Black Bear
Management Report
of survey-inventory activities
1 July 1998–30 June 2001

Carole Healy, Editor
Alaska Department of Fish and Game
Division of Wildlife Conservation
December 2002

ADF&G

Please note that population and harvest data in this report are estimates and may be refined at a later date.

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If used in part, the reference would being with the author's name, unit number, and page numbers. Authors' names and the reference for using part of this report can be found at the end of each unit section.

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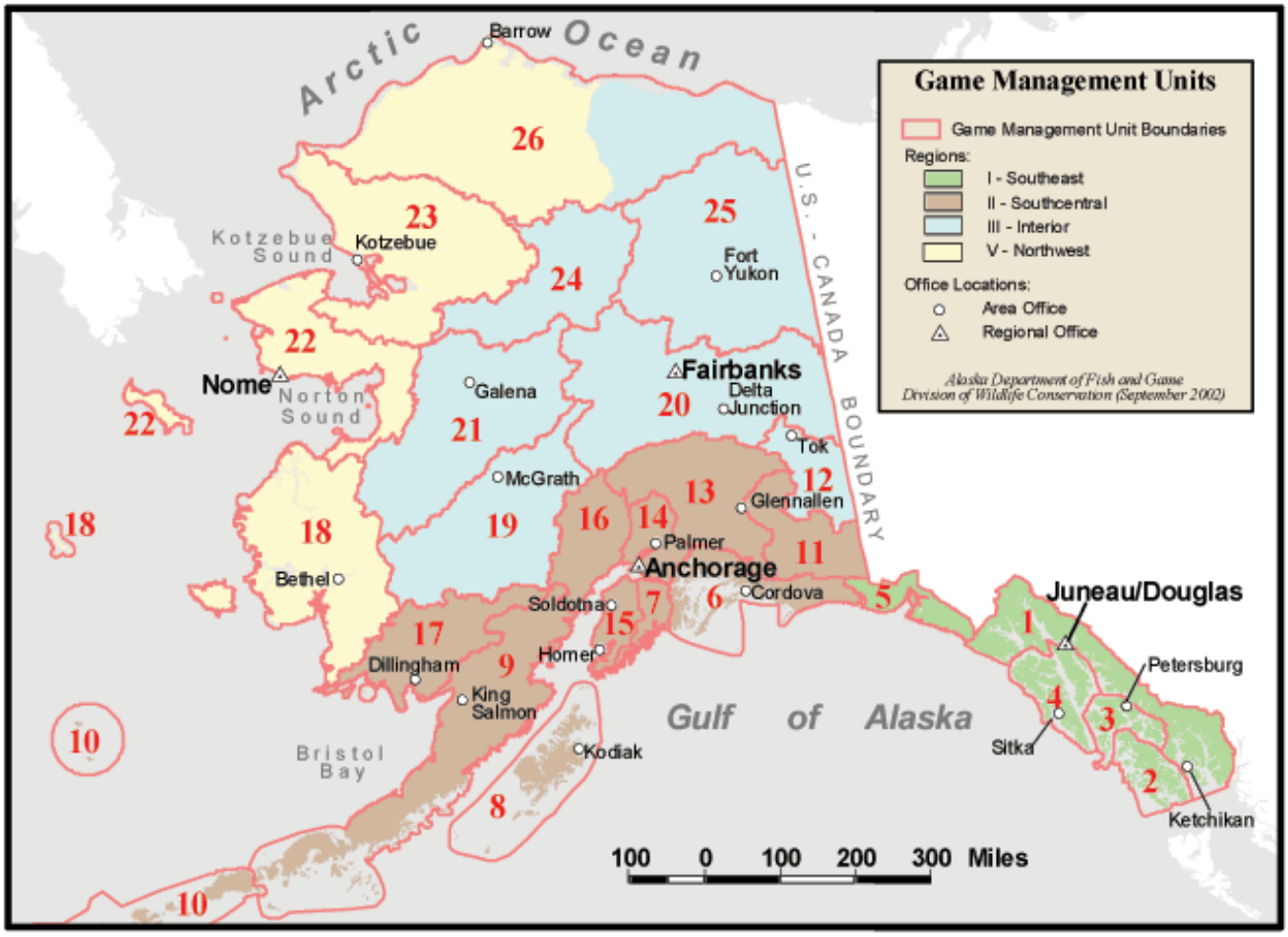
Arctic Ocean
Barrow
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Anchorage
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Juneau/Douglas
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U.S. - CANADA BOUNDARY
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Game Management Units
Game Management Unit Boundaries
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I - Southeast
II - Southcentral
III - Interior
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BLACK BEAR MANAGEMENT REPORT

From: 1 July 1998
To: 30 June 2001

LOCATION

GAME MANAGEMENT UNIT: Unit 1A (5,300 mi^2)

GEOGRAPHICAL DESCRIPTION: That portion of Unit 1 lying south of Lemesurier Point, including all drainages into Behm Canal and excluding all drainages into Ernest Sound.

BACKGROUND

HABITAT DESCRIPTION

Unit 1A includes portions of the Cleveland Peninsula and Misty Fjords National Monument on the mainland, and Revillagigedo (Revilla), Gravina, Annette, and Duke islands. Most high quality mainland black bear habitat in Unit 1A is confined to a relatively narrow band of forested landscapes between saltwater and the high elevation peaks and ice fields of the coastal mountains. An exception is the broader bays and lower peaks of southern Cleveland Peninsula. Revilla Island has many productive salmon streams and generally low-elevation, productive forest that provides high quality habitat. Gravina, Annette, and Duke islands generally have lower-quality habitat. A few large mainland river valleys, such as the Unuk, Chickamin, Blossom, Wilson, Keta, and Marten, as well as many Revilla Island stream systems, support salmon and other anadromous fish.

Portions of Revilla, Gravina, and Annette islands have been logged and have clearcuts with habitats in various stages. As is the case elsewhere in Southeast Alaska, habitat changes continue to occur from clearcut logging. Although early successional stages (3–20 years post logging) provide black bears with an abundance of plant foods, later stages result in the disappearance of understory plants as conifer canopies close and light does not penetrate to the forest floor. Second growth stands lack large hollow trees and root masses used for denning habitat. We believe that although logging may create food for bears in the short term, the long-term result of logging will be a decline in bear numbers (Suring et al. 1988).

During summer and fall, bears accumulate fat reserves necessary for winter hibernation. Bears with access to salmon streams consume large quantities of fish and consequently poor fish runs or reduced berry crops can result in low cub production and survival the following spring (Jonkel and Cowan 1971). If food supplies have been poor during the past summer and the female has not accumulated adequate energy reserves, the fertilized egg may not implant and consequently

no cubs will be produced. Poor food may also cause losses after implantation or may result in the death of cubs that are born. In most years, cub mortality is around 20% but may be as high as 50% during food-scarce years. The most critical period is when a bear first becomes independent at 16–17 months old (Jonkel and Cowan 1971). The age when females first produce cubs is also related to available food supply and may be as late as 3–7 years of age if environmental conditions are poor. This age at first reproduction ranges from two years old for females on a high nutritional plane, to as late as 5-7 years of age for some females in poor habitats (Kolenosky 1987).

Small openings and disturbed areas, such as wetlands, avalanche chutes, clearcuts, and subalpine meadows, are important areas for foraging. In some areas and during some seasons, black bear diets may range from mostly vegetarian to mostly carnivorous, and the species may subsist by scavenging or by predation on small mammals or fish. In Unit 1A, black bears primarily eat vegetation during early spring. Major foods include grasses and sedges, *Equisetum* spp., skunk cabbage (*Lysichiton americanum*), and berries (*Vaccinium and Rubus sp*.) that have persisted through the winter. Later in spring, Unit 1A black bears may be efficient predators of moose calves in the mainland Unuk River valley as well as Sitka black-tailed deer fawns in some mainland areas and on Revilla, Gravina, and Annette islands. During summer and fall when bears accumulate fat reserves for winter hibernation, bears with access to salmon streams eat large quantities of fish. Berries are also important during summer and fall. On the mainland, black bears share habitats with brown bears, however, brown bears are rare on the Unit 1A islands.

ADF&G has estimated approximately 890 square miles of forested habitat on the Unit 1A mainland and 1600 additional square miles of forested habitat on the Unit 1A islands and a portion of the lower Cleveland Peninsula south of Yes Bay. Large portions of Unit 1A are designated wilderness within the Misty Fjords National Monument.

Bear habitat near Ketchikan is presently affected by one significant, non-natural factor – human garbage. Although bears have probably always been numerous locally, the availability of an attractive alternative food source promotes high bear densities, especially when restrictions against firearm discharge within urban areas provide a refugia surrounding the city where bears are not available for hunter harvest. At the same time, the high human density in the area and differing attitudes toward responsible garbage-handling ensures a high level of conflict with bears.

HUMAN USE HISTORY

Black bears have long been hunted in Unit 1A for both trophies and for food. Sealing of black bears was first required in 1973. Hunters have not required a permit and so information on the effort of unsuccessful hunters has never been available. We have information only for successful hunts.

Regulatory history

Since statehood black bear hunting season has extended from September 1 through June 30 and the bag limit for residents has been two bears annually, only one of which can be a blue or

glacier bear. Nonresident bag limits were the same as residents until 1990 when the nonresident limit was reduced to one bear per year.

