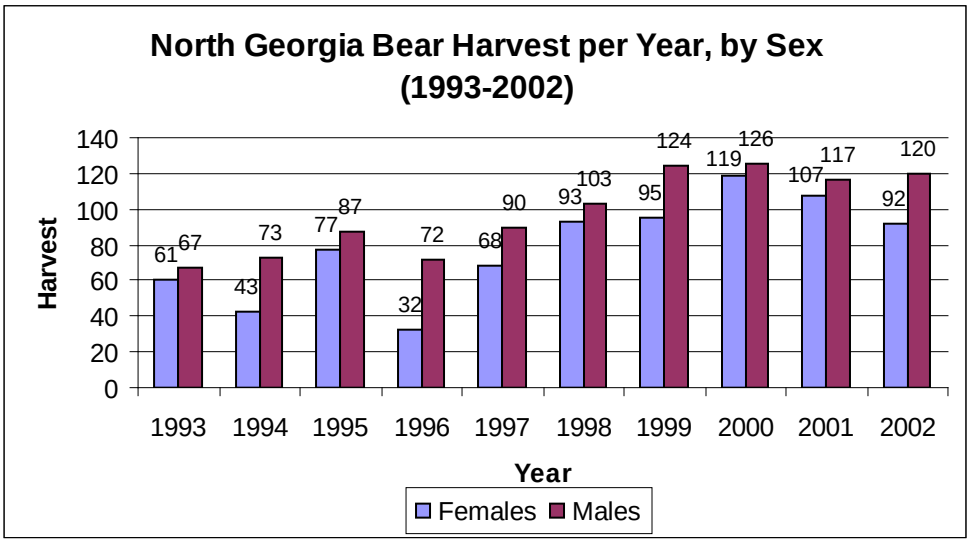


Figure 5. North Georgia bear harvest by sex (1993-2002)

Average age of bears harvested during the 2002 season was 4.52 years (n=212) overall. Average age of females was higher (4.52 years, n=90) than males (2.81 years, n=119). Even though the 2001 female age structure (3.84, n=105) was lower than the year prior (5.12, n=105) and year following, the overall trend for average age of females in the harvest remained relatively stable (Fig. 6). Over the past five years (1998-2002), the average age of harvested females was 4.35 (n=482) for females and 2.78 (n=570) for males.

