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Population and Habitat Ecology of Brown Bears on Admiralty and Chichagof Islands

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SUMMARY

We continued to monitor brown bears (*Ursus arctos*) on 2 study areas including a 344km^2 northern Admiralty Island study area and a 1,112 km^2 Chichagof Island study area. Six brown bears were recaptured on the Admiralty Island study area in 1994 including 5 adult females. We monitored 11 male and 21 female brown bears with active radiocollars during this period. Seven adult females (mean age = 21) have been monitored for > 10 years. We radiocollared 106 bears on the Admiralty Island study area from 1981 through 1994, and a minimum of 18 (17%) have been legally killed by hunters and 2 were killed in association with the Greens Creek Mine. We estimated mean litter size for cubs-of-the year (COY) to be 1.8 from 1990-1994. Mean interval between successful litters was 4.1 years and varied from 3 to 7 years.

We captured 20 bears on the study area on the northeast portion of Chichagof Island during this reporting period, including 9 recaptures of marked females. We monitored 8 male and 35 female bears with radiocollars during this period. We captured 96 bears 118 times from October 1989 through October 1994. We estimated mean litter size for COY to be 1.9 from 1990-1994. The overall 4-year Kaplan-Meier staggered-entry design annual survival rate for female brown bears > age 3 was 0.96 (n = 68) and for males > age 3 the rate was 0.84 (n = 30). Four radiocollared female and 7 radiocollared male brown bears died during this reporting period. Eight of the 11 mortalities were caused by legal hunting, defense of life or property, or illegal killing. We estimated monthly habitat use based on a sample of 1,314 aerial telemetry relocations from 96 brown bears. Upland old-growth forest was the most consistently used habitat type. Alpine and subalpine habitats were most used in June (41.9% of relocations) and avalanche slopes/deciduous brush habitat types were most used in September (43.2% of relocations). Riparian old-growth forest was used most often in August (30.8%) of relocations. Combining riparian and upland old-growth forest types we found that in August 63.4% of the relocations

were in riparian and upland old-growth forest. Few relocations (2.9%) were in clearcut habitat types.

Key Words: Admiralty Island, brown bear, Chichagof Island, habitat, mortality, survival, *Ursus arctos*.

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BACKGROUND

Brown bear (*Ursus arctos*) populations are influenced by development activities that have resulted in the elimination of the species from substantial portions of its historic range (Servheen 1990). Within Alaska, brown bear populations are generally healthy with stable populations. In some regions of Alaska, brown bear populations are being affected directly through intensive hunting pressure (Miller 1994) or indirectly through habitat change (loss of old-growth forest by logging) and the subsequent increase in human access by road construction (e.g., Titus and Beier 1993). These habitat and access changes decrease bear populations (McLellan and Shackleton 1988, McLellan 1990). Understanding and documenting these habitat and access changes to the landscape and the subsequent changes to brown bear populations are important for resource management decisions. This information may lead to changes in brown bear hunting regulations, legal harvest enforcement, and forest management in a multiple use setting.

Brown bear populations are in high densities in portions of Southeast Alaska, especially the Islands of Admiralty, Baranof, and Chichagof (Game Management Unit 4) where mark-resight density estimates have been conducted (Schoen and Beier 1990, Titus and Beier 1993). Hunting effort is high with 587 registration permits being issued to brown bear hunters for the fall 1993 and spring 1994 regulatory year. Hunters harvested 103 brown bears

during this period in GMU 4. In addition to hunting opportunities, the area provides increased use for brown bear viewing (Titus et al. 1994). Understanding and monitoring brown bear demography, relative abundance, and density in selected areas is useful to ensure that hunting and viewing opportunities for brown bears are maintained by resource management.

Habitat change and access are increasing in some portions of Unit 4. We believe it important to understand how these habitat changes correlate with changes in brown bear populations and movements over the short- and long-term. Stable brown bear populations normally have very low mortality rates and annual survival rates of adults often exceed 90% (e.g., Sellers et al. 1993, Wielgus et al. 1994). Unless mortality is very high for a few years, population declines will be slow and difficult to document in short-term studies. Therefore, we choose to monitor demographic statistics for a specific brown bear population for at least 5 years, and at the same time assess patterns of habitat use and selection in landscapes with and without habitat change. Collection of demographic patterns are useful for assessing effectiveness of hunting regulations, while the collection of habitat information is useful for modeling habitat patterns and predicting future habitats that will be relatively good or poor for brown bears. A brown bear habitat capability model has been developed for Southeast Alaska (Schoen et al. 1994) based on information from the pristine habitats of northern Admiralty Island. Our objective is to collect population and habitat ecology information to evaluate and improve this habitat capability model, continue to collect long-term reproduction information for population modeling, and evaluate the status of brown bears on our northeast Chichagof Island study area.

OBJECTIVES

The scope of our project remained similar to that of the previous reporting period (Titus and Beier 1993). The emphasis was to evaluate short- and long-term human-induced changes to habitat and demography in brown bear populations. Objectives include:

1. Evaluate long-term changes in the home ranges and centers of activity of selected brown bears in the vicinity of Greens Creek, Admiralty Island.

2. Evaluate the degree of site tenacity by female brown bears and their offspring to developed areas of Greens Creek.

3. Determine the extent to which brown bears exhibit short-term changes in home ranges or centers of activity as a result of logging activity on northeast Chichagof Island.

4. Determine seasonal and annual home ranges of selected brown bears, particularly in areas where data can be acquired both before and after roadbuilding and intensive logging activities.

5. Evaluate the interagency brown bear habitat capability model with independent data from northeast Chichagof Island.

6. Estimate annual survival and reproduction rates for brown bears on northeast Chichagof Island.

7. Determine the degree of population isolation of brown bears on northeast Chichagof Island.

8. Estimate the types of brown bear mortality on northeast Chichagof Island.

9. Use population projection models for evaluating the future status of brown bears on northeast Chichagof Island given differing demographic parameters.

10. Assess the seasonal distribution and habitat use patterns of brown bears on northeast Chichagof Island.

11. Determine the association between logging, logging camps and associated development and attributes of annual brown bear harvest in Southeast Alaska.

12. Develop management guidelines for intensive land development within Southeast Alaska brown bear range.

STUDY AREAS

The Admiralty Island study area is centered on Hawk Inlet and the Greens Creek watershed. This area encompasses 344 km^2 and is described in detail by Schoen (1982), Schoen and Beier (1983) and Schoen and Beier (1990). The topography of this study area includes marine shoreline, 7 river systems with spawning salmon (*Onchorynchus* spp.), numerous smaller streams, riparian and upland old-growth forest and extensive alpine and subalpine ridge and mountain areas. The topography is rugged with mountains rising from sea level to 1,400 m. The lowlands are dominated by a dense old-growth rain forest of Sitka spruce (*Picea sitchensis*) and western hemlock (*Tsuga heterophylla*). Subalpine forest, alpine tundra, and rock are above 600 m. Avalanche slopes dominate many long steep slopes. Riparian forests dominated by spruce are of varied widths along salmon spawning streams.

The northeast Chichagof Island study area is a 1112 km^2 island-like area north of Tenakee Inlet and east of Port Frederick. The communities of Hoonah and Tenakee Springs are at opposite corners of the study area. Whitestone logging camp is ~8 km by road from Hoonah. The topography of northeast Chichagof Island is rugged with mountains rising from sea level to 1,100 m. Forests are primarily western hemlock and Sitka spruce. The study area has > 20 salmon spawning streams. Ridges are steeper with less alpine habitat than in the Admiralty Island study area. The connection of this area with the rest of Chichagof Island is by a narrow neck of land at the Portage. This study area was chosen because the land-cover has changed with extensive roadbuilding and clearcut logging in the last 15 years, human access

to this island-like area has increased dramatically, and high brown bear harvest rates raised concerns about bear population status. As of 1994, roads and logging are along all major watersheds on the study area.

METHODS

Bear capture, aerial telemetry, study area descriptions, and data collection methods followed those of Schoen and Beier (1990) and Titus and Beier (1992). Methods specific to this report follow.

Long-term Monitoring

One method for long-term monitoring of a brown bear population entails the recapture of individual bears and replacement of their radiocollars. We recaptured adult female brown bears on the Admiralty Island study area every 2 to 4 years to replace their radiocollars. This allows continuous monitoring to collect information on cause of mortality, reproductive status, and pattern of spatial and habitat use. Using a helicopter, we captured bears opportunistically in alpine habitat or we recaptured specific radiotagged bears when the location was suitable. Untagged adult and subadult female bears were captured opportunistically. Male bears were not radiocollared.

The emphasis on capturing bears on the northeast Chichagof study area was wider than that of the Admiralty Island study area. On the northeast Chichagof study area, we recaptured bears opportunistically and sought the recapture of specific females when possible. This opportunity occurred when certain individuals were in avalanche slopes, clearcuts, subalpine or alpine habitats where recapture is possible. We also continued to radiocollar all subadult males and females in appropriate helicopter-tagging sections on the Chichagof study area to gather information on all sex and age segments of the population.

Survival Rate Analysis

We estimated the annual survival rates for brown bears on our northeast Chichagof study area using the Kaplan-Meier estimator (Kaplan and Meier 1958, White and Garrott 1990). Data were partitioned into 12-month intervals, with June of each year set as the first month of the interval for the estimation period. For each brown bear we determined the age the bear entered the Kaplan-Meier analysis, the month and year the individual bear was radiotagged, and the fate of the individual through the analysis period. We selected an analysis period beginning June 1990 and ending October 1994. Three fates were available for each bear during this period: 1) the bear survived and was on the study area still wearing a functioning radiocollar, 2) the bear became censored because it lost the radiocollar, the collar changed to inactive mode, and we were unable to retrieve the collar, or we lost contact with the radiocollar, or 3) the bear died while wearing a functioning radiocollar. Also, brown bears lost radiocollars and were recaptured and fitted with other radiocollars. We did not consider these recaptured bears as being alive for the entire intervening period. We considered these

bears censored when their fate was first unknown and considered them as new recaptures from the date of recapture.