Historical harvest patterns

Annual harvest in Unit 1A increased from about 25 bears in the 1970s and early 1980s to 60 bears in the late 1980s. Annual harvest dropped to about 45 bears in the early 1990s then rose to an average of 63 bears during the last report period (1995–1998). Fluctuations in annual harvest are probably linked more to human activity and weather during hunting season than to changes in bear numbers. Earlier harvest cycles may have been linked to the amount of logging and road building activity in the unit. The harvest increase in the 1990s may have been linked to an increase in hunting effort by residents and nonresidents alike and may also be associated with renewed logging in some areas. Over 70% of the Unit 1A bear harvest occurs during the spring season.

Resident hunters historically have accounted for about 75% of the harvest over the years. Most nonresidents have historically hunted without a guide in this unit. Nonresident hunters must purchase tags to affix to each bear harvested. Neither the cost of these tags ($250–$300) nor the cost of transportation to this area seems to limit the number of nonresident hunters who pursue black bears in Unit 1A.

Boats historically have been the favored mode of transport of Unit 1A bear hunters, with airplanes ranking second. The use of highway vehicles by bear hunters has been decreasing in recent years.

Historical harvest locations

Hunters harvest bears throughout the unit, although the highest harvests continue to come from Wildlife Analysis Areas (WAAs) 406 (Carroll Inlet), 407 (George Inlet and the Ward Cove–Harriet Hunt Lake road), and 510 (northwest Revilla Island). On the mainland, WAAs 822 (Boca De Quadra) and 823 (Nakat Bay) also contribute substantially to the harvest. Because of its proximity to Ketchikan, WAA 406 is a popular recreational area for Ketchikan residents. Coastguard personnel at the Shoal Cove Loran station in Carroll Inlet regularly harvest bears locally. WAA 407 is also easily accessed by Ketchikan residents, by boat via George Inlet and by highway vehicle up the Ward Cove–Harriet Hunt Lake road system. Ketchikan residents and personnel from the Neets Bay fish hatchery account for several bears taken in WAA 510 each season. WAAs 822 and 823 are accessible by boat from Ketchikan and are very popular places to hunt.

History of urban bear management in Ketchikan

The Ketchikan landfill, home to 60–70 garbage-habituated bears for many years, was closed during fall 1994 when the landfill operation switched to a baling facility. Having observed over twenty different bears at the Ketchikan landfill at one time, and anticipating potential problems once they were displaced from their long-established feeding area, ADF&G initiated a trapping and relocation project in September 1994. ADF&G arranged with the city of Ketchikan to move up to 30 bears from the landfill site. During 1994–1998 ADF&G handled 79 bears, relocating 58 and killing 21. Relocated bears from Ketchikan have been killed as far away as Burnette Inlet on

Etolin Island and even Greenville, B.C., Canada. Nuisance bear problems gradually decreased after this program began, with the fewest incidents occurring in 1998. Responding to "bear calls" in Ketchikan continues to consume large amounts of staff time. Tasks include responding to complaints, explaining proper garbage handling and providing public safety precautions. We continue to work with the Ketchikan Police Department and Fish and Wildlife Protection Troopers to reduce bear/human conflicts. We use the media to promote public service messages and we also conduct several local education programs geared toward awareness and prevention.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain a male to female ratio of 3:1 in the harvest.
- Maintain an average male spring skull size of at least 17.5 inches.
- Minimize human-bear conflicts by providing information and assistance to the public and to other agencies.
- Maintain a harvest of at least 65% males in the combined harvest during the most recent 3 years.

Age, genetics, and environmental factors such as habitat and forage quality combine to influence black bear skull size. Sealing records indicate that mature Unit 1A black bears generally have smaller skulls than bears from the nearby Unit 2. The skull size management objective of 17.5 inches for males harvested in the spring was established in the early 1990s after data analysis showed this to be the long-term average. We view any reduction in the average skull size as a reflection of harvest intensity or possible changes in the age structure.

Skull size is used as a management tool because we believe that mean skull size trends may indicate changes in population size and composition, and provide some measure of the sustainability of the harvest levels. A decreasing average skull size may indicate a decline in that segment of the population comprised of large, older bears and could indicate an overall population decline. However, an increasing average skull size could also indicate a reduction in the proportion of younger bears in the population. Probably the most important and safest use of skull size data at this time is as an indicator of some change in the population or in hunter effort. We do not have a technique to tell us precisely what such a change might indicate, but use it in conjunction with other data to make our best assessment of the current population.

Harvest sex ratio is the second most common parameter for monitoring black bear populations. It is relied upon as a primary means of assessing population status in 19 states and provinces and as supporting information for population assessment in another eight areas (Garshelis, D.L. 1990). Sex ratio of the harvest is thought by some bear biologists to suggest changes in the population. As a measure of harvest intensity we expect the ratio to change with cohort age. In the younger age classes, males will outnumber females in the harvest. However, the higher harvest mortality of males causes their numbers to decline more rapidly with age. Although the males remain more vulnerable, the ratio of males to females in the harvest declines with age because of the

progressive depletion of males (Bunnell and Tait 1980). A 3:1 sex ratio in favor of more males in the harvest has been suggested (Sterling pers. comm) to be a sustainable yield from a healthy bear population.

METHODS

Black bear hides and skulls taken by successful hunters were sealed by ADF&G staff, public safety staff, and designated sealers. Biological and hunt information collected at the time of sealing included sex, skull size (length and width), pelage color, date and location of kill, number of days hunted, transportation method, guide use, and hunter use of commercial services. A premolar was collected from most bears and sent to Matson's Laboratory for age determination.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Black bear population estimates are not available. Information obtained during sealing cannot be used directly to measure population trends. While harvest information gained from sealing records, such as average skull sizes, average ages, and sex ratios may provide some indication of black bear population trends, in the absence of accompanying demographic data correlations between these measures and harvest sustainability will continue to elude us. Research is needed to identify population parameters so we might better assess population trends and harvest sustainability.

Population Size

No black bear population studies have been conducted in Unit 1A. Estimates of population size or density are difficult and expensive to obtain. The species generally inhabits forested areas, where aerial surveys are impractical. Vast, remote areas in the unit also make studies difficult and expensive to undertake. Conservative black bear density estimates for Unit 1A are based on studies in similar habitats in western Washington State in the 1960s (Poelker and Hartwell 1973) where they estimated 1.4 bears/mi^2. Wood and Larsen calculated a slightly higher density of 1.5 bears/mi^2 for most of the forested islands and mainland, and lower densities for the more barren portions of the mainland and unproductive island habitats. In 1990, they made the following assumptions about bear density and derived a population estimate for all of Unit 1A.

- Revilla Island – 1,176 mi^2 x 1.5 bears/ mi^2 = 1,764 bears
- Gravina Island – 96 mi^2 X 0.75 bears/ mi^2 = 72 bears
- Cleveland Peninsula south of Yes Bay – 203 mi^2 X 1.5 bears/ mi^2 = 305 bears
- Duke and Annette islands – 140 mi^2 X 0.25 bears/ mi^2 = 35 bears
- Remainder of Unit 1A – 890 forested mi^2 X 1.5 bears/ mi^2 = 1,344 bears for a total estimated Unit 1A population of 3,520 black bears (Larsen 1990)

Based on population estimates from other North American coastal areas, Wood estimated most of Unit 1A black bear density at 1.5 bears/mi^2. (Poelker and Hartwell, 1973). Using this density

estimate, they derived a population estimate of 3,500 bears for the unit (Larsen 1993). Making this estimate, they assumed some areas may have more bears than others. For example, Revilla Island and the Cleveland Peninsula were calculated at 1.5 bears/mi^2 while other less productive areas such as Gravina, Duke, and Annette islands were much lower.

Relative density estimates for North American black bears vary between 0.3 and 6.0 bears/mile^2. A study in forested Sitka spruce habitat in Washington State that included logged areas and road access comparable to Prince of Wales Island (POW), resulted in the high estimate of 3.3 bears/mile^2 (Lindzey, *et al.* 1977). More recently, an ongoing mark recapture estimate using a biomarker technique on a 400 mile^2 portion of Kuiu Island resulted in a preliminary density estimate of 1.3 bears/mile^2 (range 0.91–1.8) (Berger and Peacock 2001). From southcentral Alaska in Eastern Prince William Sound, estimates were 1.0 bear/mile^2 (Modafferi, R. 1982). Density estimates in forested Minnesota habitat using biomarker mark-recapture methods resulted in higher values than we estimate for Unit 1A, and ranged from 4–6 bears/mile^2 (Garshelis 1989). The highest black bear density estimate found in forested habitat outside of Alaska, Minnesota, or Washington was in Virginia and ranged from 0.96–1.49 bears/mile^2 (Carney, D. W. 1985).

Female reproductive history is now available from analysis of markings laid down in teeth during years in which they give birth. Preliminary information from 43 harvested females from Units 1A and 2 suggests that age at first reproduction varies, with 9% of females producing cubs at age 4, 37% at age 5, 35% at age 6, and 17% from 7–9 years of age. In general females had young in alternate years.

Population Composition

Our management objective of a 3:1 male to female harvest ratio is aimed at assuring a minimal harvest of female bears. We lack reliable information on the composition of the bear population, but use the harvest sex ratio for insight into the availability of male bears in the population. On a very gross scale, if the harvest of females increases, we may interpret that to suggest there are fewer large male bears available to hunters.

Distribution and Movements

Black bears are thought to be more numerous on the islands of Unit 1A than on the mainland, however, population estimates or quantitative information about home ranges and movement patterns of Unit 1A black bears is not available.