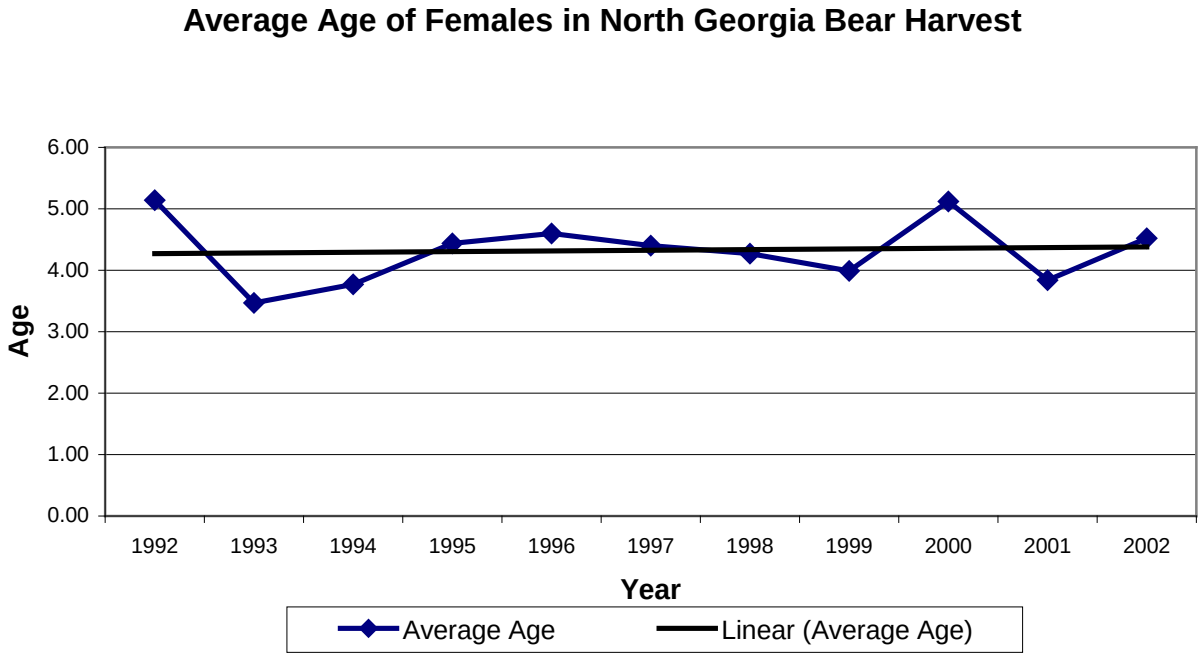


Figure 6 – Average age of females in north Georgia harvest from 1993-2002.

Nine bears were killed illegally during 2002 and 6 during 2001. Known road killed bears totaled 17 for 2002 and 13 during 2001.

Central Georgia. – No bears were harvested on the single WMA open for bear hunting during the one-day season in December (Fig. 4). One female bear was harvested during the 2001 one-day hunting season.

One bear was killed illegally during 2002. Known road killed bears totaled 12 for 2002.

South Georgia. – A total of 50 bears were harvested in South Georgia during the 2002 fall hunting season, similar to the previous year's harvest of 53 in 2001 (Fig. 4). All bears harvested were killed using traditional firearms. Of the 13 female and 38 male harvested bears aged, the average age of was 6.29 and 5.08 years respectively, similar to the average ages of bears harvested in 2001, 6.46 (n=14) for females and 5.88 (n=36) for males.

One bear was killed illegally during 2002 while none were illegally killed during 2001. Known road killed bears totaled 3 for 2002 and 1 during 2001.

DISCUSSION

Bait Station Survey

North Georgia. – Bear visitation, as indicated by the 2002 data, followed a continual trend of gradually increasing visitation rates. Even though significant differences from the previous 2 survey years were not found, the increasing trend since 1983 was maintained. This increasing trend most likely reflected increasing trends in overall black bear population size. The lack of significant findings between the past 2 years may correlate with diminished reproduction and poor food availability as related to foraging ecology.

Since a Chi^2 analysis indicated no significant differences in visitation based on road or trail type, it appears as ~~if~~ though characteristics associated with road or trail type did not impact bear behavior or habitat utilization during this year's sampling period.

South Georgia. – Bear visits, as indicated by the 2002 percent visitation rate for all sardine bait stations, were slightly lower than those in 2001, yet very similar to the 5 previous years in this comparison (2002 vs. 1997-2001). Five-year Z-statistic comparisons for this same time period indicated a significantly lower visitation rate in 1997 than in 2002. There were no significant differences in visitation rates in 2002 when compared to those for 1998, 1999, 2000, or 2001. Therefore, if the overall trend in visitation rates as expressed in Fig. 3 is any indication of the relative abundance of bears in southeastern Georgia then the population has been relatively stable if not increasing slightly since surveys began in 1992.

Visitation rates in southeastern Georgia compare favorably, but continue to be lower than rates in north Georgia (Fig. 2). Data for earlier years in north Georgia (1983 - 1991) indicated similar variations in visitation rates with a leveling off of rates from 1993 - 1995. Feeding ecology and seasonal food availability appear to influence bear activity patterns

(Garshelis and Pelton 1981, Young and Ruff 1982, Carlock et al. 1983, Garris 1983, Rogers 1987, Abler 1988, Hellgren et al. 1991, Dobey et al. 2002). Hellgren and Vaughn (1990) and Dobey et al. (2002) further identified definite shifts in home range use in response to seasonal food availability. Variations in bait station visitation rates, as well as harvest rates, could possibly be due to modifications in bear activity patterns due to food availability and other environmental factors. Dobey et al. (2002) found that when a highly sought food source such as blackgum was scarce in the swamp, bears made more use of upland habitats as they foraged for foods such as palmetto and gallberry and were thus more vulnerable to harvest by hunters. On the other hand, during years of high production of blackgum fruit, bears foraged extensively in the swamp and were less vulnerable to harvest.