We attempted to determine the fate of most radiocollars on mortality mode, but in some situations we could not retrieve the collar from the bottom of a stream or on the side of a cliff or avalanche slope. When the exact date of death could not be determined, we defined the month of death as the date midway between the date last located alive and the date the transmitter went to inactive mode. Some bears could not be relocated on the periodic aerial telemetry flights and we presume they left the study area. These animals were censored at a midway point between last observation and disappearance (Pollock et al. 1989).

Data were manipulated in SAS (SAS 1993) using code written by J. Hasbrouck; the number of brown bears at risk, the number censored, and the number that died were calculated for each month of the 4-year period. A pooled survival rate among all years was calculated with estimates for each year. A logrank test statistic was used to test for among-year differences in survival rates (Hasbrouck et al. 1992).

Habitat Assocations

We estimated the habitat type for each radiotelemetry relocation for all radiotelemetry flights. Each relocation was placed in 1 of 23 habitat types (Table 1). These habitat types match those established by Schoen and Beier (1990). We subsequently pooled the habitat types into 11 habitat categories based on the number of relocations per habitat type, closely related types, and habitat types of management interest. Bear use of habitat types were divided into monthly periods for presentation of patterns of seasonal habitat use. Patterns were also examined for specific bears to portray differences in indivuals lost through the pooling of all relocations (e.g., Schooley 1994).

RESULTS AND DISCUSSION

The primary emphasis of the work accomplished during 1993 and 1994 was to monitor adult female brown bears on the Admiralty Island study area, and to monitor and evaluate habitat use and estimate survival rates of brown bears on the Chichagof Island study area.

Admiralty Island Study Area

Bears Captured and Radiocollared - We recaptured 6 brown bears in the summer of 1994 including 5 adult females (Table 3). Like Reynolds (1994), in 1993 and 1994 we experienced difficulties in maintaining the immobilizing drug Telazol® (Taylor et al. 1989) within solution during darting operations. The problems of having the Telazol® precipitate out of solution was more noticeable during cool weather (e.g., $< 10^{o}$C).

During this reporting period we monitored 11 male and 21 female brown bears with active radiocollars (Table 3). Two radiocollared male bears were legally killed during the hunting season in the spring of 1994. No other mortalities were documented.

We radiocollared 106 brown bears on the Admiralty Island study area from 1981 through 1994. Of this total number of radiocollared bears, 18 (17%) have been killed legally by hunters. We documented that 9 of the 106 bears died of natural causes from 1981 through 1994, 1 bear was killed by an ore truck at Greens Creek Mine, and 1 bear was killed in defense of life or property. These represent minimum known mortalities because many bears left the study area and many lost their radiocollars or the collars stopped functioning.

Reproductive Performance - We monitored 7 adult females for > 10 years; the age of these females varied from 15 to 28 years (mean = 21; Table 4). The oldest of these bears, no. 43, had a single cub of the year in 1993 but she had no cubs in 1994. During the 14 years this bear has been monitored, she has been seen with cubs-of-the-year (COY) 3 times. Female bears nos. 39 and 95, monitored for 13 years, were seen with COY 4 times and 3 times, respectively. We were able to record or estimate the interval between successful litters (from weaning to weaning) for 6 of these 7 adult females for which we have more than a decade of reproductive performance. The mean interval between successful litters was 4.1 years and varied from 3 to 7 years (n = 6 bears and 11 intervals). Schoen and Beier (1990) estimated a successful breeding interval of 3.9 years when pooling all their available data. Like Schoen and Beier's, our weaning interval times represent minimums for the entire adult female bear population. Our calculations did not include females that failed to produce young over a number of years and from which a reproductive interval could not be calculated. Sellers (1994) estimated a mean minimum weaning interval of 4.6 years for a coastal brown bear population on the Alaska Peninsula.

For the period from 1990-1994 we observed adult sows (>age 7) with cubs for a total of 51 adult sow-years. We found from this sample that 24% had COY, 6% were with 1-year-old cubs, 6% were with 2-year-old cubs, 8% were with 3-year-old cubs, and 45% were without cubs. From 1990 to 1994 the mean litter size for COY was 1.8 (mode = 2, range = 1-3). Mean litter size has not changed from that reported by Schoen and Beier (1990). The mean litter size for COY on Admiralty Island may be lower than that reported from other coastal regions such as the Alaska Peninsula where Sellers (1994) found an early summer mean litter size of 2.54 for a recent 6-year period and a long-term mean of 2.2 COY.

Chichagof Island Study Area

Bears Captured and Radiocollared - We captured 20 brown bears in 1994, including 9 recaptures of previously marked females (Table 5). Three of the recaptures were in October; others were in late June and early July. One bear died of unknown causes during measurements conducted in association with bioelectric impedence data experiments. This is the only direct capture-related mortality associated with the capture of 96 bears a total of 118 times from October 1989 through October 1994.

During this reporting period we monitored 43 bears with active radiocollars, including 8 males and 35 females. We have had difficulty keeping radiocollars on male bears, making their recapture difficult. For example, 6 large male bears (170-450 kg) were captured at least

once at the Hoonah dump. Four of these bears removed their radiocollars once; 2 removed their radiocollars twice.

Of the 93 brown bears followed from 1989 through 1994, we know that 11 of these bears are dead, including 5 killed legally by hunters, 1 killed illegally, 2 killed in defense of life or property, and 3 unknown causes. We conclude that at least 7 of the 10 deaths were human-induced. Our results support the overall pattern of human-caused brown bear mortality on the northeast portion of Chichagof Island in recent years (Figure 1). The nonhunting component of reported bear mortality continues in association with the community of Hoonah and the associated road system. In the 3 cases we could not determine cause of death for the radiocollared bears, the cause of death is suspect because 1 bear was found dead near a beach and 2 were found dead within < 200 m of a road.

Reproductive Performance - We are unable to make complete comparisons of the reproductive performance of female bears between the two study areas because of the short study duration on Chichagof Island (Table 4). Through 1994 we have no complete intervals of two successful litters. We also have more difficulty observing radiocollared bears on the Chichagof Island study area because of the limited alpine habitat and the high percentage of relocations in avalanche slopes and forest. This hinders data acquisition on the presence or absence of cubs with their mothers.

From 1990 to 1994 we observed adult sows (>age 7) with cubs for a total of 81 adult sow-years. We found that 21% had COY, 21% were with 1-year-old cubs, 9% were with 2-year-old cubs, none were with 3-year-olds, and 49% were without cubs. From 1990 to 1994 the mean litter size for COY was 1.9 (n = 16, mode = 2, range = 1-3). Schoen and Beier (1990) found a mean litter size for COY of 2.6 for their Chichagof Island study area with a sample size of 5.

Survival Rates - For the 4-year period from June 1990 through May 1994, we used data on 61 female brown bears to estimate annual survival. Seven of the 61 females were censored during this period and recaptured, reentering the analysis as new individuals. Of these 68 female bears available for the survival analysis, 4 died, 35 survived the entire period, and 29 became censored. The pooled overall annual Kaplan-Meier survival rate for female brown bears was 0.96 and annual rates varied from 0.87 to 1 (Table 5). The high amount of censoring is of concern because it is possible that our data were biased for survival. Much of our censoring occurred when our radiocollars were detected on mortality mode. Although we retrieved many of the radiocollars and determined fates for those individuals (dead or slipped the collar), we were unable to retrieve < 10 inaccessible radiocollars.

The overall survival rate for female brown bears was high, although there were significant differences among years ($P < 0.05$). The overall annual survival rate of 0.96 was similar to that of 0.92 found for a naturally regulated population in Katmai National Park (Sellers et al. 1993) and may be higher than the 0.87 female survival rate for a hunted brown bear population on the Alaska Peninsula (Sellers 1994).

We used data on 30 male brown bears to estimate their annual survival. Three of the male bears were censored and recaptured; they reentered the analysis as new bears. Of these 33 male bears available for the survival analysis, 19 became censored over the 4 years, 7 died, and 7 survived from time of capture to October 1994. The pooled overall annual Kaplan-Meier survival rate for male brown bears was 0.84, and annual rates varied from 0.67 to 0.93 (Table 5).

The overall survival rate for male bears was almost all human-induced. Six of 7 radiocollared male bears that died were shot, and 1 bear (cause of death unknown) was found near the Hoonah dump. We believe this pattern of high male bear mortality resulted from hunters' selective harvest of male bears, larger home ranges, greater movement of subadult males, and male bears' attraction to the Hoonah dump, exposing these bears to humans. Sellers et al. (1993) estimated an adult male survival rate of 0.96 for adult male brown bears in an unhunted population. It is possible that male bear mortality is similar to that of females in a naturally regulated population. Wielgus et al. (1994) estimated an adult male brown bear annual survival rate of 0.81 based on a small sample of radiocollared bears in the Selkirk Mountains where nearly all bear mortality is human-caused. In an area of intensive resource extraction in British Columbia, McLellan (1989) estimated annual adult male brown bear survival of 0.92 with the legal and illegal killing of bears dominating the cause of mortality. Miller (1993) and Reynolds (1990) did not estimate annual survival rates using the methods we used, but their brown bear mortality patterns were also dominated by man-induced mortality.