Black bears typically emerge from winter dens in March and April. Following emergence from dens, bears typically occupy low elevation habitats where they feed on vegetation. As spring proceeds into summer, bears typically disperse throughout forested and alpine habitats where they continue to feed on grasses, sedges, forbs, and berry producing shrubs. In the late summer and early fall, bears typically congregate near anadromous fish streams where they feed on spawning salmon. We also know there are some bears that never visit salmon streams but instead rely on other foods to build fat deposits necessary for hibernation. As fish runs decline in the late summer and fall, bears disperse from salmon streams and feed primarily on berries and alpine vegetation before denning again in October and November.

Black colored pelage is most common and occurs throughout the bears' range. The cinnamon color phase occurs only in mainland portions of the unit. Black bears with glacier (blue) pelage are not found in Unit 1A. Kermody bears, or those with white pelage, have been reported in extreme southern mainland portions of the unit near Hyder, Alaska.

MORTALITY

Harvest

Season	Bag Limit
Sept. 1–June 30	Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear
Sept. 1–June 30	Nonresident hunters: 1 bear

Game Board Action and Emergency Orders: No Board of Game actions took place and no emergency orders were issued during this report period.

Hunter harvest. Hunters harvested the most bears of any season on record during 1999 with 95 bears taken from Unit 1A. The most recent 3-year average ($\bar{x}$ = 91 bears) was higher than the 10-year mean ($\bar{x}$ = 67 bears) and shows an increasing trend (Table 1).

Miller (1990) suggested it would be more important to monitor the number of females in the harvest rather than percentage of males. Taylor (1986) noted the effect of hunting pressure on breeding females was critical in sustained yield management. Males typically compose over 75% of the Unit 1A bear harvest, and during the past 10 years 80% of the kill has been male (range 70%–92%). The 3-year male average is slightly lower at 77% (range 73%–81%). Female harvest has averaged 23% during the same 3-year period (range 19%–27%), and is slightly higher than the last 10-year mean of 21% (Table 1).

The average male skull size during this report period ($\bar{x}$ = 18.0 inches, range 17.7–18.3) was slightly higher than the past 10-year average ($\bar{x}$ = 17.8 inches, range 17.5–18.5). During this report period the average spring male skull measured 18.2 inches, and we continue to meet our management objective. This data shows little variation between yearly and spring-only male skull size. Female skull size averages for the 3, 10, and 20-year periods were all 15.9 inches with only slight variation during those same periods (range 14.6–16.6 inches) (Table 5).

Harvest sex ratio is the second-most commonly used parameter for monitoring black bear populations. It is relied upon as a primary means of assessing population status in 19 states and provinces and as supporting information for population assessment in another eight areas (Garshelis, D.L. 1990). Sex ratio of the harvest is thought by some bear biologists to suggest changes in the population. A 3:1 sex ratio in favor of more males in the harvest has been suggested (Sterling pers. com.) to be a sustainable yield from a healthy bear population. The average male to female ratio during the past 10 years has been 4:1. Compared to other areas in Southeast, Unit 1A hunters appear to be skilled at selecting male bears. That average dropped to 3:1 during the current 3-year report period, but continues to meet our management objective.

The total number of days spent in the field, the number of hunters, and days per hunter increased during the report period. Total hunter days increased from the 10-year average of 156 days (range 60–265 days) to an average of 241 days (range 225–265). The number of hunters increased from the 10-year average of 64 (range 33–95) to an average of 88 (range 84–95). Days in the field per successful hunter increased slightly from 2.3 days (range 1.6–3.1) over the past 10 years to 2.7 days (range 2.3–3.1).

Hunter residency and success. Nonresident participation in Unit 1A black bear hunting has varied over the past 20 years, averaging 25% of the kill with a wide range (10%–49%) among years. This pattern continued through the most recent 10-year period (26%) and has increased during the past 3 years to a combined average of 34%. During the 2000 season, 49% of the successful hunters were nonresident.

Harvest chronology during report period. Unit 1A bears are most visible and accessible during the spring when near the coast feeding on sedges and grasses. The hides are also most prime during this period. During this report period, May continued to be the most popular month for Unit 1A harvest (43%), followed by September (24%) and June (17%). The May trend during the past 3 years was slightly below the 10-year average (50%, range 38–60).

Harvest in particular areas (WAAs). Hunters harvest bears throughout the unit. However, over 60% of the Unit 1A harvest has historically been taken from Wildlife Analysis Areas 0406 (Carroll Inlet), 407 (George Inlet and the Ward Cove–Harriet Hunt Lake road), 0822 (Boca De Quadra), and 0510 (northwest Revilla Island), listed in order. On the mainland, WAAs 822 and 823 (Nakat Bay) also contribute substantially to the harvest. Because of its proximity to Ketchikan, WAA 406 is a popular recreational area for Ketchikan residents. Coastguard personnel at the Shoal Cove Loran station in Carroll Inlet regularly harvest bears here. WAA 407 is also easily accessed by Ketchikan residents, by boat via George Inlet and by highway vehicle up the Ward Cove–Harriet Hunt Lake road system. Ketchikan residents and personnel from the Neets Bay fish hatchery account for several bears taken in WAA 510 each season.

Bait stations. Bear baiting has never been popular in Unit 1A. Only 3–9 bait permits are issued each year and 1–2 bears are harvested using this method.

Hunting with dogs. No permits have been requested to hunt bears with dogs in Unit 1A.

Guided hunter harvest. Guided hunts are not popular in Unit 1A and most are sold as part of multiple bag hunt. Four guides are currently permitted under state guiding regulations to conduct hunts in Unit 1A. During the past 3 years, guides have conducted an average of 7 successful hunts (range 2–11) in Unit 1A. The most guided hunts on record were conducted during the 2000 season when guides took 11 successful clients afield.

Transport methods. The use of transporters in Unit 1A is increasing and at this time all licensed transporters are using boats to take hunters to the field. Boats continue to be the most popular mode of transportation used by all bear hunters in Unit 1A. This was especially true during the past 3 years as 79% of the successful hunters used boats to access hunting areas (range 75–84%).

This is up from the 20-year average of 65%. Air and highway travel were down from the 20-year average of 13% for both modes of transportation to 1% and 8%, respectively.

Other mortality

Wounding loss. Wounding loss is not believed to be a significant source of mortality for Unit 1A bears. However, if the nonresident harvest continues to increase we expect this to become a more serious issue. The Southeast rainforest understory is dense and frequent rainfall complicates the task of tracking wounded animals. Nonresident hunters would be more vulnerable to wounding loss because of unfamiliarity with bear behavior, terrain, vegetation types, and difficult tracking conditions. In many cases a wounded bear may move a great distance through dense cover before leaving any sign of blood because of thick fur and dense fat that tends to close wounds and slow the loss of blood.

HABITAT

Assessment

Several more timber sales are planned in Unit 1A. Sales on Gravina Island include construction of roads into the interior that is currently roadless. The timber sales also target some of the most important old growth remaining in this very important habitat. With better access and more hunters we anticipate a higher harvest of bears from that area.

Second growth stands at many previously logged Revilla Island sites are now reaching the stem exclusion stage and we expect the productivity of the habitat to decline and result in lower bear densities.

Enhancement

No habitat enhancement projects specifically to benefit black bears have been attempted in the unit. Although intended as a silvicultural practice, precommercial thinning and pruning has been performed in some young second growth stands in unit. Although not the primary intent, this effort provides a benefit to wildlife by improving and extending habitat suitability in the short-term by permitting sunlight to reach the forest floor and increase understory production. These benefits are short-lived (20–25 years), after which time canopy closure again results in loss of understory vegetation. The long-term effects of clear-cut logging will be detrimental to black bear populations.

NONREGULATORY MANAGEMENT PROBLEMS AND NEEDS

Nonhunting issues. Margaret Creek, located on Revilla Island approximately 20 miles north of Ketchikan, is a contentious area. The US Forest Service recently improved a trail to an existing fish weir, funneling black bears coming to the site to feed in close proximity to humans. Several air charter services have now sell trips from Ketchikan to cruise ship passengers for bear viewing. There have been several clashes with hunters and bear viewers during the past several years; this site received more complaints to the Tongass Forest Supervisor than any other site in Southeast Alaska. Bear viewers would like to see some or all of the area closed to hunting, but hunters do not want any more hunting areas taken away from them. ADF&G has safety concerns

with an increasing number of bear viewers at the site and bear hunters using the same area for sport hunting.

Neets Bay, also on Revilla Island, has recently developed into a substantial bear viewing site. Southern Southeast Regional Aquaculture Association (SSRAA) operates a salmon hatchery at this site and contracts with air charter services to transport cruise ship passengers to the site for bear viewing. SSRAA provides a natural history bear guide from the dock to the viewing site. They have reported observing up to 40 or more bears in one evening feeding in the stream and estuary near this site.

Nuisance bear problems/urban bear management activities. Household garbage, bird feeders, and pet foods continue to attract bears to urban locations. We are working with the police departments, city managers, and Fish and Wildlife Protection to provide educational material on how to reduce bear encounters. Combined, FWP, Ketchikan Police Department, and the Ketchikan ADF&G office receives 400–800 calls annually from residents asking us to deal with bears. While responding to these calls we inform the public about their responsibilities and options. The City of Ketchikan has distributed approximately 2000, 90 gallon roller-cans to residents in an attempt to reduce the availability of garbage to bears. We spend time talking to school classes about bear safety and bear awareness.

