

STATUS OF THE BLACK BEAR IN SOUTH-CENTRAL FLORIDA

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Abstract.—Archbold Biological Station (ABS) is an important center of information and distribution for the Florida black bear (*Ursus americanus floridanus*) in south-central Florida. Examinations of a 36-year database (1962-1997) and track census data (1974-2003) revealed that most of the 255 observations occurred during autumn, whereas highway mortality exhibited peaks in early summer and fall. Increases in annual roadkills since the mid-1980s coincide with human population growth and development in Highlands County. Nearly 75% of all reports, regardless of category, occurred from July through December, and approximately 77% occurred on or near the 2,020 ha ABS. Bear observations and acorn production on ABS exhibited similar annual patterns that suggest an ecological association. In addition, concentrations of roadkills may represent important bottlenecks in pathways to and from food supplies on the Lake Wales Ridge and baygall habitats. Detailed field studies of this population are warranted to describe its demographic status, conservation needs, and potential as part of a statewide metapopulation.

Less is known about the black bear (*Ursus americanus floridanus*) population of Highlands County and adjoining counties of south-central Florida than any other in the state. Whereas telemetry studies have targeted the larger populations at Eglin Air Force Base, Apalachicola National Forest, Osceola National Forest, Ocala National Forest, and Big Cypress Swamp (Maehr et al. 2001), little, other than anecdotal information, is known about the demographics or status of the black bear in south-central Florida. Although at least one dispersing male from the Big Cypress region has moved to Highlands County in the last 2 decades (Maehr et al. 1988), this population likely is exceeded in its isolation from others only by the remnant population in the greater Chassahowitzka ecosystem in west-central Florida (Maehr et al. 2003, Larkin et al. 2004). Other bear populations in Florida are associated with large tracts of forest and other dense cover that are usually centered on public lands. This led Maehr (1997:43) to suggest

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“the importance of upland forests, and inland swamps to South Florida’s large mammalian carnivores is obvious.” The relationship between bear population status and forest distribution in south-central Florida is not so obvious. Indeed, the potential bear habitat in a 584 km² area surrounding Archbold Biological Station appears more sparse and patchy than anywhere else in Florida (Cox et al. 1994:58, Hctor 2003). In part because of a lack of information on the population of this area and its questionable suitability as bear habitat, it was not included by Cox et al. (1994) as one of 5 strategic habitat conservation areas for the species. However, roadkills and observations indicate that a population persists in this landscape.

Although some skeptics have questioned the importance of corridors and interconnected landscapes for biodiversity conservation (Simberloff and Cox 1987, Simberloff et al. 1992), Florida’s largest native land mammal, the black bear, is a clear example of the need for and opportunity to manage a functional statewide metapopulation (Harris et al. 1996, Maehr et al. 2001). Over the last 3 decades individual black bears have demonstrated the potential for long distance movements between disjunct Florida population centers (Maehr et al. 1988, Maehr and Wooding 1992, Wooding et al. 1992, Smith 2001) including the longest-known dispersal of a female in North America (Maehr 1997a, Onorato and Hellgren 2001). Thus, an effective metapopulation approach to management of the Florida black bear should include more than just the largest populations (Cox et al. 1994) because smaller populations can serve as stepping-stones and future distribution centers in a statewide ecological network (Hctor et al. 2000, Hctor 2003). For this reason, the south-central peninsular population centered in Highlands County is of potential importance to Florida black bear conservation. In this paper we use 4 decades of records and field observations to examine the status of the black bear in this region.

STUDY AREA

The area considered in this analysis is centered on Highlands County (approximately 2,664 km²), particularly Archbold Biological Station 12 km S of the town of Lake Placid. It includes all or parts of Glades, Lee, Charlotte and Polk counties (Fig. 1)—a region extending from the Caloosahatchee River north to Lake Kissimmee, and from the Gulf of Mexico east to the Kissimmee River. Habitat types occurring in Highlands County of particular historical and current relevance to the black bear are the xeric upland associations (sand pine scrub, south Florida sandhill, and scrubby flatwoods) associated with the Lake Wales Ridge that extend through most of the county, and the dense bayhead forest (known locally as “baygall”) located along the east side of the ridge from Lake Istokpoga southward. The human population of Highlands County was approximately 88,972 in 2001, and grew by 27.7% from 1990 to 2000, a 4% faster rate than the mean for the state (U.S. Census Bureau 2002). The area has experienced extensive loss of forested and other native plant communities to commercial, housing, and a variety of agricultural uses.