Our actual male bear mortality may be higher than estimated because we lost track of bears that may have left the study area whose fate was not determined and radiocollars switched to mortality mode in locations where they could not be retrieved. In some of these situations, bears probably died and the fate of the censored animal may not have been independent of its censoring (Pollock et al. 1989). There may have been bias for censored animals to be dead rather than survived, especially those with radiocollars on mortality but never retrieved.

We conclude that the pattern of human-induced mortality on the northeast Chichagof Island study area has resulted in a decline in the male segment of the bear population. Interpretation of our mortality data and knowledge of the patterns of legal and illegal harvests suggest this type of mortality was occurring during the mid 1980s amid extensive roadbuilding and timber harvest activities. The legal take of brown bears declined in 1989 when the fall hunting season was closed. The legal take and DLP harvest of brown bear has increased since 1989 and the known bear kill through 1994 was approximately equal to that of the pre-1989 period which had spring and fall hunting seasons.

Habitat Associations

We estimated seasonal habitat use from 96 brown bears, using 1,314 relocations from our northeast Chichagof Island study area. No relocations occurred in some of the habitat types developed by Schoen and Beier (1990) for their Admiralty and Chichagof islands study areas. We had no relocations in the 2 even-aged regrowth (nos. 07 and 08), frozen lake/river (no.

15), tidal flats/river delta (no. 18), or blowdown (no. 21) habitats. The pooling of habitat categories (Table 2) enabled us to examine patterns in habitat use and monthly changes in use (Figure 2). The largest percentage of all relocations were in upland old-growth coniferous forest (32.4%). Combined with riparian old-growth forest, 46.5% of all relocations were in productive old-growth forest. The second most used habitat type was avalanche slopes and deciduous brush (27.2%). Nearly all relocations in this habitat type were in the extensive avalanche slopes on the steep ridges of the northeast Chichagof study area.

We found little use of clearcut habitat types (2.9%) as did Schoen and Beier (1990) who found from 2.1% to 3.2% of their relocations in clearcuts on their Chichagof Island study area. Of the 29 relocations in the 3 clearcut habitat types, 25 were in early successional clearcuts (0-15 years of age), 1 was in a mid-successional deciduous-dominated clearcut (16-30 years of age), and 3 were in a mid-successional coniferous clearcut (16-30 years of age). Five of the 25 relocations of bears in early successional clearcuts were from 1 bear, no. 141. This adult female lives in the Spasski Creek watershed that has undergone extensive logging.

Like Schoen and Beier (1990), we found changes in the use of habitat types by season (Figure 2). Subalpine and alpine habitats along with upland old-growth forest were used as denning habitat through the winter (Schoen et al. 1987). We found that 41.9% (88 of 210 relocations) of all radiotelemetry locations were in high elevation subalpine and alpine habitat types during June when this was the most commonly used habitat type. For their early summer season (mid-May through mid-July) Schoen and Beier (1990) had 39.3% of their Admiralty Island and 7.4% of their Chichagof Island radiotelemetry relocations in subalpine and alpine habitats.

Like Schoen and Beier (1990), we found extensive use of riparian old-growth forest in the late summer season. This is believed to be related to the association of brown bears with salmon (*Onchornychus* spp.) spawning streams and the importance of this food resource to the brown bear populations' annual cycle (McCarthy 1989). In August we had 30.8% of 383 relocations in riparian old-growth forests. Schoen and Beier (1990) had 54.7% of 404 relocations in riparian old-growth forest on their Chichagof Island study area. Our finding lower use of riparian old-growth forest during the peak salmon spawning season may have been due to 1) differences of available habitats in the study areas and 2) a larger sample of bears from our study area including bears that may not feed on salmon during their annual cycle.

We found extensive use of avalanche slopes by brown bears on our study area during the months of September and October/November. During September this represented 43.2% of 185 relocations compared with 25.2% and 19.0% of the fall relocations of Schoen and Beier (1990) for their Admiralty and Chichagof island study areas. Some bears on the northeast Chichagof Island study area made extensive use of avalanche slopes from den emergence through summer until den entrance in the fall. For example, bear nos. 106, 107, and 156 had 17 of 45 (38%), 22 of 46 (48%), and 14 of 25 (56%) relocations in avalanche slopes.

We did not analyze habitat selection which requires an estimate of habitat availability (e.g., Johnson 1980, Porter and Church 1987). We propose using geographic information system (GIS) habitat types from the US Forest Service's Chatham area office to estimate habitat availability on the northeast Chichagof Island study area. Then a compositional analysis (Aebischer et al. 1993) can be used to test for differences in habitat selection among groups such as study areas, sexes, age classes, or watersheds.

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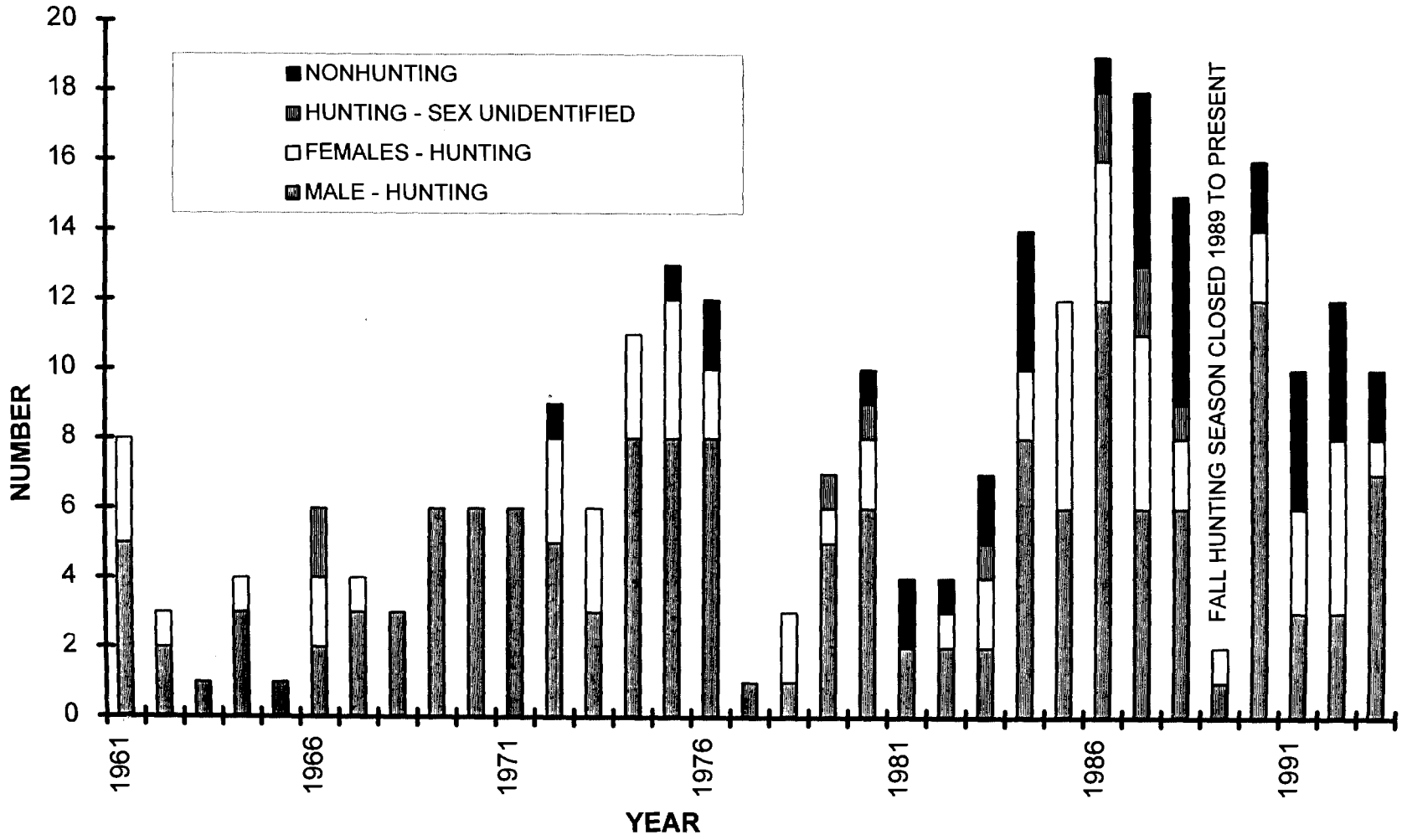


Figure 1. Total known human-caused mortality of brown bears on the northeast portion of Chichagof Island, Alaska, 1961-1993.