Harvest Survey

Bear hunting is an important part of Georgia's bear management program. Hunting plays an important role in regulating bear populations and associated nuisance problems while providing an important recreational opportunity for sportsmen and women. Because of the reproductive ecology of bears, however, hunting seasons are monitored annually and fine-tuned to prevent negative impacts on the bear population. For this reason, a maximum harvest rate of 20% with females comprising no more than 50% of the harvest is the goal for hunted populations. Additionally, female average ages ideally should be held at or above 3.75 years to insure sufficient recruitment rates.

North Georgia – Even though the 2002 harvest was smaller than the previous 3 years, this lack of increase may be a reflection in the lack of changes to the overall harvest regulations over this same period. Unfortunately, bear hunter numbers are not available to determine hunter effort or success, which could greatly influence bear harvest data.

Harvest data is always of importance to both hunters and managers, however harvest figures should not be the sole consideration for basing management decisions. For this reason, gender and age of harvested bears are analyzed to further support harvest management recommendations. During 2002 season, females comprised 43% of the harvest while the average age of harvested females was 4.52 years. Both sex and age harvest characteristics from the 2002 hunting season and trend data leading up to the 2002 season are well within the originally established management guidelines. Parameters established to accomplish such harvest characteristics should be continued to support bear harvest as a critical bear management tool in north Georgia.

Central Georgia – Most likely, legal bear harvest likely has no significant impact on the overall population status in the Central Georgia black bear population. Even though bear hunting is limited in this population, the opportunity for hunters to harvest a bear most likely creates desirable awareness for the need to manage bear in this portion of the state while having no significant impacts on black bear population characteristics.

South Georgia -- Average harvest rates (Table 7) were calculated for all of the years represented by this survey (1992-2002). These harvest figures were compared with the annual percent visitation rates for the same time period. Since survey lines were not run in 1996, visitation rates could not be compared with the harvest during that year. A statistical comparison, using a Pearson's r correlation coefficient, between 6 pairs of data (1992 - 1998) for visitation rates (independent variable) and harvest (dependent variable) indicated a very strong but non- significant ($r = 0.8051$; $P = 0.053$) linear relationship between the 2 variables. The same analysis was used with 7 data pairs (1992 -1999), 8 data pairs (1992 - 2000), and 9 data pairs (1992 - 2001). These tests indicated significant linear relationships in 1999 ($r = 0.7917$; P

= 0.034), 2000 (r = 0.7956; *P* = 0.018), and 2001 (r = 0.7101; *P* = 0.032). Therefore, the percent visits for the annual bait station surveys could be expected to do a very good job of predicting whether there will be a relatively high or low harvest during the year of a survey. Using the linear regression equations from these tests, percent visitation rates were used to determine predicted (actual) harvests of 64 (54), 55 (55), 78 (53), and 63 (50) for 1999, 2000, 2001, and 2002 respectively. Though the actual harvests were generally below the predicted harvests, this method appears to do a pretty good job of forecasting the harvest for a given year. Only time will tell how consistently this predictor will forecast harvest numbers in future years.

Dobey, et al. (2002) estimated a population density of 830 bears (95% CI = 707 – 1,045) for the entire Okefenokee-Osceola ecosystem. Using the lower end of the interval (700 bears) the maximum annual harvest would be estimated at 140 bears with no more than 50% of the harvest being females. As indicated in Table 7, the highest harvest of bears from this population was 86 bears in 1993 with a current average annual harvest of 47.2. Except for 2 years, females in the harvest have remained below 50% with average ages ranging from 4.95 to 7.67 years. Harvest for this population, therefore, has remained well below the annual goals while average ages are well above target and has probably had no effect on the overall population.

Table 7. Percent visitation rates by black bears to sardine bait stations and annual and average harvest rates of black bears in Southeastern Georgia: 1992-2002.

Year	Percent Visitation Rates	Harvest		Total Annual Harvest	Average Harvest
		Males	Females		
1992	13.4	14	6	20	20.0
1993	27.4	45	41	86	53.0
1994	14.4	12	13	25	43.7
1995	27.2	33	11	44	43.8
1996	**	13	15	28	40.6
1997	23.5	35	13	48	41.8
1998	29.1	33	23	56	43.9
1999	28.9	35	19	54	45.1
2000	26.3	33	22	55	46.2
2001	35.1	38	15	53	46.9
2002	32.3	36	14	50	47.2

** Survey was not run in 1996.

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