The Ketchikan landfill site was closed in 1994, and many food-conditioned bears were either relocated or killed. Prior to that closure an average of 2–8 bears per year were killed in Ketchikan; since 1997 an average of 10 bears (range 5–20) have been killed annually, some of which could be bears (or their offspring) that frequented the dump prior to 1994. Residents continue to provide opportunities for bears to access human foods and are likely educating new bears, and consequently bears are common around town in the summer and fall, and are periodically killed either by ADF&G, enforcement officers, or residents. A total of 11 bears were relocated during the 1999 season and another 16 were killed. Since 1999 we have relocated few bears due to the high cost and lack of suitable relocation sites. During 2000 only one bear was relocated, although 7 were killed near town. During 2001, no bears were relocated and 10 were killed; vehicles near Ketchikan killed an additional 3 bears. We continue to educate the public about proper garbage handling to prevent bears from becoming food-conditioned which ultimately results in public safety issues and needless killing of bears. ADF&G staff continue to spend too much time away from other pressing management concerns dealing with urban bear issues.

CONCLUSIONS AND RECOMMENDATIONS

Black bears are an important big game species in Unit 1A and the harvest continues to increase because of a long hunting season, liberal bag limit, and an attractive meat source to hunters.

The harvest ratio, proportion of females, and age structure of the harvest all suggest a stable bear population and the 1A harvest is within sustainable limits. Harvest records indicate the annual kill remains low relative to our crude population estimate. Harvest records also indicate a healthy male component, and have not shown any discernible changes in skull size, age, or sex parameters. We continue to see increasing numbers of nonresident hunters, some unguided and others using transporters or licensed big game guides. As local bear viewing interest continues to

grow we will undoubtedly be faced with allocation issues related to both human safety and bear preservation issues, requiring compromise by hunters and wildlife watchers. Town bears continue to occupy staff time, and education efforts continue; the problem cannot be solved until city decision makers take responsibility for garbage problems. As logging continues, and large tracts of previously logged habitat rapidly converts to second growth forest, we anticipate reductions in Unit 1A bear numbers. Research is needed to better identify and understand the dynamics of Unit 1A black bears.

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Table 1 Unit 1A back bear harvest, regulatory years 1980 through 2000

Regulatory year	Reported									Estimated kill		Total estimated kill						
	Hunter kill					Nonhunting kill[a]												
	M	F	Unk	Total	Baited[b]	M	F	Unk	Total	Unrep	Illegal	M	(%)	F	(%)	Unk	(%)	Total
1980–1981																		
Fall 1980	3	5	0	8		0	0	0	0	0	0	3	(38)	5	(62)	0	(0)	8
Spring 1981	18	1	0	19		3	1	0	4	0	0	21	(91)	2	(9)	0	(0)	23
Total	21	6	0	27	--	3	1	0	4	0	0	24	(77)	7	(23)	0	(0)	31
1981–1982																		
Fall 1981	5	2	0	7		0	0	0	0	0	0	5	(71)	2	(29)	0	(0)	7
Spring 1982	26	2	0	28		0	0	0	0	0	0	26	(93)	2	(7)	0	(0)	28
Total	31	4	0	35	--	0	0	0	0	0	0	31	(89)	4	(11)	0	(0)	35
1982–1983																		
Fall 1982	5	2	1	8		0	0	0	0	0	0	5	(63)	2	(25)	1	(12)	8
Spring 1983	21	4	1	26		0	0	0	0	0	0	21	(81)	4	(15)	1	(4)	26
Total	26	6	2	34	--	0	0	0	0	0	0	26	(76)	6	(18)	2	(6)	34
1983–1984																		
Fall 1983	13	10	0	23		1	0	0	1	0	0	14	(58)	10	(42)	0	(0)	24
Spring 1984	17	6	0	23		1	0	0	1	0	0	18	(75)	6	(25)	0	(0)	24
Total	30	16	0	46	--	2	0	0	2	0	0	32	(67)	16	(33)	0	(0)	48
1984–1985																		
Fall 1984	9	13	0	22		2	3	0	5	0	0	11	(41)	16	(59)	0	(0)	27
Spring 1985	28	0	0	28		1	1	0	2	0	0	29	(97)	1	(3)	0	(0)	30
Total	37	13	0	50	--	3	4	0	7	0	0	40	(70)	17	(30)	0	(0)	57
1985–1986																		
Fall 1985	11	10	1	22		4	2	0	6	0	0	15	(54)	12	(43)	1	(3)	28
Spring 1986	33	5	0	38		1	1	0	2	0	0	34	(85)	6	(15)	0	(0)	40
Total	44	15	1	60	--	5	3	0	8	0	0	49	(72)	18	(27)	1	(1)	68

Table 1 continued

Regulatory year	Reported																	
	Hunter kill					Nonhunting kill[a]				Estimated kill		Total estimated kill						
	M	F	Unk	Total	Baited[b]	M	F	Unk	Total	Unrep	Illegal	M	(%)	F	(%)	Unk	(%)	Total
1986–1987																		
Fall 1986	15	9	1	25		1	0	0	1	0	0	16	(62)	9	(35)	1	(3)	26
Spring 1987	39	4	0	43		0	0	0	0	0	0	39	(91)	4	(9)	0	(0)	43
Total	54	13	1	68	--	1	0	0	1	0	0	55	(80)	13	(19)	1	(1)	69
1987–1988																		
Fall 1987	13	7	0	20		0	2	1	3	0	0	13	(57)	9	(39)	1	(4)	23
Spring 1988	39	4	0	43		0	0	0	0	0	0	39	(91)	4	(9)	0	(0)	43
Total	52	11	0	63	0	0	2	1	3	0	0	52	(79)	13	(20)	1	(1)	66
1988–1989																		
Fall 1988	8	4	1	13		3	1	0	4	0	0	11	(65)	5	(29)	1	(6)	17
Spring 1989	29	2	12	43		0	0	0	0	0	0	29	(67)	2	(5)	12	(28)	43
Total	37	6	13	56	0	3	1	0	4	0	0	40	(67)	7	(12)	13	(21)	60
1989–1990																		
Fall 1989	5	0	4	9		0	1	0	1	0	0	5	(50)	1	(1)	4	(40)	10
Spring 1990	43	5	8	56		0	0	2	2	0	0	43	(74)	5	(9)	10	(17)	58
Total	48	5	12	65	0	0	1	2	3	0	0	48	(71)	6	(9)	14	(20)	68
1990–1991																		
Fall 1990	9	3	1	13		1	0	2	3	0	0	10	(62)	3	(19)	3	(19)	16
Spring 1991	62	5	2	69		0	0	0	0	0	0	62	(90)	5	(7)	2	(3)	69
Total	71	8	3	82	0	1	0	2	3	0	0	72	(85)	8	(9)	5	(6)	85
1991–1992																		
Fall 1991	11	7	2	20		2	0	1	3	0	0	13	(57)	7	(30)	3	(13)	23
Spring 1992	33	3	1	37		0	0	0	0	0	0	33	(89)	3	(8)	1	(3)	37
Total	44	10	3	57	0	2	0	1	3	0	0	46	(77)	10	(17)	4	(6)	60
1992–1993																		
Fall 1992	5	8	0	13		0	4	0	4	0	0	5	(29)	12	(71)	0	(0)	17
Spring 1993	18	2	0	20		0	0	0	0	0	0	18	(90)	2	(10)	0	(0)	20
Total	23	10	0	33	0	0	4	0	4	0	0	23	(62)	14	(38)	0	(0)	37

Table 1 continued

Regulatory year	Reported											Estimated kill		Total estimated kill						
	Hunter kill					Nonhunting kill[a]														
	M	F	Unk	Total	Baited[b]	M	F	Unk	Total			Unrep	Illegal	M	(%)	F	(%)	Unk	(%)	Total
1993–1994																				
Fall 1993	9	1	0	10		0	0	0	0			0	0	9	(90)	1	(10)	0	(0)	10
Spring 1994	37	3	0	40		1	0	0	1			0	0	38	(93)	3	(7)	0	(0)	41
Total	46	4	0	50	1	1	0	0	1			0	0	47	(92)	4	(8)	0	(0)	51
1994–1995																				
Fall 1994	5	2	0	7		2	0	1	3			0	0	9	(90)	1	(10)	0	(0)	10
Spring 1995	31	8	0	39		0	0	0	0			0	0	38	(93)	3	(7)	0	(0)	41
Total	36	10	0	46	1	2	0	1	3			0	0	47	(92)	4	(8)	0	(0)	51
1995–1996																				
Fall 1995	17	9	0	26		0	1	0	1			0	0	17	(63)	10	(37)	0	(0)	27
Spring 1996	35	6	0	41		0	0	0	0			0	0	35	(85)	6	(15)	0	(0)	41
Total	52	15	0	67	1	0	1	0	1			0	0	52	(76)	16	(24)	0	(0)	68
1996–1997																				
Fall 1996	11	4	0	15		0	1	0	1			0	0	11	(69)	5	(31)	0	(0)	16
Spring 1997	30	3	0	33		0	0	0	0			0	0	30	(91)	3	(9)	0	(0)	33
Total	41	7	0	48	1	0	1	0	1			0	0	41	(84)	8	(16)	0	(0)	49
1997–1998																				
Fall 1997	13	3	0	16		0	1	0	1			0	0	13	(76)	4	(24)	0	(0)	17
Spring 1998	52	5	0	57		0	0	0	0			0	0	52	(91)	5	(9)	0	(0)	57
Total	65	8	0	73	1	0	1	0	1			0	0	65	(88)	9	(12)	0	(0)	74
1998–1999																				
Fall 1998	19	11	0	30		0	0	0	0			0	0	19	(63)	11	(37)	0	(0)	30
Spring 1999	48	5	1	54		2	2	0	4			0	0	50	(86)	7	(12)	1	(2)	58
Total	67	16	1	84	1	2	2	0	4			0	0	69	(79)	18	(20)	1	(1)	88
1999–2000																				
Fall 1999	15	21	0	36		4	0	0	4			0	0	19	(48)	21	(52)	0	(0)	40
Spring 2000	54	5	0	59		1	0	0	1			0	0	55	(92)	5	(8)	0	(0)	60
Total	69	26	0	95	2	5	0	0	5			0	0	74	(74)	26	(26)	0	(0)	100