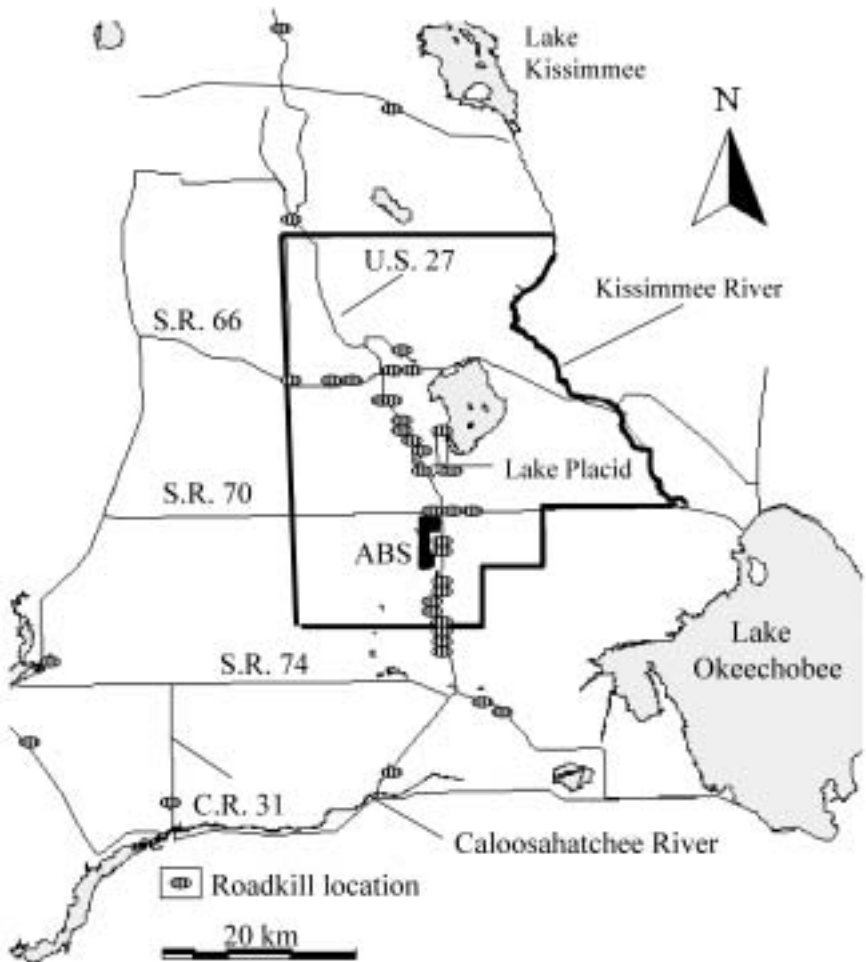


Figure 1. The south-central Florida study area centered on Highlands County (boundary indicated with heavy black line). Not all 57 roadkills appear as individual symbols because some are masked by the spatial overlap among records.

The ABS covers approximately 2,020 ha in the south-central part of Highlands County SW of the junction of State Highway 70 and U.S. Highway 27 (T38S, R30E). The major topographic features of ABS are the Lake Wales Ridge and intra-ridge valley. Predominant plant communities include sand pine scrub, southern ridge sandhill, scrubby flatwoods, pine flatwoods, dry prairies, bayhead, and scattered seasonally wet herbaceous depressions (Abrahamsom et al. 1984, Myers and Ewel 1990).

Because forested wetlands appear important to all bear populations in Florida (Maehr et al. 2001), bayhead systems may be critical to

the species' future in south-central Florida. Dominant trees in these semi-permanently wet depressions include sweet bay (*Magnolia virginiana*), swamp redbay (*Persea palustris*), dahoon holly (*Ilex cassine*), red maple (*Acer rubrum*), and swamp tupelo (*Nyssa biflora*) (Abrahamson et al. 1984, Duever 1984, Ewel 1990). The once continuous bayhead habitat bordering the east edge of the ridge has experienced extensive conversion to other land uses and now exists mostly as isolated islands in an increasingly open landscape.

METHODS

We used data from several sources to document seasonal variation, annual trends, and spatial patterns of black bear occurrences in south-central Florida. We also examined the relationship between annual acorn production among 5 species of oak in different vegetation associations on ABS (Abrahamson and Layne 2003) with annual numbers of black bear records for the period 1969 to 1996. We tested the null hypothesis that there was no association between acorn production and number of black bears seen (using Chi-square with $P \leq 0.05$).

Primary data sources were records (from the files of JNL) of sightings, scats, tracks, and other sign, nuisance activity, and roadkills. This material included field notes, reports from ABS staff and visitors, many residents in the region, newspaper accounts, and data from systematic track surveys conducted in July and January on ABS for the periods 1974-1986, 1993-1996, and 2000-2003. The track survey route consisted of a 2-m-wide bare strip extending for 4.5 km along the edge of a wide, sandy fire lane (see Layne and Glover 1985). Additional data were provided by field notes of C. E. Winegarner, a former research assistant at ABS, and the Natural History Observation file of ABS. Roadkill statistics for the region were provided by the Florida Fish and Wildlife Conservation Commission (FFWCC). The JNL database also included 4 roadkills in 1972, 1975, 1976, and 1997 not represented in the FFWCC database. Duplicate records from different sources were eliminated. We also excluded events that were based on questionable identification, lacked a precise date for the observation, or were based on second-hand reports not made within a month of the record.

RESULTS

Of the 242 acceptable black bear records from the period 1962 to 1997, 48% were sightings of one or more black bears. Another 13 records were recorded on ABS track surveys. Seventy six percent of all observations were made on ABS (Appendix 1). Tracks, scats, and nuisance reports accounted for 35.6%, 5.4%, and 7.5%, respectively. Observations and tracks were most frequently reported in October (Fig. 2). Most (74%) reports, regardless of category, occurred from July through December. During the 29-year period of continuous record-keeping (1969-1997) the annual number of reports ranged from 0 to 30 ($\bar{x} = 8.4$, $sd = 7.7$), the maximum occurring in 1987. Sightings of females with cubs ($n = 15$) and tracks of family groups ($n = 9$) accounted for 10% of reliable reports. Of the 98 records that identified a habitat associated with an observation, 47% were in sand-pine scrub, 14% were in