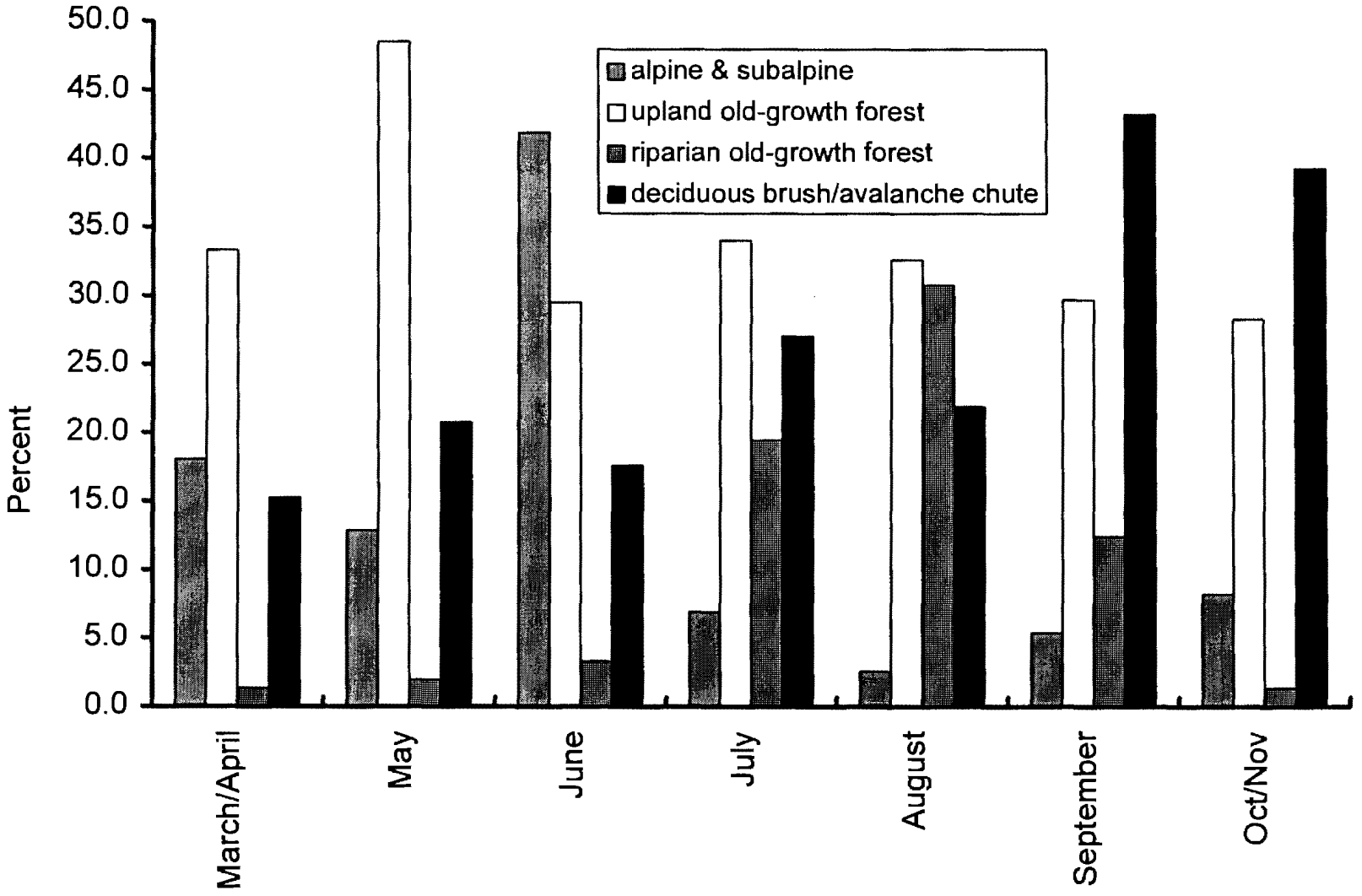


Figure 2. Percent monthly use of four habitat types by 96 brown bears based on 1,314 aerial telemetry relocations, Chichagof Island, Alaska, 1990-1994.

Table 1. Habitat codes and types used to classify brown bear telemetry relocations in Southeast Alaska.

Code	Habitat type	Comment
01	Beach	beach habitat
02	Beach fringe	old-growth forest < 100m from beach
03	Old growth conifer forest	upland old growth away from beaches & streams
04	Early successional clearcut	0-15 year age
05	Mid successional clearcut	16-30 year age; deciduous dominating
06	Mid successional clearcut	16-30 year age; conifers dominating
07	Even-aged regrowth	31-200 year age; deciduous dominating
08	Even-aged regrowth	(31-200 years); conifers dominating
09	Deciduous brush	usually slide or avalance chute
10	Muskeg	open muskeg and <10% cover with brush or stunted conifer
11	Subalpine	includes patchy mountain hemlock habitat
12	Alpine tundra	open, vegetated habitat usually above 800m elevation
13	Rocky outcrop; cliff face	
14	Permanent ice-snowfield	
15	Frozen lake-river	
16	Wet meadow	does not include tidal flat habitats near beaches
17	Riparian old-growth forest	within 100m of rivers and anadromous fish streams
18	Tidal flats - River Delta	
19	Garbage Dump	
20	Road	
21	Blowdown	
22	Stream (inland)	radiocollared bear located in the stream
23	Stream (beach)	radiocollared bear located in the stream

Table 2. Pooled habitat types used to classify brown bear telemetry relocations in Southeast Alaska.

Codes	Habitat type	Comment
01, 02	Beach habitats	beach habitats
03	Old-growth conifer forest	upland old-growth away form beaches & streams
04, 05, 06	Clearcut habitats	pooling relocations occurring in all previously clearcut habitat types
09	Deciduous brush	usually slide or avalanche chute
10, 16	Muskeg and wet meadow	open muskeg and <10% cover with brush or stunted conifer and isolated wet meadows
11, 12	Subalpine and alpine habitats	open alpine and stunted conifer habitats, usually above 800m elevation
13, 14	Rock and snowfields	nonproductive high elevation habitats
17	Riparian old-growth forest	within 100m of rivers and anadromous fish streams
19	Garbage Dump	
20	Road	
22	Stream-inland and beach	radiocollared bear located in the stream

Table 3. Summary and status of brown bears captured on Admiralty Island, 28 August 1981 through 31 October 1994.

Bear No.	Location	Sex	Capture (recapture) Age[a]	Weight (kg)[b]	Date	Capture Techniques[c]	Current Status (31 October 1994)
01	Wheeler Mountain	F	8	159	7/15/91	H	--
01	Wheeler Mountain	F	9	154	(7/22/92)	H	transmitting
02	Greens Creek Drainage	M	18	290	6/14/93	H	unknown, lost radio
03	Upper King Salmon Creek	M	7	181	7/22/92	H	transmitting
04*	Greens Creek Drainage	F	6	214[d]	9/29/83	H	sport harvest 9-87
05	Upper King Salmon Creek	M	12	204	6/16/93	H	transmitting
06	Upper King Salmon Creek	F	8	150[d]	9/27/81	H	--
06	Wheeler Creek	F	10	153[d]	(6/14/83)	H	unknown, lost radio 5-86
07	Pack Creek	F	11	150	8/26/82	D	unknown, no radio
08	Pack Creek	F	10	150	8/26/82	T	--
08	Pack Creek	F	16	120	(7/19/88)	D	unknown, removed radio
09[f]	Pack Creek	F	(1)	54	8/26/82	D	observed at Pack Creek 1982-94
09	Upper King Salmon Creek	M	7	170	7/22/92	H	unknown
10	Greens Creek Drainage	M	11	280[d]	7/02/82	H	--
10	Greens Creek Drainage	M	13	288[d]	(7/06/84)	H	--
10	Hawk Inlet	M	15	315	(6/09/86)	S	unknown, lost radio 5-87
11*	Pack Creek	M	4	120	8/28/82	T	sport harvest 5-83
12*	Greens Creek Camp	M	2	68	5/18/92	D	ore truck-killed 6-92
13	Greens Creek Drainage	M	15	284[d]	6/14/83	H	--
13	Greens Creek Drainage	M	16	270[d]	(7/06/84)	H	--
13*	Hawk Inlet	M	18	270	(6/11/86)	S	sport harvest 5-88
14	Greens Creek Drainage	F	6	120	9/26/81	H	--
14	Greens Creek Drainage	F	7	90	(7/02/82)	H	--
14*	Greens Creek Drainage	F	10	95[d]	(7/08/85)	H	bear kill 9-88
B14*	Upper King Salmon Creek	F	5	100	9/26/81	H	mortality
15	Robert Barron Peak	F	4	129	7/21/92	H	transmitting
16[i]	Greens Creek Drainage	F	4[1]	90[d]	6/16/83	H	--
16[i]	Wheeler Mountain	F	8[2]	170[d]	(6/28/87)	H	--
16[i]	Greens Creek Drainage	F	10[3]	195	(7/21/92)	H	unknown, lost radio
17	Greens Creek Drainage	M	(3)	68	7/13/90	H	--
17	Upper King Salmon Creek	M	(6)	91	(6/16/93)	H	transmitting
18	Greens Creek Drainage	M	6	214[d]	6/17/83	H	unknown, last located 8-85
19*	Upper King Salmon Creek	F	13	191	9/29/83	H	mortality

Table 3. Continued.

Bear No.	Location	Sex	Capture (recapture) Age[a]	Weight (kg)[b]	Date	Capture Techniques[c]	Current Status (31 October 1994)
20	Greens Creek Drainage	M	4	100	7/30/82	S	--
20*	Upper King Salmon Creek	M	5	135	(5/01/83)	H	mortality
21	East Eagle Peak	F	10	143	6/15/93	H	transmitting
22	Greens Creek Drainage	M	8	195	6/22/93	H	transmitting
23	Upper King Salmon Creek	M	13	249[d]	6/27/92	H	transmitting
24	Upper Greens Creek Drainage	F	3	82	6/14/93	H	unknown, lost radio
25[i]	Greens Creek Drainage	M	(2)	68	6/26/87	H	unknown, last located 9-89
26	Robert Barron Peak	F	17	168	7/22/92	H	--
26	Robert Barron Peak	F	18	181	(7/10/93)	H	unknown, lost radio
27[g]	Greens Creek Drainage	M	3	77	6/11/86	S	--
27[g]	Greens Creek Drainage	M	4	154[d]	(6/28/87)	H	--
27[g]	Lake Florence	M	5	159	(7/06/88)	H	unknown, removed radio
28*	Greens Creek Drainage	M	14	260	6/11/86	S	--
28	Wheeler Mountain	M	14	260	(7/10/86)	H	sport harvest 5-87
29	Wheeler Mountain	F	13	158	7/05/84	H	unknown, last located 11-84
31	Greens Creek Drainage	F	5	154	7/14/91	H	transmitting
32	Head Fowler Creek	F	6	159	7/21/92	H	transmitting
33	Greens Creek Drainage	M	6	125	6/22/92	H	transmitting
34*	Mansfield Peninsula	F	2	70	7/08/82	H	sport harvest 9-83
35	Wheeler Creek	F	8	135[d]	6/17/83	H	mortality
36	Robert Barron Peak	F	14	230	9/26/81	H	unknown, lost radio 5-82
37*	Mansfield Peninsula	F	10	270	8/03/82	S	sport harvest 10-83
38	Greens Creek Drainage	F	23	280	7/02/82	H	--
38*	Greens Creek Drainage	F	16	180[d]	(7/08/85)	H	natural mortality picked up 5-86
39	Mansfield Peninsula	F	9[l]	270	7/08/82	S	--
39	Robert Barron Peak	F	9[2]	171[d]	(7/09/85)	H	--
39	Robert Barron Peak	F	15	181[d]	(6/16/89)	H	--
39	Robert Barron Peak	F	18	172	(7/15/91)	H	--
39	Robert Barron Peak	F	21	170	(7/12/94)	H	transmitting
40	Greens Creek Drainage	M	10	180	6/21/83	H	unknown, last located 8-85
41*	Mansfield Peninsula	M	3	135	6/21/84	H	sport harvest 9-86
42	Greens Creek Drainage	M	7	154	7/15/91	H	unknown, lost radio
42	Head Wheeler Creek	M	8	186	(6/19/92)	H	transmitting

Table 3. Continued.