Table 1 continued

Regulatory year	Reported									Estimated kill		Total estimated kill						
	Hunter kill					Nonhunting kill[a]												
	M	F	Unk	Total	Baited[b]	M	F	Unk	Total	Unrep	Illegal	M	(%)	F	(%)	Unk	(%)	Total
2000–2001																		
Fall 2000	18	11	0	29		2	1	0	3	0	0	20	(63)	12	(37)	0	(0)	32
Spring 2001	57	11	0	68		1	1	0	2	0	0	58	(83)	12	(17)	0	(0)	70
Total	75	22	0	97	2	3	2	0	5	0	0	78	(76)	24	(24)	0	(0)	102

[a] Includes defense of life or property kills, research mortalities, and other known human-caused mortality.
[b] Bears reported harvested over bait.

Table 2 Unit 1A successful black bear hunter residency, regulatory years 1980 through 2000

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Unknown residency[b]	(%)	Total
1980–1981	17	(55)	3	(10)	7	(22)	4	(13)	31
1981–1982	25	(71)	0	(0)	10	(29)	0	(0)	35
1982–1983	24	(71)	0	(0)	10	(29)	0	(0)	34
1983–1984	21	(44)	20	(42)	5	(10)	2	(4)	48
1984–1985	33	(58)	4	(7)	13	(23)	7	(12)	57
1985–1986	33	(49)	11	(16)	16	(23)	8	(12)	68
1986–1987	41	(59)	5	(7)	22	(32)	1	(2)	69
1987–1988	48	(73)	5	(8)	10	(15)	3	(4)	66
1988–1989	30	(50)	1	(2)	25	(42)	4	(6)	60
1989–1990	42	(62)	9	(13)	14	(21)	3	(4)	68
1990–1991	57	(67)	14	(16)	11	(13)	3	(4)	85
1991–1992	29	(48)	8	(13)	20	(33)	3	(6)	60
1992–1993	23	(62)	1	(3)	9	(24)	4	(11)	37
1993–1994	35	(69)	6	(12)	9	(18)	1	(1)	51
1994–1995	29	(59)	7	(14)	10	(21)	3	(6)	49
1995–1996	44	(65)	11	(16)	12	(18)	1	(1)	68
1996–1997	32	(65)	3	(6)	13	(27)	1	(2)	49
1997–1998	38	(51)	11	(15)	24	(32)	1	(2)	74
1998–1999	51	(58)	14	(16)	19	(22)	4	(4)	88
1999–2000	48	(48)	8	(8)	39	(30)	5	(5)	100
2000–2001	45	(44)	2	(2)	50	(49)	5	(5)	102
Average	35	(58)	7	(11)	17	(25)	3	(5)	62

[a] Local hunters are those hunters that resident in Unit 1A.

[b] Includes Defense of Life or Property kills, research mortalities, and other known human-caused mortality.

Table 3 Unit 1A black bear harvest chronology by month[a], regulatory years 1980 through 2000

Regulatory year	Month												
	Sep	(%)	Oct	(%)	Nov	(%)	Apr	(%)	May	(%)	Jun	(%)	*n*
1980–1981	5	(16)	3	(10)	0	(0)	4	(13)	17[b]	(55)	2[c]	(6)	31
1981–1982	3	(8)	3	(9)	1	(3)	0	(0)	17	(49)	11	(31)	35
1982–1983	6	(18)	2	(6)	0	(0)	3	(9)	16	(49)	6	(18)	33
1983–1984	17	(37)	5	(11)	1	(2)	8	(18)	13	(28)	2	(4)	46
1984–1985	23[c]	(42)	2[b]	(4)	0	(0)	1	(2)	25[b]	(46)	3[b]	(6)	54
1985–1986	22[c]	(34)	2	(4)	0	(0)	3	(4)	26[b]	(41)	11[b]	(17)	64
1986–1987	18	(27)	3	(4)	4	(6)	1	(1)	36	(53)	6	(9)	68
1987–1988	14	(22)	4[c]	(6)	3	(5)	6	(9)	25	(39)	12	(19)	64
1988–1989	8[b]	(14)	4	(7)	2	(3)	0	(0)	38	(67)	5	(9)	57
1989–1990	7	(10)	3[b]	(4)	1	(1)	1	(1)	50[b]	(75)	6	(9)	68
1990–1991	11[d]	(13)	4	(5)	0	(0)	2	(2)	51	(61)	16	(19)	84
1991–1992	12	(21)	4	(7)	4[b]	(7)	3	(5)	29	(51)	5	(9)	57
1992–1993	13[d]	(35)	4[c]	(11)	0	(0)	4	(11)	14	(38)	2	(5)	37
1993–1994	5	(10)	5	(10)	0	(0)	3	(6)	27	(54)	10	(20)	50
1994–1995	6	(13)	2	(4)	0	(0)	1	(2)	28	(60)	10	(21)	47
1995–1996	18	(26)	9[b]	(13)	0	(0)	2	(3)	31	(46)	8	(12)	68
1996–1997	12[b]	(25)	4	(8)	0	(0)	3	(6)	25	(51)	5	(10)	49
1997–1998	10[b]	(14)	7	(9)	0	(0)	11	(15)	43	(58)	3	(4)	74
1998–1999	26	(30)	4	(4)	0	(0)	3	(3)	35[b]	(40)	20[d]	(23)	88
1999–2000	21	(21)	14[b]	(14)	1	(1)	4	(4)	46	(46)	10[b]	(10)	96
2000–2001	22	(22)	7	(7)	1[b]	(1)	8[b]	(8)	42	(43)	19	(19)	99
Average	13	(22)	5	(7)	1	(1)	3	(4)	30	(50)	8	(13)	60

[a] Does not include bears killed during closed season
[b] Includes 1 DLP
[c] Includes 2 DLPs
[d] Includes 3 DLPs

Table 4 Unit 1A black bear harvest percent by transport method, regulatory years 1980 through 2000

Regulatory	Transport												
					Highway								
year	Air	(%)	Boat	(%)	vehicle	(%)	Walk	(%)	Other[a]	(%)	Unk[b]	(%)	*n*
1980–1981	7	(22)	16	(52)	3	(10)	1	(3)	0	(0)	4	(13)	31
1981–1982	12	(34)	22	(63)	1	(3)	0	(0)	0	(0)	0	(0)	35
1982–1983	14	(41)	15	(44)	3	(9)	2	(6)	0	(0)	0	(0)	34
1983–1984	8	(17)	27	(56)	6	(13)	4	(8)	1	(2)	2	(4)	48
1984–1985	11	(19)	28	(49)	8	(14)	0	(0)	3	(6)	7	(12)	57
1985–1986	10	(15)	42	(62)	5	(7)	1	(1)	0	(0)	10	(15)	68
1986–1987	17	(25)	42	(61)	7	(10)	0	(0)	2	(3)	1	(1)	69
1987–1988	11	(17)	35	(53)	19	(29)	0	(0)	0	(0)	1	(1)	66
1988–1989	13	(22)	33	(55)	12	(20)	0	(0)	0	(0)	2	(3)	60
1989–1990	2	(3)	46	(68)	15	(22)	0	(0)	1	(1)	4	(6)	68
1990–1991	8	(10)	66	(78)	8	(9)	0	(0)	1	(1)	2	(2)	85
1991–1992	10	(17)	34	(57)	6	(10)	4	(6)	3	(5)	3	(5)	60
1992–1993	0	(0)	22	(59)	6	(16)	1	(3)	4	(11)	4	(11)	37
1993–1994	2	(4)	35	(69)	10	(20)	2	(3)	1	(2)	1	(2)	51
1994–1995	6	(13)	31	(63)	6	(12)	3	(6)	1	(2)	2	(4)	49
1995–1996	6	(9)	46	(68)	12	(18)	3	(4)	0	(0)	1	(1)	68
1996–1997	4	(8)	37	(76)	4	(8)	3	(6)	0	(0)	1	(2)	49
1997–1998	4	(6)	61	(82)	5	(7)	3	(4)	0	(0)	1	(1)	74
1998–1999	0	(0)	66	(75)	11	(12)	7	(8)	0	(0)	4	(5)	88
1999–2000	4	(4)	79	(79)	5	(5)	5	(5)	2	(2)	5	(5)	100
2000–2001	0	(0)	86	(84)	6	(6)	2	(2)	2	(2)	6	(6)	102
Average	7	(14)	41	(64)	8	(12)	2	(3)	1	(2)	3	(5)	62

[a] Includes 3 or 4 wheelers or other ORV

[b] Includes DLP

Table 5 Unit 1A black bear hunter effort, mean skull size, and mean age, regulatory years 1980 through 2000