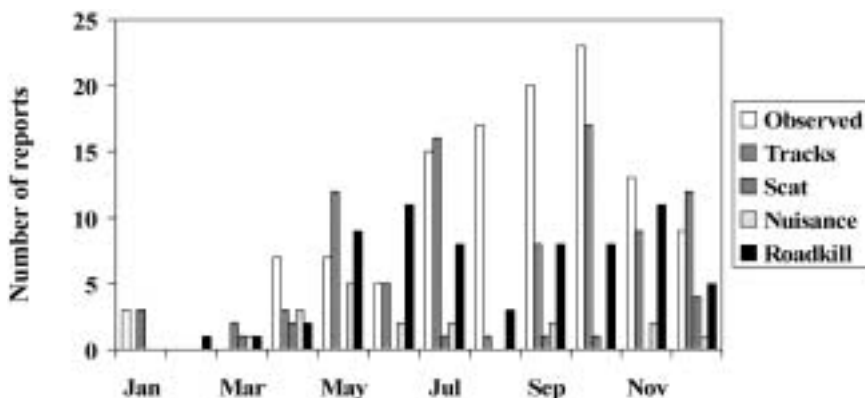


Figure 2. Frequency and breakdown by category of black bear records by month on Archbold Biological Station and other localities in south-central Florida. The nuisance category included apiary damage ($n = 12$), livestock depredation ($n = 2$), garbage-raiding ($n = 2$), and damage to ABS nest boxes and research equipment ($n = 4$).

scrubby flatwoods, 13% were in developed (residential/office) areas, 6% were in citrus or avocado groves, and 6% were in apiaries. Less than 5% each of the remaining observations were made in pine flatwoods, oak hammock, grasslands, sandhill, and bay swamp. We recorded 13 sets of tracks (including two sets that were paired) during the 20 years that seasonal surveys were conducted. All tracks were found during July, and in the 9 years that surveys were conducted after 1985 (i.e., none during the 12-year period from 1974–1984). Annual variation in black bear observations was associated with annual acorn production on ABS ($\chi^2 = 175.3$, $df = 28$, $P < 0.0001$) (Fig. 3).

Recorded roadkills occurred mostly ($n = 49$) in Highlands County but also in Glades ($n = 7$), Polk ($n = 4$), Charlotte ($n = 2$), and Lee ($n = 1$) counties from 1972–2001. The number of bears killed each year increased from 1985 through 1997 with a decline from 1998 to 2001 (Fig. 4). Roadkills were fairly evenly distributed from May through December with a noticeable reduction or absence in the months from January through April (Fig. 2), presumably reflecting hibernation and denning. Of the 57 roadkills in the FFWCC database, 72% were males. Most roadkills occurred on U.S. 27 along most of its length through Highlands County (with the exception of the extreme northern part), with lesser concentrations on and near State Highway 70 and U.S. Highway 98 (Fig. 1). Roadkills also occurred on several secondary roads with lower traffic volumes such as CR 29, CR 621, and CR 731. Along a 1-km stretch of County Road 619, 8 roadkills (including 3 females) were documented between 1989 and 2000.

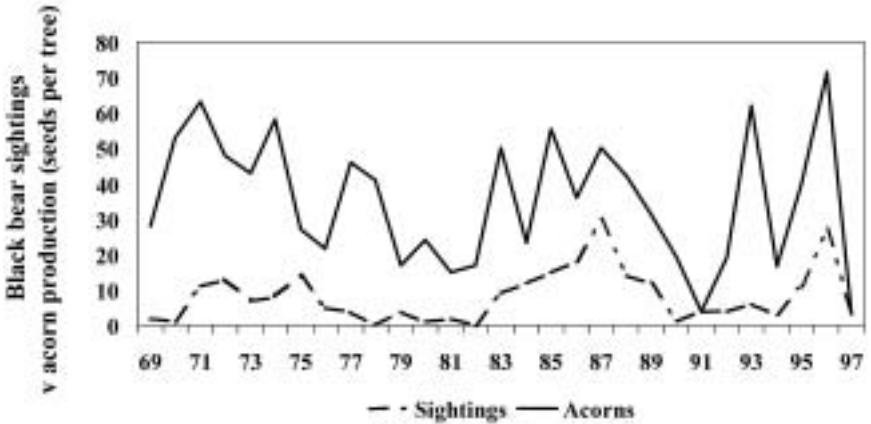


Figure 3. Relation between annual acorn mast production in 3 xeric upland associations on Archbold Biological Station and number of bear records. Mast production is based on the average number of acorns per tree (Abrahamson and Layne 2003).

DISCUSSION

Although both roadkills and observations of bears and sign in Highlands County and vicinity occurred during the months when the black bear is prone to be active in the southern peninsula (Maehr 1997a), roadkills were more frequent during the summer breeding season and fall when movements tend to be wide-ranging—apparently in response to the distribution of food such as acorns, nuts of scrub hickory (*Carya floridana*) and the fruit of saw palmetto (*Serenoa repens*) (Maehr and Layne 1996, Maehr 1997a). Most highway collisions occurred near patches of remnant oak scrub. Such mobility in exploiting seasonally available resources is common elsewhere in the range of the species (Garshelis and Pelton 1981, Villarubia 1982, Rogers 1987). Thus, the abundance of acorns and other mast in the xeric habitats of the Lake Wales Ridge may explain the increase in fall observations reported here. The temporal pattern of roadkill occurrence in south-central Florida was similar to that for the entire state (Wooding and Brady 1987).