Bear No.	Location	Sex	Capture (recapture) Age[a]	Weight (kg)[b]	Date	Capture Techniques[c]	Current Status (31 October 1994)
43	Upper King Salmon Creek	F	15[1]	250	9/27/81	H	--
43	Upper Greens Creek	F	9[2]	114	(7/03/86)	H	--
43	Upper King Salmon Creek	F	23	136[d]	(6/20/89)	H	--
43	Upper King Salmon Creek	F	25	127	(7/1/91)	H	--
43	Upper King Salmon Creek	F	28	126[d]	(6/30/94)	H	transmitting
44*	Greens Creek Drainage	M	9	243	6/22/93	H	sport harvest 5-94
45	Greens Creek Drainage	M	7	186	7/01/91	H	transmitting
46	Greens Creek Drainage	M	12	248[d]	6/26/86	H	unknown, last located 1988
47	Wheeler Mountain	M	15	218[d]	7/03/90	H	transmitting
48	Greens Creek Drainage	M	17	300	8/03/82	S	unknown, lost radio 6-83
49	Mansfield Peninsula	M	(3)	100	6/16/84	H	unknown, no radio
50	Greens Creek Drainage	M	(3)	120	9/26/81	H	--
50	Greens Creek Drainage	M	(5)	146	(6/17/83)	H	unknown, lost radio 5-85
51	Greens Creek Drainage	M	(1)	60	8/28/81	S	unknown, lost radio 9-81
52	Greens Creek Drainage	M	6	190	6/26/86	H	unknown, last located 9-89
53	Upper King Salmon Creek	F	12	147	6/22/92	H	transmitting
54[j]	Eagle Peak	M	3	73	6/26/87	H	unknown, lost radio 1988
55	Greens Creek Drainage	F	7	124	6/21/83	H	--
55	Greens Creek Drainage	F	10	155[d]	(7/10/86)	H	--
55	Greens Creek Drainage	F	11	113	(6/26/87)	H	radio failure, last located 1988
55	Greens Creek Drainage	F	18	132	(7/11/94)	H	transmitting
56	Greens Creek Drainage	F	13[1]	170	7/30/82	S	--
56	Greens Creek Drainage	F	15[2]	158[d]	(7/08/85)	H	--
56	Greens Creek Drainage	F	20	181	(6/16/89)	H	--
56	Greens Creek Drainage	F	22	172	(7/14/91)	H	transmitting
57	Greens Creek Drainage	F	11	203[d]	9/28/83	H	unknown, last located 7-85
58	Eagle Peak	M	4	180	9/21/81	H	--
58	Hawk Inlet	M	5	194	(8/08/82)	S	unknown, sighted Hood Bay 9-84
59[e]	Greens Creek Drainage	M	3	80	9/21/81	H	--
59[e]*	Upper King Salmon Creek	M	5	113[d]	(5/01/83)	H	mortality

Table 3. Continued.

Bear No.	Location	Sex	Capture (recapture) Age[a]	Weight (kg)[b]	Date	Capture Techniques[c]	Current Status (31 October 1994)
60	Greens Creek Drainage	F	19	160	9/21/81	H	--
60	Greens Creek Drainage	F	20	135[d]	(7/02/82)	H	--
60	Greens Creek Drainage	F	23	125[d]	(7/08/85)	H	--
60	Greens Creek Drainage	F	24	125	(7/03/86)	H	--
60*	Greens Creek Drainage	F	25	163	(6/28/87)	H	natural mortality, picked up 10-91
61	Hawk Inlet	M	11	215	6/12/86	S	--
61*	Hawk Inlet	M	13	215	(6/27/88)	H	sport harvest 5-89
62	Young Bay	F	14	150	6/16/82	S	unknown, last located 9-86
63	Greens Creek Drainage	F	17	160	7/08/82	H	unknown, last located 10-84
64	North of Bear Trail	F	14[l]	190[d]	6/24/83	H	--
64	North of Bear Trail	F	17	159	(7/03/86)	H	unknown, last located 1988
64	North of Bear Trail	F	22+7[2]	177	(7/15/91)	H	transmitting
65	Wheeler Mountain	F	(16)	150	6/22/93	H	transmitting
66	Greens Creek Drainage	M	4	180[d]	6/22/83	H	unknown, last located 8-85
67	Greens Creek Drainage	F	(2)	60	8/02/82	S	no radio, sighted L.Florence 9-85
68*	Greens Creek Drainage	F	5	146[d]	9/28/83	H	sport harvest 9-88
69[k]	Eagle Peak	M	(2)	59	7/09/85	H	unknown, lost radio 5-86
70[e]	Greens Creek Drainage	F	(3)	77	7/16/87	H	--
70[e]	Upper King Salmon Creek	F	(4)	118	(9/16/88)	H	unknown, lost radio
71	Wheeler Mountain	F	4	148	6/29/87	H	unknown, lost radio 8-87
72*	Eagle Peak	M	6	200	7/08/82	H	sport harvest Winning Cove 5-93
73[l]	Robert Barron Peak	M	3	79	6/15/93	H	--
73[l]	Robert Barron Peak	M	4	100[d]	(6/30/94)	H	transmitting
74*	Greens Creek Drainage	F	10	172	7/01/91	H	sport harvest 5-92
74N[m]*	Upper King Salmon Creek	M	3	160	6/28/91	H	sport harvest 9-91
75	Wheeler Mountain	F	9	159	7/03/90	H	--
75*	Greens Creek Drainage	F	10	159	(6/28/91)	H	sport harvest 5-92
76[h]	Greens Creek Drainage	M	3	130[d]	7/10/86	H	--
76[h]*	Lake Florence	M	5	168	(7/06/88)	H	sport harvest Hood Bay 10-92
77[n]*	Greens Creek Drainage	M	3	115	6/26/86	H	sport harvest King Salmon 5-89
78[n]*	Greens Creek Drainage	F	(3)	91	7/10/86	H	mortality 8-86
79*	Hawk Inlet	F	6	124	6/11/86	S	sport harvest 9-87

Table 3. Continued.

Bear No.	Location	Sex	Capture (recapture) Age[a]	Weight (kg)[b]	Date	Capture Techniques[c]	Current Status (31 October 1994)
80	Greens Creek Drainage	F	3	127	7/03/90	H	--
80	Greens Creek Drainage	F	5	136	(7/21/92)	H	transmitting
81*	Robert Barron Peak	F	15[1]+17[2]	200	6/21/84	H	natural mortality, picked up 11-92
82	West of Bear Trail	M	9	347	6/22/93	H	unknown, lost radio
83	Greens Creek Drainage	M	7	193	6/28/91	H	transmitting
84	Wheeler Mountain	F	12	147	7/09/86	H	unknown, last located 4-90
85	Wheeler Mountain	F	12	150	7/11/86	H	unknown, last located 1988
86	Wheeler Mountain	F	(adult)	170	7/16/87	H	unknown, last located 1988
87*	Greens Creek Drainage	M	4	136	6/28/91	H	sport harvest Lake Kathleen 4-94
89O*	Admiralty Cove	F	16	150	7/09/86	H	DLP 8-87
90	Upper King Salmon Creek	M	6	170	6/16/93	H	unknown, lost radio
91	Pack Creek	F	19	162[d]	6/21/83	H	unknown, lost radio 1984
92	Pack Creek	F	16	159[d]	6/21/83	H	unknown, lost radio 5-86
93	Pack Creek	M	5	158[d]	6/21/83	H	--
93	Pack Creek	M	10+12[2]	170	(6/27/88)	H	unknown, removed radio
94	Pack Creek	F	10	156[d]	7/13/83	T	--
94	Pack Creek	F	15	114	(7/19/88)	D	unknown, removed radio
95	Robert Barron Peak	F	8	170	7/08/82	H	--
95	Robert Barron Peak	F	14	200	(9/16/88)	H	--
95	Robert Barron Peak	F	19	147	(6/14/93)	H	--
95	Robert Barron Peak	F	20	134[d]	(6/30/94)	H	transmitting
96	Robert Barron Peak	F	7	148	7/03/86	H	radio failure, last located 10-87
96	Robert Barron Peak	F	15	148[d]	(6/21/94)	H	transmitting
97	Greens Creek Drainage	M	12	293[d]	7/10/86	H	unknown
98	Greens Creek Drainage	M	19	315[d]	6/26/86	H	unknown, last located 4-90
99	Greens Creek Drainage	F	17	200	7/08/82	H	--
99	Greens Creek Drainage	F	19	158	(6/21/84)	H	unknown, lost radio 9-85
101	Robert Barron Peak	M	8	177	6/23/93	H	transmitting
102	Robert Barron Peak	F	18	159	6/23/93	H	transmitting
103	Upper King Salmon Creek	M	3	95	6/23/93	H	unknown, no radio
104	Robert Barron Peak	F	9	163	6/23/93	H	transmitting
105	Robert Barron Peak	F	13	186	6/26/93	H	transmitting
106	Wheeler Mountain	F	8	168	6/26/93	H	transmitting

Table 3. Continued.