Regulatory year	Hunter effort			Mean skull size[a] (inches)				Average age (years)[b]			
	Total days	No. hunters	Mean days per hunter	Male	*n*[c]	Female	*n*	Male	*n*	Female	*n*
1980–1981											
Fall 1980	24	8	3.0	15.7	3	15.8	4				
Spring 1981	56	23	2.4	17.6	16	14.6	1				
Total	80	31	2.6	17.3	19	15.5	5	---		---	
1981–1982											
Fall 1981	18	7	2.6	17.0	5	14.5	1				
Spring 1982	70	28	2.5	17.8	24	16.1	2				
Total	88	35	2.5	17.7	29	15.5	3	8.0	19	12.0	2
1982–1983											
Fall 1982	23	8	2.9	16.8	5	16.8	2				
Spring 1983	105	26	4.0	17.1	20	16.2	3				
Total	128	34	3.8	17.1	25	16.4	5	7.0	17	11.0	5
1983–1984											
Fall 1983	57	24	2.4	16.7	10	15.7	10				
Spring 1984	73	24	3.0	18.0	15	16.5	4				
Total	130	48	2.7	17.5	25	15.9	14	7.2	18	6.3	12
1984–1985											
Fall 1984	49	26	1.9	16.0	11	15.9	16				
Spring 1985	90	28	3.2	18.2	24	16.0	1				
Total	139	54	2.6	17.5	35	15.9	17	7.0	27	9.7	12
1985–1986											
Fall 1985	79	25	3.2	17.4	11	15.8	10				
Spring 1986	95	40	2.4	18.3	32	15.4	5				
Total	174	65	2.7	18.1	43	15.7	15	8.0	31	9.4	12
1986–1987											
Fall 1986	52	26	2.0	17.1	13	15.6	9				
Spring 1987	123	43	2.9	17.5	36	16.4	4				
Total	175	69	2.5	17.4	49	15.8	13	7.8	44	9.8	13

Table 5 continued

Regulatory year	Hunter effort			Mean skull size[a] (inches)				Average age (years)[b]			
	Total days	No. hunters	Mean days per hunter	Male	*n*[c]	Female	*n*	Male	*n*	Female	*n*
1987–1988											
Fall 1987	38	22	1.7	18.4	10	15.7	8				
Spring 1988	125	43	2.9	18.1	36	15.5	4				
Total	163	65	2.5	18.1	46	15.6	12	7.9	39	6.3	9
1988–1989											
Fall 1988	32	13	2.5	17.5	7	16.1	4				
Spring 1989	131	43	3.0	18.8	27	16.2	1				
Total	163	56	2.9	18.5	34	16.1	5	10.0	15	7.0	1
1989–1990											
Fall 1989	19	8	2.4	17.1	5	---	0				
Spring 1990	151	56	2.7	18.5	39	16.0	5				
Total	170	64	2.6	18.4	44	16.0	5	---	---	---	---
1990–1991											
Fall 1990	16	13	1.2	16.7	9	16.4	3				
Spring 1991	272	67	4.1	18.0	56	15.6	5				
Total	288	80	3.6	17.8	65	15.9	8	10.2	67	11.0	8
1991–1992											
Fall 1991	44	20	2.2	18.1	11	15.9	7				
Spring 1992	120	37	3.2	18.2	32	16.4					
Total	164	57	2.9	18.1	43	16.1	10	11.0	42	9.6	10
1992–1993											
Fall 1992	22	13	1.7	16.3	5	16.6	10				
Spring 1993	38	20	1.9	17.9	18	15.8	2				
Total	60	33	1.8	17.6	23	16.4	12	8.0	21	9.0	13
1993–1994											
Fall 1993	12	10	1.2	17.7	8	16.1	1				
Spring 1994	87	40	2.2	17.4	38	15.8	3				
Total	99	50	2.0	17.5	46	15.9	4	9.0	46	9.0	4

Table 5 continued

Regulatory year	Hunter effort			Mean skull size[a] (inches)				Average age (years)[b]			
	Total days	No. hunters	Mean days per hunter	Male	*n*[c]	Female	*n*	Male	*n*	Female	*n*
1994–1995											
Fall 1994	10	8	1.3	16.8	7	14.6	2				
Spring 1995	98	39	2.5	18.1	31	16.0	7				
Total	108	47	2.3	17.8	38	15.7	9	9.6	36	11.0	10
1995–1996											
Fall 1995	38	27	1.4	17.5	18	15.7	8				
Spring 1996	73	41	1.8	18.3	35	15.9	6				
Total	111	68	1.6	18.0	53	15.8	14	8.3	51	8.8	14
1996–1997											
Fall 1996	30	16	1.9	16.8	12	15.0	3				
Spring 1997	73	33	2.2	18.4	30	15.8	3				
Total	103	49	2.1	17.6	42	15.4	6	10.9	40	4.9	7
1997–1998											
Fall 1997	47	17	2.8	17.2	12	15.6	4				
Spring 1998	139	56	2.5	17.9	52	15.9	3				
Total	186	73	2.5	17.8	64	15.7	7	9.0	65	10.0	8
1998–1999											
Fall 1998	62	30	2.1	17.1	19	16.3	11				
Spring 1999	172	54	3.2	17.9	50	15.1	7				
Total	234	84	2.8	17.7	69	15.8	18	7.8	64	10.0	16
1999–2000											
Fall 1999	71	37	1.9	17.5	15	16.0	21				
Spring 2000	154	58	2.7	18.1	54	16.6	5				
Total	225	95	2.3	17.9	69	16.1	26	8.1	69	9.9	26
2000–2001											
Fall 2000	64	29	2.2	17.7	18	15.8	11				
Spring 2001	201	66	3.0	18.5	53	16.0	10				
Total	265	85	3.1	18.3	71	15.9	21	9.0	72	9.8	24

[a] Skull sizes equal length plus zygomatic width.72

[b] Bear ages not available for 1980–1981 and 1989–1990.

[c] *n* represents sample size.

Table 6 Unit 1A black bear harvest[a] by Wildlife Analysis Area (WAA), regulatory years 1992 through 2000

	Regulatory years									
WAA	1991–1992[b]	1992–1993	1993–1994	1994–1995	1995–1996	1996–1997	1997–1998	1998–1999	1999–2000	2000–2001
0101		2			1	2			1	1
0303				1						
0404	7	3	4	2	1	1	1	4	6	8
0405	1		2		3	3		2	4	
0406	11	7	17	13	13	8	20	25	22	22
0407	6	5	7	12	12	7	5	13	15	12
0408	3	5			2	3		8	5	7
0509	2	4	2	3	10	2	3	1	4	4
0510	10	4	8	5	5	2	12	12	10	13
0511	1	1					1	1		
0612				1					1	
0613	1	3	2	1	5	2	1	3		3
0614			2		2			1	1	
0715	2						2	3		3
0716	3					1		2		1
0717						1		1	2	
0718				1						
0719	2					2	1		2	2
0820	2	1		1		2	4		2	4
0822	3	2	5	3	6	7	12	2	18	14
0823	5		2	6	5	5	8	5	2	2
0824					1	1	1		4	3
0825					1			1		1
0826					1		2	1	1	1
1209								1		
1210								1		
1319								1		
1526							1			

[a] Includes DLP and road kills

[b] Does not include 1 harvested bear, unspecified location

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BLACK BEAR MANAGEMENT REPORT

From: 1 July 1998
To: 30 June 2001

LOCATION

GAME MANAGEMENT UNIT: Unit 1B (3,000 MI^2)

GEOGRAPHIC DESCRIPTION: Southeast Alaska mainland, Cape Fanshaw to Lemesurier Point.

BACKGROUND

HABITAT DESCRIPTION

Most high quality black bear habitat in Unit 1B is confined to a relatively narrow band of forested landscape between saltwater and the coastal mountains. A large portion of the unit encompasses high elevation peaks and ice fields. ADF&G has estimated that of the 3,000 square miles in Unit 1B, only about 850 square miles is forested habitat. A few large river valleys, such as the Farragut, Stikine, Bradfield, Harding, Eagle, and Thomas Bay drainages support salmon and other anadromous fish. The Anan Creek drainage also supports large, accessible salmon runs and attracts many bears as well as humans who view them. Portions of the unit have been logged and have clearcuts in various stages of seral habitats and some logging roads.

Small openings and disturbed areas, such as wetlands, avalanche chutes, clearcuts, and subalpine meadows are important black bear foraging areas. Black bear diets may range from mostly vegetarian to mostly carnivorous, and the species may subsist by scavenging or by predation on large and small mammals or fish. In Unit 1B, black bears primarily eat vegetation during early spring. Major foods include grasses and sedges, *Equisetum* spp., and berries that have persisted through the winter. Later in spring, black bears may be efficient predators of moose calves and/or Sitka black-tailed deer fawns. During summer and fall when bears accumulate fat reserves for winter hibernation, those bears with access to salmon streams eat large quantities of fish. Berries are also important during the summer and fall months. Poor fish runs or berry crops are thought to result in low cub production and survival the following spring. In most areas of the mainland, black bears share habitats with brown bears.

Over 20,000 acres of forested habitat in Unit 1B have been logged to date. As a result, timber harvest poses the most serious threat to black bear habitat in the unit over the long term. Black bears appear able to exploit increases in forage in early-successional plant communities immediately after logging and may temporarily benefit from clearcutting. However, this food source is lost approximately 20–25 years post-logging with canopy closure and second-growth forests provide little habitat for bears. Precommercial thinning and pruning of second growth

stands can extend the short-term benefits to bears but the long-term effects of logging will be detrimental.