Although the habitats reported in the present database suggest a tendency for the black bear to use scrub and other mast-producing habitats, telemetry data of a dispersal-aged male (Maehr et al. 1988) suggested that bay-swamp habitat may be more important, at least during summer. This bear was found in bay-swamp forests for 67% of daytime telemetry records where habitat use could be determined. This supports historical impressions of bear distribution in Highlands County

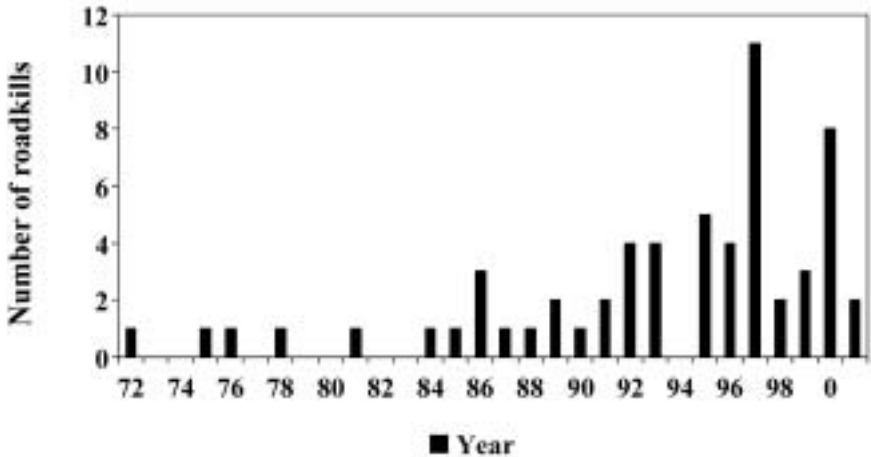


Figure 4. Documented annual black bear highway mortality in south-central Florida.

(Rand and Host 1942, DeVane 1978) and suggests that reports from ABS and elsewhere may be biased by the habitat types in which observations were made (because scrub and scrubby flatwoods dominate), and by the time of day when most sightings were made (during the day). On the other hand, tracks and other sign were likely made at night. At the very least, this suggests that both xeric upland habitats and bottomland forests should be considered in the development of a management plan for this species in south-central Florida, and that more systematic sampling of habitat use is needed to better understand bear-habitat relations in the region.

Although nothing is known about its demography or population trend, the black bear has persisted in Highlands County and the surrounding region despite widespread and increasing development and agricultural activity. An obvious symptom of this human influence is highway mortality. Although roadkill statistics have been suggested as a population monitoring tool (Florida Game and Fresh Water Fish Commission 1993) on the assumption that roadkills vary proportionally with population size in a given area, the effects of increasing human populations, habitat loss, and traffic volume have not been adequately considered as contributing factors in the relation between bear collisions and population status. Mortality rates and observations of family groups in Highlands County support the notion that the black bear continues to persist and reproduce in the region, however, habitat loss and fragmentation may have lead to increased observability in areas of upland food production, and increased vulnerability to vehicular

collision (Forman et al. 2003). Indeed, Wooding and Brady (1987) predicted that highway mortality would become a more important management issue as habitat becomes increasingly patchy. Regardless, the persistence of the black bear in this region belies the forest fragmentation that is so characteristic of Highlands County, and that is the result of natural and anthropogenic influences (Cox et al. 1994). Similarly denatured and unforested habitats in Florida are devoid of the species (Hector 2003). Perhaps the patterns of forest distribution, food productivity, and human development are such that the south-central Florida black bear can survive despite living in areas that are below the minimum preserve size threshold of 10,000 ha suggested by Hellgren and Maehr (1992). Although development continues to intensify, most patches of forest in the study area are still primarily surrounded by agricultural uses that may remain permeable to bear movements.

The black bear has been an important part of the regional culture for at least a century. Historical records indicate that it was the target of hunting before highway mortality became common, and it was the target of poaching and poisoning just a few decades ago (Williams 1978). DeVane (1978) noted that 33 bears were killed in 30 days at a single location in the Parker Island area in the late 1800s and another 34 were killed along a short stretch of SR 70 during its construction in 1921. In addition, early 20th century accounts obtained by JNL from long-time residents of the county included a description of the practice of driving bears into pits and the open water of Lake Placid where as many as 22 were shot in a single day, and the case of a beekeeper who claimed to have poisoned 10 bears in the vicinity of ABS in the late 1960s. The effects of current habitat distribution and highway-related mortality on the region's black bear population are unknown.

Although the data exhibit an approximately 10-11-year cycle in frequency of bear records (Fig. 3), it is unlikely that this is a direct reflection of local population dynamics. Rather, when considering the steady increase in highway mortality from 1984-1997, and the considerable year-to-year variation in acorn production in the xeric upland habitats of the ABS (Abrahamson and Layne 2003), it is possible that bear occurrence on the station has been more a function of food availability than population size. This suggestion is supported by the higher rates of visitation on the station during autumn—the months when nutritious foods are most abundant. Further, trends in black-bear highway mortality follow a trajectory that is similar to recent human population growth in Highlands County (>300% since 1960), and may reflect both habitat loss and perhaps increased bear movements (in response to a fragmented landscape) as well as an increase in local and long-distance highway traffic.