Bear No.	Location	Sex	Capture (recapture) Age[a]	Weight (kg)[b]	Date	Capture Techniques[c]	Current Status (31 October 1994)
107	Robert Barron Peak	F	2	122	6/26/93	H	transmitting
108	Robert Barron Peak	M	5	209	6/26/93	H	unknown, lost radio

a Age determined by tooth sectioning or (estimated).
Age determined by tooth sectioning at different years.
b Weight estimated.
c S = snare; H = helicopter; D = darted, free ranging; T = trap.
d Actual weight.
e Offspring of No. 60.
f Offspring of No. 07 (Pack Creek bear called "Pest")
g Offspring of No. 56, sibling of No. 76.
h Offspring of No. 56, sibling of No. 27.
i Offspring of No. 55; however, No. 16 and No. 25 are not siblings.
j Offspring of No. 64.
k Offspring of No. 99.
l Offspring of No. 39.
m Offspring of No. 43.
n Siblings, No. 77 & No. 78.
o DLP = defense of life or property.
* Bear confirmed dead.

Table 4. Reproductive history of radiocollared female brown bears on Admiralty Island, 28 August 1981 through 31 October 1994.

Bear No.	capture (yrs)	Offspring[a] by year								
		1981	1982	1983	1984	1985	1986	1987	1988	1989
01	8									
04*	6			0	2 coy	2 1-yr	no[s]	no[l]		
06	8	0	no	1 coy[f]	0	0	no	no	no	no
07	11		1 1-yr	1 2-yr	no	no	no	no	no	no
08	10		0	0	2 coy	2 1-yr	2 2-yr	2 3-yr[b]	1 coy	no
09[p]	1		0	0	0	0	0	0	0	0
14*	7	0	0	0	2 coy	0[d]	0	2 coy	2 1-yr[e]	
15	4									
16[n]	4			0	no	no	0	0	0	0
21	(21)									
24	(5)									
26	16									
29	13				3 1-yr[i]	no	no	no	no	no
31	5									
32	6									
34	2		0	0[l]						
36	14	2 coy	no	no	no	no	no	no	no	no
37*	10		0	1 coy[l]						
38*	23		0	0	0	0	0	no[m]		
39	9		0	0	2 coy	0[f]	1 coy	?	1 coy	1 1-yr
43	15	0	2 coy	2 1-yr	no	no	no	2 coy	2 1-yr	2 2-yr
53	6									
55	7			0	no	no	1 1-yr	1 2-yr	1 3-yr[b]	?
56	13		2 2-yr	2 3-yr[b]	2 coy	2 1-yr	2 2-yr[b]	1 coy	0[f]	0[g]
57	11			2 2-yr	2 3-yr	2 coy	no	no	no	no
60*	20	1 2-yr	1 3-yr[b]	2 coy[c]	1 coy	1 1-yr	1 2-yr	1 3-yr	1 4-yr[b]	0
62	14		0	0	0	0	0	no	no	no
63	17		2 cubs	0	0	2 coy	no	no	no	no
64	14			1 1-yr	1 2-yr[b]	2 coy	2 1-yr	2 2-yr	1 3-yr[b]	0
65	(16)									
67	2		0	no	0[s]	no	no	no	no	no
68*	5			0	0	0	0	?	0[l]	
70[r]	3							0	0	0

Table 4. Continued.

Bear No.	capture (yrs)	Age atOffspring[a] by year								
		1981	1982	1983	1984	1985	1986	1987	1988	1989
71	4							0	no	no
74*	10									
75*	10									
78*	3						0			
79*	6						0	0[hl]		
80	3									
81*	15				0	0	0	no	no	no
84	12						2 coy	2 1-yr	2 2-yr	2 3-yr[b]
85	12						1 coy	1 1-yr	1 2-yr	no
86	adult							2-2-yr	2 3-yr	no
89*	16						2 coy	2 1-yr[k]		
91	19		0	0	no	no	no	no	no	no
92	16			0	2 coy	no	no	no	no	no
94	10			0	2 coy	2 1-yr	2 2-yr[b]	2 coy	2 1-yr	2 2-
95	8		2 1-yr	2 2-yr	0	2 coy	2 1-yr	no	2 coy	2 1-yr
96	7						3 coy[f]	2 1-yr	no	no
99	17		2 3-yr	2 coy	2 1-yr	1 2-yr[f]	no	no	no	no
102	18									
104	9									
105	13									
106	8									
107	2									

Table 4. Continued

Bear No.	capture (yrs)	Age at 1990	1991	1992	1993	1994	Offspring[a] by year
01	8		2 2-yr	0[o]	no	no	
04*	6						
06	8	no	no	no	no	no	
07	11	no	no	no	no	no	
08	10	no	no	no	no	no	
09[p]	(1)	2 coy	0[f]	0	0	0	
14*	6						
15	4			2 2-yr	2 3-yr	no	
16[n]	4	no	no	no	no	no	
21	10				0	no	
24	3				0	0	
26	16			2 3-yr	0	no	
29	13	no	no	no	no	no	
31	5		0	no	0	no	
32	6			0	1 coy	1 1-yr	
34*	2						
36	14	no	no	no	no	no	
37*	10						
38*	23						
39	9	no	3 coy	3 1-yr	0	0	
43	15	2 3-yr	0[q]	0	1 coy	0	
53	12			0	no	no	
55	7	no	no	no	no	1 coy	
56	13	no	1 coy	no	1 2-yr[i]	0[t]?	
57	11	no	no	no	no	no	
60*	19	no	no[m]				
62	14	no	no	no	no	no	
63	17	no	no	no	no	no	
64	14	no	3 coy	no	2 2-yr[b]	no	
65	(16)				0	no	
67	(2)	no	no	no	no	no	
68*	5						
70	(3)	no	no	no	no	no	

Table 4. Continued.

Bear No.	capture (yrs)	Age at 1990	1991	1992	1993	1994	Offspring[a] by year
71	4	no	no	no	no	no	
74*	10		1 2-yr	1 3-yr[ql]			
75*	9	2 coy	2 1-yr	2 2-yr[ql]			
78*	(3)						
79*	6						
80	3	0	0	0	0	1[t?]	
81*	15	no	no[m]				
84	12	2 coy	no	no	no	no	
85	12	no	no	no	no	no	
86	adult	no	no	no	no	no	
89*	16						
91	19	no	no	no	no	no	
92	16	no	no	no	no	no	
94	10	no	no	no	no	no	
95	8	no	no	no	0	3 coy	
96	7	no	no	no	no	2 coy	
99	17	no	no	no	no	no	
102	18				2 1-yr	no	
104	9				0	no	
105	13				2 coy	no	
106	8				1 1-yr	no	
107	2				0	0	

Table 4. Continued.

[a] Female observed with:
coy = cub of year
1-yr = yearling
2-yr = 2-year-old
3-yr = 3-year-old
4-yr = 4-year-old
cub = cub older than coy
0 = no cubs observed
no = no observation of marked bear

[b] Cubs disappeared over summer.

[c] Male killed cubs in June.

[d] Female ate cubs in den.

[e] Female killed by marked male, fate of cubs unknown.

[f] Cubs disappeared over winter.

[g] Female lactating but no cubs present.

[h] Observed breeding.

[i] One cub disappeared over summer.

[k] Female killed in DLP by deer hunter 8/87.

[l] Sport harvested.

[m] Natural mortality.

[n] Offspring of No. 55.

[o] Cubs kicked out 2 weeks prior to capture of No. 01.

[p] Offspring of No. 07.

[q] Cubs kicked out this spring.

[r] Offspring of No. 60.

s Ear tagged, no collar. (No. 67 sighted L.Florence Ck. 9/84 by LB)
(No. 04 sighted Jims's Ck. 9/86 & 9/87 by LB)

t Aerial observation, poor visibility because of vegetation.

* Bear confirmed dead.

Table 5. Summary and status of brown bears captured on Northeast Chichagof Island, 13 October 1989 through 31 October 1994.