HUMAN USE HISTORY

Black bears are indigenous to Unit 1B and have traditionally been hunted for food and trophies. Information about black bears in the unit is limited to sealing records, anecdotal public reports, and observations by our staff. Although we lack quantitative demographic information on black bears in the unit we believe the population is stable.

Regulatory history

Statewide sealing of black bears began in 1973. Hunters have not been required to obtain a hunt registration permit for black bear, thus effort data for unsuccessful hunters has never been available. We have information on hunt effort only for successful hunters.

For most years since statehood the black bear hunting season extended from 1 September through 30 June with a resident bag limit of two bears annually, only one of which could be a blue or glacier bear. From 1980 through 1983 the season closed on 15 June and the bag limit for residents and nonresidents was only one bear. In 1984, the limit increased to two bears. In 1990, .the nonresident bag limit was reduced from two bears to one per year. In 1982 it became legal to use bait to hunt black bears year round. In 1988 the Board of Game limited baiting in Southeast Alaska to the spring period April 15–June 15. The use of dogs for hunting black bears has been allowed since 1966. Hunting with dogs requires a permit issued by ADF&G. No permit requests to hunt bears with dogs have been received for the unit. Since 1996, hunters have been required to salvage the edible meat of all black bears killed in Southeast Alaska during the period 1 January–31 May.

Historical harvest patterns

Because of difficult access to most areas and a low human population, the annual harvest in the unit has remained low, averaging 8 bears per year from 1973 to 1979, 15 bears per year in the 1980s, and 17 bears per year in the 1990s. The 29 bears killed during the 1995/96 regulatory year represents the highest recorded annual harvest. While there is no clear explanation for this harvest spike, there was a relatively high take by guided nonresident hunters (38%) and local resident hunters (28%) that year, but we do not know if total hunter effort was higher than normal. Approximately 70–85% of the annual harvest occurs during the spring season. Since 1973 males have outnumbered females in the harvest by about 7 to 1. Beginning in 1993, the nonresident harvest began to exceed the resident harvest, with nonresidents accounting for over 60% of the harvest in recent years. Most nonresidents hunt with a guide in the unit. Nonresident hunters must purchase a tag to affix to each bear harvested. The cost of these tags ($225 for nonresidents and $300 for nonresident aliens) may limit the number of nonresident hunters who pursue black bears. Nonresidents willing to purchase a tag are more likely to hunt the adjacent Unit 3 islands which are better known for producing trophy sized bears.

Historical harvest locations

Between 1973 and 1998 black bear harvest was documented in 15 Wildlife Analysis Areas (WAAs) in Unit 1B. These include WAAs in the Cape Fanshaw, Farragut Bay, Thomas Bay,

LeConte Bay, Stikine River, Eastern Passage, Bradfield Canal, Frosty Bay, and Cleveland Peninsula areas. WAA 1603, the Dry Bay/Thomas Bay area, accounted for a disproportionately high percentage (22%) of the total harvest. Proximity to and accessibility from the communities of Petersburg and Wrangell probably influence harvest areas. Most harvest areas are associated with river drainages that support anadromous fish runs. Roads associated with logging at Thomas Bay and the Bradfield River valley provide easy access to hunters previously restricted to airplanes or boats.

Anan Creek management

Anan Creek, on the upper Cleveland Peninsula, has long been a popular black bear viewing area. Since statehood the Anan Creek drainage has been closed to black bear hunting. In October 1996, the Board of Game changed the boundaries of the Anan Creek Closed Area. Effective July 1, 1997 the Anan Creek drainage within 1 mile of Anan Creek downstream from the mouth of Anan Lake, including the area within a 1-mile radius from the mouth of Anan Creek Lagoon, was closed to taking black and brown bear. The rationale for this regulatory change was a desire to protect bears that had become vulnerable to harvest due to human habituation as a result of bear viewing at Anan Creek.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain an average spring skull size and an average annual male skull size of at least 17.5 inches.

- Maintain a male to female ratio of 3:1 in the harvest.

We have been using skull size as a management objective since the late 1980s because we believe that year-to-year trends in average skull size may indicate changes in population size and composition, and provide some measure of the sustainability of harvest levels. A decreasing average skull size may indicate a decline in that segment of the population comprised of large, older bears, and could indicate an overall population decline. However, an increasing average skull size could also indicate a reduction in the proportion of younger bears in the population. Probably the most appropriate use of skull size data at this time is as an indicator of some change in the population or in hunter effort. We do not have a technique to tell us precisely what such a change might indicate, but use it in conjunction with other data to make our best assessment of the current population.

Age, genetics, and environmental factors such as habitat and forage quality all combine to influence black bear skull size. Sealing records and anecdotal evidence indicate that mature mainland black bears generally have smaller skull sizes compared to those found on Southeast Alaska islands. The skull size management objective of 17.5 inches was established after analysis of previous years data showed this to be the long term average. We wanted to maintain skull size in the harvest at the long-term high, and we have looked at any reduction in this mean as a possible indication of changes in the populations' age structure.

In January 2002 Region I management biologists met to evaluate existing management objectives for black bears. We anticipate that management objectives will change prior to the next report period.

METHODS

Staff of the Departments of Fish and Game and Public Safety and state appointed sealing agents sealed hides and skulls of black bears. Hunters are required to submit bear skulls and hides for sealing within 30 days of the kill. Biological and hunt information collected included pelage color, sex, skull size (length and width), date and location of kill, number of days hunted, transportation method, guide use, and hunter use of commercial services. A premolar was collected from most bears and sent to Matson's Laboratory for age determination. We also seal any bear that is killed under defense of life or property provisions (DLP), as a road kill or illegal kill, or during research efforts. During this report period tissue samples were opportunistically collected from some bears harvested in the unit for DNA and stable isotope analysis. Comparison of current and historical data indicates harvest trends and may offer indirect evidence of population trends.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population estimates are not currently available for black bears in this unit. Information obtained during sealing cannot be used to measure population trends. While harvest information gained from sealing records, such as average skull sizes, average ages, and sex ratios may provide some indication of black bear population trends, in the absence of accompanying demographic data, correlations between these measures and harvest sustainability will continue to elude us. Research is needed to identify population parameters so we might better assess population trends and harvest sustainability.

Population Size

No black bear population studies have been conducted in Unit 1B. Estimates of population size or density are difficult to obtain, as the species generally inhabits forested areas and aerial surveys are impossible. The vast, remote areas in the unit also make studies difficult and expensive to undertake. Black bear density estimates for Unit 1B are based on studies in similar habitats in western Washington State in the 1960s. We believe minimum densities in mainland Southeast Alaska are slightly higher than the 1.4 bears per square mile found in the Washington study (Poelker and Hartwell, 1973). Assuming a density of approximately 1.5 bears per square mile of forested habitat, ADF&G estimated 1,230 black bears in Unit 1B in 1990. Densities of black bears are probably similar in Unit 1B to other Southeast Alaska mainland areas.

Black bears with cinnamon-colored pelage occur primarily in a few isolated pockets in Unit 1B. A relatively high proportion of bears taken by hunters from the Farragut Bay, Stikine River, and Eastern Passage areas have cinnamon pelage. Although there exist a few unverified reports of glacier bear sightings in the unit, no glacier bears have been noted in the harvest. No Kermody bears (those with white pelage) have been reported in the unit.

Population Composition

We lack quantitative information with which to estimate the sex and age composition of the Unit 1B black bear population. The male to female ratio in the harvest may provide a better indicator of harvest sustainability and population status than does average skull size. Considering their high reproductive potential, survival of breeding females is critical to sustained yield management. Prolonged overharvest of females is likely to result in population declines. A decreasing trend in the male to female harvest ratio could signal a decline in that segment of the population composed of older, larger males. Region I staff established the 3:1 male-to-female guideline in the late 1980s, based on work done on black bears elsewhere.

Distribution and Movements

Black bears are thought to be evenly distributed throughout the forested habitats in Unit 1B. Unlike black bears on most Southeast Alaska islands, Unit 1B black bears share mainland habitat with brown bears. Quantitative information about home ranges and movement patterns of Unit 1B black bears is not available.

The only quantitative information on black bear movement patterns in Southeast Alaska comes from a single denning study conducted on Mitkof Island in Unit 3 during 1980–1981 (Erickson et al. 1982). Black bear movement patterns are influenced to a large degree by seasonal changes and annual differences in the occurrence, abundance, and quality of preferred food items. Reproductive activities also influence bear movement patterns, particularly for males. As a result males typically have larger home ranges than do females.

Black bears typically emerge from winter dens in March and April. Following emergence from dens, bears typically occupy low elevation habitats where they feed on greening vegetation. As spring proceeds into summer, bears typically disperse throughout forested and alpine habitats where they continue to feed on grasses, sedges, forbs, and berry producing shrubs. In the late summer and early fall bears typically congregate near anadromous fish streams where they feed on spawning salmon. As fish runs decline in the late summer and fall, bears disperse from salmon streams and feed primarily on berries and alpine vegetation before denning again in October and November.

MORTALITY

Harvest

Season	Bag Limit
Sept. 1–June 30	Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear
Sept. 1–June 30	Bag Limit Nonresident hunters: 1 bear

Board of Game Action and Emergency Orders. No Board of Game actions took place and no emergency orders were issued during this report period.

Hunter Harvest. The Unit 1B black bear harvest has remained relatively stable at low levels since about 1980. However, the level of harvest during the most recent 5-year period increased 10% over the preceding 5-year period.