Apparent heavy use of ABS during the fall may be a compensatory response to diminished food supplies elsewhere, although such use is

also well documented in the historical literature, and thus, cannot be interpreted as a new phenomenon related solely to habitat loss. Similar movements have been reported in the very small bear population in the greater Chassahowitzka ecosystem of west central Florida where adult females occasionally abandon home ranges during fall to access acorns (Orlando 2003). During these movements they are subjected to highway mortality. In the greater Chassahowitzka ecosystem, the effects of fragmentation by roads are exacerbated by noise and other edge effects that degrade otherwise suitable habitat. Bears in the Highlands County area may be equally vulnerable because they must cross highways to access food-producing xeric habitats. Regardless, better demographic and spatial data are needed to understand the survival prospects for the south-central Florida population.

In the face of continuing loss of forest and scrub habitats in Highlands County and south-central Florida generally, the ABS and other protected areas with suitable black-bear habitat (e.g., Apthorpe Tract, Royce Ranch, Lake Wales Ridge National Wildlife Refuge) are of increasing importance to the population's future. Although Wooding and Brady (1987) recommended a variety of solutions to ameliorate the effects of habitat fragmentation and highway mortality, the only methods that do more than treat symptoms of an increasingly patchy landscape are the protection of habitat through land-use regulations and acquisition efforts, and the re-creation of connectivity among habitat patches (Hoctor 2003). We recommend that state and regional land-management agencies and private environmental groups involved in the protection and restoration of natural habitats give high priority to maintaining and restoring the demographic interchange within a once continuous Florida population. In the case of the south-central Florida black-bear population, the success of such efforts will depend upon additional research to clarify the spatial and temporal patterns of bear ecology as an aid to mitigating continued human pressures on the population.

ACKNOWLEDGMENTS

We thank the over 100 ABS staff members, visitors, and other individuals who reported bear observations over the span of 40 years. Archbold Biological Station supported acquisition and curation of the records. Portions of data analyses were supported by a Disney Wildlife Conservation Fund grant. T. Eason of the Florida Fish and Wildlife Conservation Commission graciously provided bear highway-mortality statistics. This is journal series number 03-09-140 of the Kentucky Agricultural Experiment Station and is published with permission of the director.

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Appendix 1. Records of the black bear in and around Highlands County, FL 1962-1997.

Date	Approximate location	Evidence	Habitat (if noted) ¹	Observer
12 Oct. 1962	ABS ²	Tracks	Scrubby flatwoods	J. Layne
16 Jul. 1969	ABS	Scat	Scrub	P. Cone
4 Nov. 1969	ABS	Tracks	Scrub	J. Layne
15 Oct. 1970	ABS	Tracks	Scrubby flatwoods	J. Layne
9 Jan. 1971	Hickory Branch	Observed	Dike	D. Tuck
27, 28 Mar. 1971	ABS	Tracks	Scrub	J. Layne
1 Apr. 1971	ABS	Observed	Scrub	R. Archbold
9 Apr. 1971	ABS	Observed	Scrub	T. Lodge
27 Apr. 1971	ABS	Scat	Scrubby flatwoods	C. Winegarner
29 May 1971	ABS	Tracks	Scrub	R. Archbold
8 Jun. 1971	ABS	Tracks	—	G. Woolfenden
14 Jun. 1971	ABS	Observed	Scrub	C. Winegarner
15 Jun. 1971	ABS	Tracks	Scrubby flatwoods	J. Layne
17 Jun. 1971	ABS	Tracks	—	C. Winegarner
1 May 1972	ABS	Tracks	Scrub	B. Barbour
2 May 1972	ABS	Tracks	Scrub	B. Thomason
8 May 1972	ABS	Damage	Scrubby flatwoods	J. Layne
9 May 1972	ABS	Damage	—	J. Layne
10 May 1972	County Road 17	Damage	Agriculture	B. Lewis
10 Jun. 1972	US Highway 27	Hit by car	—	Tampa Tribune
12 Jun. 1972	Hickory Branch	Damage	Citrus grove	J. Johnson
10 Jul. 1972	Peoples Ranch	Observed	—	J. Johnson
20 Jul. 1972	Hickory Branch	Observed	Apiary	J. Layne
26 Jul. 1972	ABS	Damage	—	J. Johnson
10 Sep. 1972	Placid View Road	Observed	—	F. Lohrer
3 Oct. 1972	State Road 70	Observed	—	C. Lohrer
8 Oct. 1972	ABS	Tracks	—	J. Layne
9 May 1973	ABS	Damage	Scrub	J. Layne
22 Jun. 1973	ABS	Observed	Office area	M. Harbaugh
31 Jul. 1973	ABS	Observed	Scrub	J. Layne
1 Sep. 1973	ABS	Observed	—	J. Fitzpatrick
22 Oct. 1973	ABS	Tracks	—	J. Layne
16, 29 Nov. 1973	ABS	Tracks	—	J. Layne
9 Jul. 1974	ABS	Tracks	—	C. Winegarner
12, 15 Jul. 1974	ABS	Tracks	—	F. Lohrer
21 Jul. 1974	Brighton Reservation	Observed	—	J. Gibbons
5 Aug. 1974	ABS	Observed	Scrub	H. Higgins
28 Aug. 1974	ABS	Observed	—	F. Lohrer
30 Aug. 1974	ABS	Observed	Scrubby flatwoods	F. Lohrer
8 Oct. 1974	ABS	Tracks	Scrubby flatwoods	J. Layne
10 May 1975	ABS	Tracks	—	J. Layne
29 May 1975	Lake Huntley	Observed	Avocado grove	J. Watters

¹Or inferred from location/description.²Archbold Biological Station.³This observation was facilitated with radio telemetry on a bear that was the subject of a paper by Maehr et al. (1988); subsequent telemetry locations were not reported herein due to duplication and sampling bias.