Bear No.	Location	Sex	Capture (recapture) Age[a]	Weight (kg)[b]	Date	Capture Techniques[c]	Current Status (31 October 1994)
101	Mt. head Seal Ck.	F	6	159[d]	10/13/89	H	--
101	Mt. head Seal Ck.	F	10	284[d]	(6/24/94)	H	transmitting
102	Repeater Mountain	M	13	345[d]	6/12/90	H	unknown, lost radio
102	Hoonah Dump	M	13	374	(7/28/90)	S	unknown, lost radio 8/90
102	Hoonah Dump	M	13	374	(8/14/90)	S	Hoonah Dump 10/90
102*	Hoonah Dump	M	14	363	(10/10/91)	S	illegal harvest 9/93
103	Mt. S. False Bay	M	2	170	10/13/89	H	unknown
104	Mt. head Seal Ck.	F	3	113[d]	10/13/89	H	unknown, lost radio
105	Repeater Mountain	F	13	127	6/12/90	H	unknown, lost radio
106	Den Mountain	F	8	172	6/13/90	H	transmitting
107	Den Mountain	F	8	154[d]	6/13/90	H	transmitting
108	3 foot Mountain	M	11	318[d]	6/13/90	H	unknown, lost radio
109	Den Mountain	F	4	91	6/13/90	H	unknown, lost radio
110	Repeater Mountain	F	3	73	6/19/90	H	unknown, lost radio 4/91
110	Repeater Mountain	F	4	73	(6/26/91)	H	unknown, lost radio
111	Repeater Mountain	M	(3)	82	6/19/90	H	unknown, lost radio
112*	Mt. N. Fk. Freshwater Ck.	M	4	136	6/19/90	H	sport harvest 5/92
113	Mts. E. Indian River	F	10	172	6/19/90	H	transmitting
114	Mt. N. Fk. Freshwater Ck.	F	(3)	73	6/21/90	H	unknown, lost radio
115*	Mts. E. Salt Lake Bay	F	24	127	6/21/90	H	unknown mortality
116	Mt. S. of 3 Foot Mt.	F	6	136	6/21/90	H	unknown, lost radio
117	Repeater Mountain	F	9	159	6/21/90	H	unknown, lost radio
118	Repeater Mountain	F	4	64	6/21/90	H	unknown, lost radio
118	Repeater Mountain	F	6	118	6/30/92	H	transmitting
119	Mts. E. Indian River	F	(3)	68	6/22/90	H	unknown, lost radio
120	Mts. E. Indian River	F	12	163	6/22/90	H	lost radio
120	Mts. E. Indian River	F	16	143[d]	(6/24/94)	H	transmitting
121	Mts. E. Indian River	M	4	170	6/22/90	H	transmitting
122	Mts. E. Indian River	M	11	295	6/22/90	H	unknown, lost radio
123	Tenakee Mts. mile 20	M	(18)	249	6/22/90	H	unknown, lost radio
124	S. Fk. Freshwater Ck.	M	8	267	6/22/90	H	unknown, lost radio 5/93
125	Tenakee Mts. mile 20	M	8	193	6/25/90	H	unknown, lost radio

Table 5. Continued.

Bear No.	Location	Sex	Capture (recapture) Age[a]	Weight (kg)[b]	Date	Capture Techniques[c]	Current Status (31 October 1994)
126	Mts. E. of Narrows	F	16	159	6/25/90	H	lost radio
126	Mts. E. of Narrows	F	20	136[d]	(7/1/94)	H	transmitting
127	Mts. E. of Narrows	F	26	204	6/25/90	H	unknown, lost radio 8/90
128	Mt. South Den Mt.	F	9	136	6/26/90	H	unknown, lost radio 4/91
129*	Tenakee Mts. mile 20	M	21	295[d]	6/26/90	H	DLP 10/90 Hoonah[e]
130*	Tenakee Mts. mile 20	F	(3)	73	6/26/90	H	sport harvest 5/93
131	Mt. S. of 3 Foot Mt.	F	23	147	6/26/90	H	unknown, lost radio 5/93
132	Mt. South Den Mt.	F	12	159	6/26/90	H	unknown, lost radio 5/93
133	Tenakee Mts. mile 20	F	11	147	6/28/90	H	unknown, lost radio
134	Mt. South Den Mt.	F	8	170	6/28/90	H	unknown, lost radio
135	Den Mountain	F	16	143	6/28/90	H	--
135	Mt. W. Ten Mile Ck.	F	22[2]	227	(10/2/94)	H	transmitting
136	Mts. E. of Narrows	F	2	68	6/28/90	H	--
136	Tenakee Mts. mile 20	F	4	70	(6/26/92)	H	lost radio
136	Tenakee Mts. mile 20	F	6	105[d]	(6/24/94)	H	transmitting
137	Spasski Creek	M	4	136	7/17/90	S	unknown, lost radio
138	Spasski Creek	M	(20)	227	7/17/90	S	unknown, lost radio 6/91
139[f]	Spasski Creek	M	(1)	27	7/20/90	S	unknown, lost radio at den 4/92
140*	Spasski Creek	M	4	136	7/25/90	D	sport harvest 5/91
141	Spasski Creek	F	5	147	7/26/90	S	--
141	Spasski Creek	F	9	249	(10/1/94)	H	transmitting
142	Hoonah Dump	M	4	170	7/27/90	D	Hoonah Dump
142	Hoonah Dump	M	5	170	(8/10/90)	D	Hoonah Dump
142	Hoonah Dump	M	7	272	(9/9/91)	D	Hoonah Dump
142*	Hoonah Dump	M	7	454	(10/13/93)	D	sport harvest 5/94
143	Hoonah Dump	M	8	306	7/27/90	S	Hoonah Dump 10/90
143	Hoonah Dump	M	8	306	(8/14/90)	S	Hoonah Dump 10/90
143	Hoonah Dump	M	9	318	(10/10/91)	S	sighted Hoonah Dump 10/93
144	Game Creek	M	9	159	8/13/90	S	lost radio
144	Mts. W. Ten Mile Ck.	F	10[2]	204	(7/12/94)	H	transmitting
145	Game Creek	F	5	159	8/13/90	S	--
145	Long Is. Rd. Clearcut	F	10[2]	249	(10/1/94)	H	transmitting

Table 5. Continued.

Bear No.	Location	Sex	Capture (recapture) Age[a]	Weight (kg)[b]	Date	Capture Techniques[c]	Current Status (31 October 1994)
146	Hoonah Dump	M	5	272	8/13/90	S	--
146*	Hoonah Dump	M	6	249	(8/8/91)	S	unknown mortality 10/91
147	Hoonah Dump	M	20	340	8/14/90	S	sighted Hoonah Dump 8/92
147	Hoonah Dump	M	21	318	(9/11/91)	S	sighted Hoonah Dump 10/93&10/94
148	Game Creek	F	6	147	8/14/90	S	unknown, lost radio
149*	Repeater Mountain	F	13	136	6/26/91	H	unknown mortality
150	Repeater Mountain	F	5	147	6/26/91	H	transmitting
151	Mts. E. Indian River	M	4	125	6/26/91	H	--
151	Mts. E. Indian River	M	5	136	(6/29/92)	H	unknown, lost radio
152	Repeater Mountain	F	15	154	7/5/91	H	unknown, lost radio
153	Mt. head Seal Ck.	F	9	147	7/5/91	H	transmitting
154	Mts. E. Indian River	F	12	125	7/5/91	H	--
154	Pass Pavlov-Indian River	F	15	152	(7/10/94)	H	transmitting
155	Bear Creek	F	6	127	7/25/91	S	unknown, lost radio
156	Mt. head Seal Ck.	F	16	159	6/23/92	H	transmitting
157*	Bear Creek	F	4	132	7/25/91	S	sport harvest 5/92
158	Mt. head Seal Ck.	F	16	170	6/23/92	H	transmitting
159	Tenakee Mts. mile 20	F	11	150	6/23/92	H	transmitting
160	Tenakee Mts. mile 20	M	4	91	6/23/92	H	unknown last located 5/93
161	3 foot Mountain	F	22	170	6/24/92	H	transmitting
162	Mts. E. Indian River	F	21	193	6/24/92	H	transmitting
163	Mts. E. Indian River	F	11	159	6/24/92	H	transmitting
164	Mts. E. Indian River	M	5	227	6/24/92	H	unknown, lost radio 9/92
165	Mt. head Seal Ck.	F	8	136	6/25/92	H	transmitting
166	Virgin Mts.	M	3	102	6/25/92	H	unknown, lost radio
167	Virgin Mts.	F	13	170	6/25/92	H	transmitting
168	Virgin Mts.	M	2	73	6/25/92	H	unknown
169	Head Gypsum Ck.	F	13	209	6/25/92	H	unknown, lost radio
170	Mts. E. Salt Lake Bay	M	5	163	6/26/92	H	transmitting
171	Ridge S. Gypsum Ck.	F	4	125	6/26/92	H	transmitting
172	Mts. E. Indian River	F	2	70	6/26/92	H	unknown, lost radio
173*	Whitestone Ck. clearcut	M	4	167	6/28/92	H	DLP 8/92 Kennel Ck.[e]
174	Tenakee Mts. mile 8	F	13	145	6/29/92	H	transmitting

Table 5. Continued.

Bear No.	Location	Sex	Capture (recapture) Age[a]	Weight (kg)[b]	Date	Capture Techniques[c]	Current Status (31 October 1994)
175	Tenakee Mts. mile 8	F	16	141	6/30/92	H	transmitting
176	Tenakee Mts. mile 8	F	10	159	6/30/92	H	transmitting
177	3 foot Mountain	F	11	154	6/30/92	H	unknown, lost radio
178	Seagull Creek	F	14	193	8/30/92	S	transmitting
179	Bear Creek	F	10	265	8/31/92	S	unknown, lost radio
180	Hoonah Dump	F	6	238	10/13/93	D	transmitting
181[g]*	Hoonah Dump	F	(.8)	59	10/13/93	D	unknown mortality 10/14/93
182[g]*	Hoonah Dump	M	(.8)	68	10/13/93	D	bear kill
183	Mt. head Seal Ck.	F	4	108	7/1/94	H	transmitting
184	Hoonah Dump	M	5	254	10/13/93	D	transmitting
185	Destruction Valley	F	5	113[d]	6/24/94	H	transmitting
186	Tenakee Mts. mile 20	M	15	290[d]	7/1/94	H	transmitting
187	Bob's Par 3	F	4	124[d]	7/9/94	H	transmitting
188	Mt. head Spasski	M	1	91	7/9/94	H	transmitting
189*	Mt. head Spasski	F	8	130[d]	7/9/94	H	BIA research mortality
190	E. fork Seal Ck.	F	8	132	7/10/94	H	transmitting
192	Mt. above Columbia Cove	F	9	175	7/10/94	H	transmitting
193	Mt. head Seal Ck.	M	2	91	7/11/94	H	transmitting
194	Tenakee Mts. 10 mile Ck.	F	3	68	7/11/94	H	transmitting
195	Mt. head SW fork Spasski Ck.	F	17	181	7/11/94	H	transmitting
196	Across from Saltery Bay	M	2	68	7/12/94	H	transmitting

[a] Age determined by tooth sectioning or (estimated).
[#] Age determined by tooth sectioning at different years.
[b] Weight estimated.
[c] S = Snare; H = helicopter; D = darted, free ranging.
[d] Actual weight.
[e] DLP = Defense of life or property.
[f] A male coy, no sow observed, family status unknown.
[g] Offspring of No. 180.
[*] Bear confirmed dead.