Appendix 1. (Continued) Records of the black bear in and around Highlands County, FL 1962-1997.

Date	Approximate location	Evidence	Habitat (if noted) ¹	Observer
30 May 1975	Lake Grassy	Hit by car	—	M. Yusko
18 Nov. 1975	Tiger Creek, Polk Co.	Damage	Apiary	K. Morrison
20 Nov. 1975	ABS	Tracks	Scrubby flatwoods	C. Winegarner
25 Nov. 1975	Lake Crews	Treed	—	J. Layne
26 Nov. 1975	Fisheating Creek	Tracks	—	M. Masters
1 Dec. 1975	ABS	Tracks	—	M. Masters
3 Dec. 1975	Lake Redwater	Tracks	Orange grove	V. Morgan
11 Dec. 1975	ABS	Scat	—	C. Winegarner
12 Dec. 1975	ABS	Scat	Scrub	C. Winegarner
14 Dec. 1975	ABS	Damage	Office area	J. Layne
28 Dec. 1975	ABS	Scat	—	J. Layne
28 Dec. 1975	ABS	Observed	Sandhill	D. Moskovitz
6 Jan. 1976	ABS	Scat/tracks	—	V. Brach
25 May 1976	ABS	Tracks	—	M. Yusko
27 May 1976	ABS	Tracks/hair	—	M. Yusko
15 Jul. 1976	Near Venus	Hit by car	—	R. Marine
17 Dec. 1976	North of Lake Placid	Tracks	Citrus grove	J. Morgan
6 Apr. 1977	East of ABS	Tracks	—	C. Winegarner
3 May 1977	Lake Frances	Treed	—	J. Layne
21 May 1977	Highlands Park Estates	Tracks	Suburb	H. Higgins
25 Jun. 1977	Highlands Park Estates	Observed	Suburb	K. Crawford
2 Jan. 1979	Hendrie Ranch	Observed	Oak hammock	J. Hendrie
6 May 1979	ABS	Tracks	—	C. Winegarner
8 Oct. 1979	Sun-n-Lakes	Observed	Suburb	W. Joiner
12 Oct. 1979	ABS	Tracks	Scrub	M. Yusko
17 Apr. 1980	Lake Placid	Observed	Citrus grove	R. Carter
25 Apr. 1981	ABS	Scat	—	J. Layne
1 Jun. 1981	Lake Placid	Tracks	Citrus grove	R. Carter
29 Nov. 1983	Consolidated Tomoka	Observed	Scrub	W. Maulden
2 Dec. 1983	ABS	Tracks	Scrubby flatwoods	C. Winegarner
4 Dec. 1983	ABS	Observed	Scrub	M. Winegarner
4 Dec. 1983	ABS	Tracks	—	R. Layne
5 Dec. 1983	ABS	Tracks	Scrub	J. Layne
6 Dec. 1983	ABS	Scat/tracks	—	C. Winegarner
11 Dec. 1983	ABS	Tracks	Scrub	F. Lohrer
12 Dec. 1983	ABS	Tracks	—	F. Lohrer
13 Dec. 1983	ABS	Tracks/hair	—	G. Woolfenden
17 Jul. 1984	ABS	Tracks	Scrub	K. McGowan
24 Jul. 1984	ABS	Observed	—	M. Lee
30 Jul. 1984	ABS	Tracks	—	K. McGowan
10 Aug. 1984	ABS	Observed	Scrubby flatwoods	J. Layne
13 Sep. 1984	ABS	Observed	—	B. Patterson

¹Or inferred from location/description.²Archbold Biological Station.³This observation was facilitated with radio telemetry on a bear that was the subject of a paper by Maehr et al. (1988); subsequent telemetry locations were not reported herein due to duplication and sampling bias.

Appendix 1. (Continued) Records of the black bear in and around Highlands County, FL 1962-1997.

Date	Approximate location	Evidence	Habitat (if noted) ¹	Observer
14 Sep. 1984	ABS	Tracks	—	J. Layne
24 Sep. 1984	ABS	Observed	—	A. Johnson
2 Oct. 1984	ABS	Tracks	—	M. Deyrup
4 Oct. 1984	ABS	Tracks	—	J. Layne
7 Oct. 1984	ABS	Observed	—	J. Layne
9 Oct. 1984	ABS	Diggings	—	B. Crawford
15 Oct. 1984	ABS	Scat	Scrubby flatwoods	J. Layne
27 May 1985	ABS	Observed	—	A. Johnson
13 Jun. 1985	Carter residence	Tracks	Residence	D. Carter
4 Jul. 1985	Parker Island	Observed	Residence	M. Yusko
18 Jul. 1985	ABS	Tracks	—	F. Lohrer
23 Jul. 1985	ABS	Observed	—	J. Peoples
2 Oct. 1985	ABS	Tracks	—	B. Crawford
8 Oct. 1985	ABS	Tracks	—	J. Layne
10 Oct. 1985	ABS	Observed	—	T. Summerlin
17 Oct. 1985	ABS	Observed	—	D. Smith
18 Oct. 1985	ABS	Observed	—	F. Lohrer
28 Oct. 1985	ABS	Observed	—	T. Summerlin
7 Nov. 1985	ABS	Tracks	—	M. Elowson
2 Dec. 1985	ABS	Tracks	Scrub	T. Summerlin
3, 4 Dec. 1985	ABS	Tracks	—	T. Summerlin
1 Jul. 1986	ABS	Observed ³	Flatwoods	J. Layne
8 Jul. 1986	ABS	Tracks	Scrub	P. Martin
10 Jul. 1986	ABS	Tracks	—	F. Lohrer
14 Jul. 1986	ABS	Tracks	—	B. Crawford
18 Jul. 1986	ABS	Observed	Scrub	J. Layne
1 Aug. 1986	ABS	Observed	Bayhead	M. Minno
21 Aug. 1986	ABS	Observed	Lake Annie	M. McMillian
29 Aug. 1986	ABS	Observed	—	D. Smith
11 Sep. 1986	ABS	Tracks	—	M. McMillian
12 Sep. 1986	ABS	Tracks	Scrub	M. McMillian
13 Sep. 1986	ABS	Tracks	—	M. McMillian
18 Sep. 1986	ABS	Tracks	—	M. Deyrup
22 Sep. 1986	ABS	Observed	—	L. Ferguson
22 Sep. 1986	ABS	Tracks	—	D. Fleck
1 Oct. 1986	ABS	Tracks	Scrubby flatwoods	P. Martin
1, 7 Oct. 1986	ABS	Tracks	—	P. Martin
7 Oct. 1986	ABS	Observed	—	Unknown
2 Jun. 1987	ABS	Damage	—	J. Layne
8 Jun. 1987	ABS	Observed	—	ABS staff
18 Jun. 1987	ABS	Observed	—	M. Valero
12 Aug. 1987	Lake Placid	Observed	Scrub	J. Wolfe

¹Or inferred from location/description.²Archbold Biological Station.³This observation was facilitated with radio telemetry on a bear that was the subject of a paper by Maehr et al. (1988); subsequent telemetry locations were not reported herein due to duplication and sampling bias.

Appendix 1. (Continued) Records of the black bear in and around Highlands County, FL 1962-1997.

Date	Approximate location	Evidence	Habitat (if noted) ¹	Observer
20 Aug. 1987	ABS	Tracks	Scrub	P. Frank
30 Aug. 1987	ABS	Observed	Scrub	R. Layne
2 Sep. 1987	ABS	Observed	Scrub	J. Woolfenden
7 Sep. 1987	ABS	Observed	—	M. Deyrup
9, 16 Sep. 1987	ABS	Observed	Scrub	P. Martin
18 Sep. 1987	ABS	Observed	—	K. Lips
19 Sep. 1987	Lake Placid	Observed	—	K. Simpson
29 Sep. 1987	ABS	Observed	—	J. Angell
29 Sep. 1987	Sun 'n Lake	Observed	—	K. Simpson
5 Oct. 1987	ABS	Observed	Scrub	J. Cronin
7 Oct. 1987	ABS	Observed	Field	R. Curry
20, 21 Oct. 1987	ABS	Tracks	—	J. Layne
22 Oct. 1987	ABS	Observed	—	C. Phypers
22, 27 Oct. 1987	Venus	Observed	Residential	S. Powers
27 Oct. 1987	ABS	Observed	—	P. Keller
29 Oct. 1987	ABS	Observed	—	D. Carter
30 Oct. 1987	ABS	Observed	Scrub	J. Layne
4 Nov. 1987	ABS	Observed	Scrub	K. Lips
5 Nov. 1987	ABS	Observed	—	D. Carter
19 Nov. 1987	ABS	Tracks	—	J. Layne
21 Nov. 1987	ABS	Damage	—	D. Smith
27 Nov. 1987	Consolidated Groves	Observed	Scrub	B. Stayer
3 Dec. 1987	ABS	Observed	—	G. Woolfenden
8 Mar. 1988	ABS	Digging	Saw palmetto	J. Layne
27 Apr. 1988	ABS	Tracks	—	F. Yusko
28 Apr. 1988	ABS	Observed	—	G. Woolfenden
10 May 1988	ABS	Tracks	—	D. Smith
16 May 1988	ABS	Tracks	Apiary	J. Layne
26 May 1988	ABS	Observed	-	T. Mauldin
2 Jul. 1988	Lake Placid	Observed	Apiary	R. Carter
12 Jul. 1988	Rozier Road	Tracks	Apiary	J. Layne
21 Jul. 1988	ABS	Observed	—	W. Goodwin
26 Jul. 1988	ABS	Damage	—	D. Smith
27 Jul. 1988	ABS	Observed	Scrub	B. Crawford
29 Jul. 1988	ABS	Observed	Scrubby flatwoods	ABS staff
16 Aug. 1988	ABS	Observed	—	B. Patterson
18 Aug. 1988	ABS	Observed	—	D. Daigneau
7 Mar. 1989	ABS	Damage	Scrub	K. Visscher
11 Apr. 1989	ABS	Damage	—	J. Layne
13 Apr. 1989	ABS	Damage	Scrub	J. Layne
15 Apr. 1989	ABS	Observed	—	J. Stanley
19 Apr. 1989	ABS	Garbage	—	J. Layne

¹Or inferred from location/description.²Archbold Biological Station.³This observation was facilitated with radio telemetry on a bear that was the subject of a paper by Maehr et al. (1988); subsequent telemetry locations were not reported herein due to duplication and sampling bias.

Appendix 1. (Continued) Records of the black bear in and around Highlands County, FL 1962-1997.