Table 6. Reproductive history of radiocollared female brown bears on Northeast Chichagof Island, 13 October 1989 through 31 October 1994.

Bear No.	Age at capture (yrs)	Offspring[a] by year					
		1989	1990	1991	1992	1993	1994
101	6	0	0	no	no	no	2 coy
104	9	0	0	no	no	no	no
105	13		0	no	no	no	no
106	8		0	no	0	no	no+
107	8		0	no	2 coy	no	0
109	4		0	0	no	no	no
110	(3)		0	0	no	no	no
113	10		0	no	no	0	no+
114	(3)		0	no	no	no	no
115*	24		0	no[g]	no	no	no
116	6		0	no	no	no	no
117	9		1 coy	no	no	no	no
118	4		0	no	0	0[i]	0
119	(3)		0	no	no	no	no
120	12		0	no	no	no	2 1.5-yr
126	16		0	no	no	no	0
127	26		0	no	no	no	no
128	10		0	no	no	no	no
130*	(3)		0	no	no	no[f]	
131	23		1 1-yr	no	0	no	no
132	12		1 1-yr	no	no	no	no
133	11		0	no	no	no	no
134	8		0	no	0	no	no
135	16		3 coy	1 coy[b]	2 1-yr	no	0
136	4		0	no	0	no	0
139[c]	coy		no	no	no	no	no
141	5		1 coy[e]	no	1 1-yr	no	2 2.5-yr
145	5		0[e]	0	2 1.5-yr	1 2.5-yr	3 coy
148	6		0[e]	no	no	no	no
149*	13			2 1-yr[g]	no	no	no
150	5			0	0	no	no
152	15			1 1-yr	0	no	no
153	9			1 2-yr	0	no	1 2-yr

Table 6. Continued.

Bear No.	Age at capture (yrs)	Offspring[a] by year					
		1989	1990	1991	1992	1993	1994
154	12			2 1-yr	no	no	1 coy
155	6			0	0	no	no
156	16				1 1-yr	1 2.5	2 coy
157*	4			0	no[f]		
158	16				1 1-yr	1 2-yr	3/2 coy[k]
159	11				2 1-yr	no	no+
161	22				1 1-yr	1 2-yr	no+
162	21				2 coy	2 1-yr	no+
163	11				1 coy	no	no+
165	8				2 1-yr	no	no+
167	13				3 1-yr	no	0
169	13				0	no	no
171	4				0	0	no
172	2				0	no	no
174	13				2 1-yr	no	no
175	16				0	0	2 coy
176	10				0	no	0
177	11				0	no	no
178	14				2 2.5-yr	2 3.5-yr	no+
179	10				0[e]	no	no
180	6				no[h]	2 coy	0
183	4						0
185	5						0
187	4						0
189*	8						2 coy[J]
190	8						0
192	9						3 coy
194	3						0
195	17						1 coy
196	2						0

Table 6. Continued.

[a] Female observed with:
coy = cub of year
1-yr = yearling
1.5-yr = 1.5-year-old
2-yr = 2-year-old
2.5-yr = 2.5-year-old
3.5-yr = 3.5-year-old
0 = no cubs observed.
no = no observation of marked bear.
no+= located, no obsevation of marked bear.

[b] Aerial observation, poor visibility because of vegetation.

[c] A male coy, no sow observed, family status unknown.

[e] Snared along salmon stream, limited visibility. If cubs present may not be visible.

[f] Sport harvested.
Unknown mortality/picked up.

[h] Observed mating with #142.

[i] Observed with another bear.

[j] Mortality as a result from BIA weighing process.

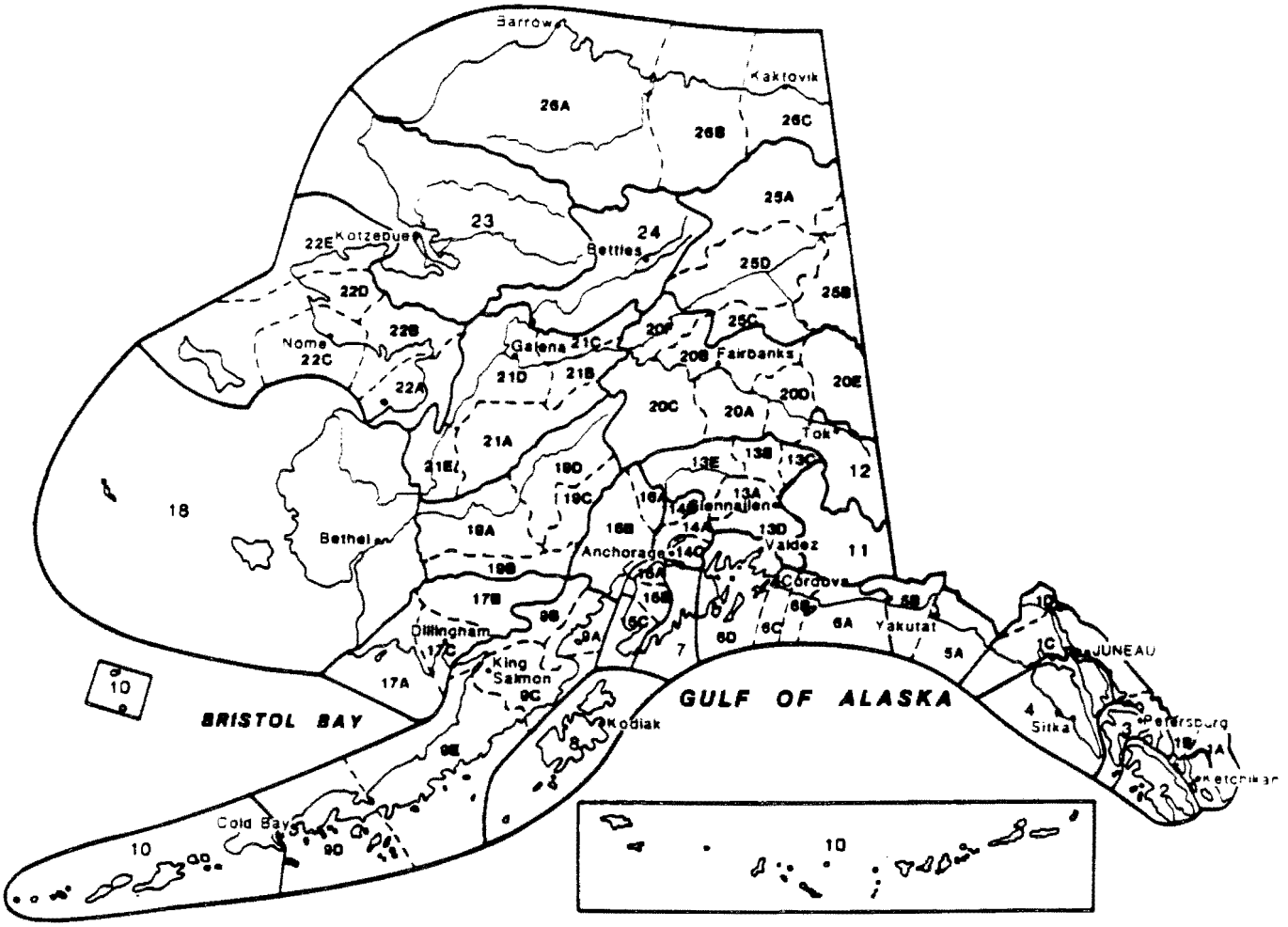
[k] 6/6/94 Bear observed with 3 coy.
8/17/94 Bear observed with 2 coy.

[*] Bear confirmed dead.

Table 7. Annual survival rates of 30 male and 61 female brown bears > age 4 on Chichagof Island, Alaska, as determined by radiotelemetry and Kaplan-Meier staggered-entry design survival estimation.

	Males		Females	
Period	Survival Rate	SE	Survival Rate	SE
June 1990 - May 1991	0.84	0.10	1	0
June 1991 - May 1992	0.80	0.13	0.87	0.07
June 1992 - May 1993	0.93	0.07	0.97	0.03
June 1993 - May 1994	0.67	0.19	1	0
All Years Pooled	0.84	0.06	0.96	0.02

Alaska's Game Management Units



The Federal Aid in Wildlife Restoration Program consists of funds from a 10% to 11% manufacturer's excise tax collected from the sales of handguns, sporting rifles, shotguns, ammunition, and archery equipment. The Federal Aid program allots funds back to states through a formula based on each state's geographic area and number of paid hunting license holders. Alaska receives a maximum 5% of revenues collected each year. The Alaska Department of Fish and Game uses federal aid funds to help restore, conserve, and manage wild birds and mammals to benefit the public. These funds are also used to educate hunters to develop the skills, knowledge, and attitudes for responsible hunting. Seventy-five percent of the funds for this report are from Federal Aid.