Date	Approximate location	Evidence	Habitat (if noted) ¹	Observer
24 Apr. 1989	ABS	Observed	—	K. Vulinek
25 Apr. 1989	Rozier Road	Tracks	—	M. Yusko
28 Apr. 1989	ABS	Observed	—	R. Mumme
3 May 1989	ABS	Tracks	—	R. Titus
4 May 1989	ABS	Damage	—	J. Layne
12 May 1989	Highlands Hammock	Observed	—	J. Moore
6 Jul. 1989	ABS	Tracks	—	J. Layne
24 May 1990	ABS	Observed	—	D. Radtke
28 May 1991	ABS	Observed	Scrub	M. Crawford
15 Jul. 1991	ABS	Tracks	—	B. Crawford
4 Sep. 1991	Jack Creek	Damage	Scrub	R. Layne
10 Nov. 1991	ABS	Observed	Scrub	G. Woolfenden
28 Mar. 1992	Flamingo Villas	Scat	—	B. Simons
26 May 1992	Highland Park Estates	Observed	—	B. Beck
7 Jul. 1992	ABS	Tracks	—	R. Bowman
24 Sep. 1992	Carter Creek	Scat	Scrub	B. Stith
1 Jul. 1993	Royce Ranch	Observed	Pasture	G. Woolfenden
2 Jul. 1993	ABS	Tracks	—	J. Layne
14 Jul. 1993	ABS	Digging	Cutthroat grass	J. Layne
26 Sep. 1993	Sebring (airport)	Tracks	Scrub	D. Shoch
19 Oct. 1993	County Road 619	Observed	—	J. Hendrie
16 Nov. 1993	Nutracker Farm	Tracks	—	E. Nutkin
7 Jan. 1994	Venus	Observed	—	W. Johnson
21 Sep. 1994	Royce Ranch	Calf kill	Pasture	J. Layne
18 Oct. 1994	Carter Creek Road	Observed	—	R. Bowman
25 Jul. 1995	ABS	Tracks	—	K. Main
20 Sep. 1995	ABS	Observed	—	D. Johnston
25 Sep. 1995	ABS	Observed	—	D. Johnston
4 Oct. 1995	Palmdale	Observed	—	G. Crawford
18 Oct. 1995	ABS	Tracks	Scrub	K. Tarvin
26 Oct. 1995	ABS	Observed	—	M. Hestand
26 Oct. 1995	ABS	Tracks	—	N. Deyrup
2 Nov. 1995	Lake Placid	Observed	Scrub	G. Landman
5 Nov. 1995	ABS	Tracks	—	J. Layne
23 Nov. 1995	Lake Placid	Observed	Bay forest	D. Durrance
27 Dec. 1995	ABS	Observed	Scrub	R. Bowman
8 Jul. 1996	ABS	Tracks/scat	—	D. Burhans
9 Jul. 1996	ABS	Observed	—	G. Woolfenden
31 Jul. 1996	Lake Placid	Observed	Citrus grove	L. Hartzell
2 Aug. 1996	Lake Placid	Observed	Suburb	H. Marshall
9 Aug. 1996	ABS	Observed	Scrubby flatwoods	C. Casado
20 Aug. 1996	Highland Park Estates	Observed	Suburb	S. Duran

¹Or inferred from location/description.

²Archbold Biological Station.

³This observation was facilitated with radio telemetry on a bear that was the subject of a paper by Maehr et al. (1988); subsequent telemetry locations were not reported herein due to duplication and sampling bias.

Appendix 1. (Continued) Records of the black bear in and around Highlands County, FL 1962-1997.

Date	Approximate location	Evidence	Habitat (if noted) ¹	Observer
25 Aug. 1996	ABS	Observed	—	M. Minno
29 Aug. 1996	ABS	Observed	Scrubby flatwoods	M. Evans
31 Aug. 1996	ABS	Observed	—	M. Evans
6 Sep. 1996	ABS	Tracks	—	D. Burhans
9 Sep. 1996	ABS	Observed	—	B. Conner
13 Sep. 1996	ABS	Observed	—	B. Nelson
16 Sep. 1996	ABS	Observed	—	C. Atkisson
17 Sep. 1996	ABS	Observed	—	B. Garner
19 Sep. 1996	West of Lake Annie	Observed	Apiary	M. E'hart
3 Oct. 1996	Lake Placid	Treed	Suburb	L. Wells
22 Oct. 1996	ABS	Observed	—	H. Kowalski
30 Oct. 1996	ABS	Observed	—	Z. Lavoy
2 Nov. 1996	ABS	Observed	—	M. Evans
4 Nov. 1996	North of ABS	Observed	—	H. Kowalski
18 Nov. 1996	ABS	Observed	Scrub	J. Hailman
21 Nov. 1996	ABS	Observed	—	D. Berry
21 Nov. 1996	ABS	Observed	—	R. Pickert
3 Dec. 1996	ABS	Observed	—	L. Hailman
6 Dec. 1996	ABS	Observed	—	M. Conner
6 Dec. 1996	ABS	Observed	—	D. Durrance
12 Dec. 1996	ABS	Observed	Scrub	D. Maehr
2 Jan. 1997	ABS	Scat	—	P. Boulay
13 Jan. 1997	ABS	Scat	—	F. Lohrer
31 Mar. 1997	South of Haines City	Hit by car	Commercial/woods	R. Bowman

¹Or inferred from location/description.

²Archbold Biological Station.

³This observation was facilitated with radio telemetry on a bear that was the subject of a paper by Maehr et al. (1988); subsequent telemetry locations were not reported herein due to duplication and sampling bias.