Hunter harvest in Unit 1B ranged from 13 to 24 bears annually during this report period (Table 1). The 24 bears killed from July 1998 through June 1999 represent the highest recorded annual harvest since 1995/1996 when 29 bears were taken.

Males made up 100%, 92%, and 91% of the kill in regulatory years 1998, 1999, and 2000, respectively. During this report period the average male skull size was 18.5 inches, well above the management objective of 17.5 inches, during all three years. The average male skull size of 18.7 inches in 1999/2000 was the highest mean skull size since 1980/1981 (Table 2). The male to female ratio during this report period was 19:1, well above the management goal of 3:1.

Hunter Residency and Success. Although the ratio varies annually, during this report period nonresident hunters took approximately 66% of the total annual harvest, local residents took about 29%, and nonlocal Alaska hunters took 5% of the bears harvested in the unit (Table 3).

Harvest Chronology. Most black bears are taken in the spring, with 50–70% of bears killed in May (Table 4).

Harvest in Particular Areas (WAAs). During this report period the black bear harvest has been fairly evenly distributed over 14 Wildlife Analysis Areas (WAAs) in Unit 1B. These include WAAs in the Cape Fanshaw, Farragut Bay, Thomas Bay, LeConte Bay, Stikine River, Eastern Passage, Bradfield Canal, Frosty Bay, and Cleveland Peninsula areas.

Bait Stations. No permits were applied for or issued for the operation of bait stations in the unit.

Hunting with Dogs. No permit requests have been made to hunt bears with dogs in the unit.

Guided Hunter Harvest. Guided nonresident harvest has increased slightly as a percentage of the harvest over the past 5 years. During this report period most successful nonresident hunters used a guide (66%) while 5 percent used commercial services for transportation to and from the field.

Transport Methods. Hunter transportation is primarily by boat with the infrequent use of aircraft to access hunting areas (Table 5). There are no communities in Unit 1B, and with the exception of Thomas Bay and Bradfield Canal there are very few roads.

Other Mortality

There were no reports of nonhunting mortality in Unit 1B during the report period (Table 1). No DLP's or illegal harvests were reported. While possibly significant, no information is currently available on the amount of wounding loss that occurs in the unit.

HABITAT

Assessment

Timber harvest continues to pose the most serious threat to black bear habitat in the unit. Post-logging increases in berry production, primarily *Vaccinium* sp., may contribute to short-term bear population growth. This forage source will be lost as the canopy closes, as will habitat diversity associated with old-growth forests, accompanied by a loss of denning trees. The long-term effects of logging will be detrimental to black bears. Roads associated with logging increases human access and can make bears increasingly vulnerable to harvest.

Although no new logging activity occurred during this report period, there are several proposed timber sales in planning stages. One timber offering in the Crystal Creek drainage near Thomas Bay has already been sold, and the Forest Service is currently in the planning stages for additional timber sales at Farragut Bay, Madan Bay, Bradfield Canal, and Emerald Bay.

Enhancement

No habitat enhancement projects specifically intended to benefit black bears have been attempted in the unit. Although primarily intended as a silvicultural practice, habitat manipulation in the form of precommercial thinning and pruning has been performed in some young second growth stands in the Thomas Bay area. While not the primary intent, this effort does provide a secondary benefit to wildlife by improving and extending habitat suitability in the short-term, by reducing canopy cover, permitting sunlight to reach the forest floor, and increasing the production and availability of understory forage plants and berries. These benefits are relatively short-lived, approximately 20–25 years, after which time canopy closure again results in loss of understudy vegetation. The long-term effects of clearcut logging will be detrimental to black bear populations.

NONREGULATORY MANAGEMENT PROBLEMS AND NEEDS

Nuisance Bear Problems. There are no established communities on the Unit 1B mainland. We have, however, received occasional reports of bears breaking into cabins and campers in the Thomas Bay area.

Kuiu Island Nonresident Harvest. In fall 2000, due to concerns over the steadily increasing harvest of black bears on Kuiu Island in Unit 3, the Board of Game established a nonresident harvest guideline of 120 bears per year there. In 2001 this new harvest guideline resulted in the emergency closure of the entire fall nonresident season on Kuiu. Similar closures are expected in the future, and in anticipation of these closures guides and transporters are expected to seek out alternative areas for nonresident clients. As a result, we anticipate the Forest Service will experience increases in the number of guide and transporter requests for Special Use Permits in Unit 1B over the next few years. We anticipate an associated increase in harvest and will monitor harvest trends closely.

CONCLUSIONS AND RECOMMENDATIONS

The Unit 1B black bear harvest has remained relatively stable at low levels. However, the harvest level during the most recent 5-year period increased 10% over that of the preceding 5-year period. As a result of fall 2000 Board of Game actions that established a nonresident harvest guideline of 120 bears per year on Kuiu Island in Unit 3, future increases in guide and transporter use in Unit 1B are anticipated. An associated increase in harvest is expected and will be monitored closely. In order to ensure that black bears are managed on a sustained yield basis, research is needed to estimate the black bear population in the unit. Research is also needed to identify possible correlations between sealing data and population trends. A better understanding of the short and long-term impacts of clearcut logging on black bear populations is also needed. The percentage of males in the harvest and average male skull size were above the management objectives during this 3-year period and indicates that black bear populations are stable in Unit 1B. No management or regulatory changes are recommended at this time.

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Table 1 Unit 1B black bear harvest, 1992–2000

Regulatory year	Hunter kill						Nonhunting kill [a]			Total estimated kill					
	M	F	F %	Unk.	Total	Over bait	M	F	Unk.	M	(%)	F	(%)	Unk.	Total
Fall 92	2	2	50	0	4	NA	0	0	0	2	50	2	50	0	4
Spring 93	9	1	10	0	10	0	0	0	0	9	90	1	10	0	10
Total	11	3	21	0	14	0	0	0	0	11	79	3	21	0	14
Fall 93	1	1	50	0	2	NA	0	0	0	1	50	1	50	0	2
Spring 94	8	3	27	0	11	0	0	0	0	8	73	3	27	0	11
Total	9	4	31	0	13	0	0	0	0	9	69	4	31	0	13
Fall 94	0	0	0	0	0	NA	0	0	0	0	0	0	0	0	0
Spring 95	8	4	33	0	12	0	0	0	0	8	67	4	33	0	12
Total	8	4	33	0	12	0	0	0	0	8	67	4	33	0	12
Fall 95	4	1	20	0	5	NA	0	0	0	4	80	1	20	0	5
Spring 96	24	0	0	0	24	0	0	0	0	24	100	0	0	0	24
Total	28	1	3	0	29	0	0	0	0	28	96	1	4	0	29
Fall 96	7	0	0	0	7	NA	0	0	0	7	100	0	0	0	7
Spring 97	14	1	7	0	15	0	0	0	0	14	93	1	7	0	14
Total	21	1	5	0	22	0	0	0	0	21	95	1	5	0	22
Fall 97	0	0	0	0	0	NA	0	0	0	0	0	0	0	0	0
Spring 98	9	2	18	0	11	0	0	0	0	9	82	2	18	0	11
Total	9	2	18	0	11	0	0	0	0	9	82	2	18	0	11
Fall 98	1	0	0	0	1	NA	0	0	0	1	100	0	0	0	1
Spring 99	23	0	0	0	23	0	0	0	0	23	100	0	0	0	23
Total	24	0	0	0	24	0	0	0	0	24	100	0	0	0	24
Fall 99	4	0	0	0	4	NA	0	0	0	4	100	0	0	0	4
Spring 00	8	1	11	0	9	0	0	0	0	8	89	1	11	0	9
Total	12	1	8	0	13	0	0	0	0	12	92	1	8	0	13
Fall 00	4	1	25	0	5	NA	0	0	0	4	80	1	20	0	5
Spring 01	16	1	6	0	17	0	0	0	0	16	94	1	6	0	17
Total	20	2	10	0	22	0	0	0	0	20	91	2	9	0	22

[a] Includes defense of life or property kills, research mortalities, and other known human-caused accidental mortality.

Table 2 Unit 1B black bear mean skull size[a], 1990–2000

Regulatory year	Males	*n*	Females	*n*
1990/1991	17.3	10	15.7	2
1991/1992	18.1	13	16.3	1
1992/1993	17.9	11	16.9	2
1993/1994	18.4	9	16.0	4
1994/1995	18.2	8	16.9	4
1995/1996	18.1	28	17.2	1
1996/1997	18.6	19	18.7	1
1997/1998	17.4	9	16.0	1
1998/1999	17.7	23	N/A	0
1999/2000	18.7	12	N/A	0
2000/2001	18.5	19	15.7	2

[a] Skull size = total length + zygomatic width in inches.

Table 3 Unit 1B successful black bear hunter residency, 1990–2000

Regulatory year	Local resident [a]	(%)	Nonlocal resident	(%)	Non-resident	(%)	Total successful hunters
1990/1991	10	77	1	8	2	15	13
1991/1992	11	73	0	0	4	27	15
1992/1993	8	57	2	14	4	29	14
1993/1994	2	15	3	23	8	62	13
1994/1995	2	17	3	25	7	58	12
1995/1996	8	28	1	3	20	69	29
1996/1997	7	32	0	0	15	68	22
1997/1998	3	27	1	9	7	64	11
1998/1999	8	34	1	4	15	62	24
1999/2000	2	15	1	8	10	77	13
2000/2001	7	32	1	4	14	64	22

a Local residents are those that reside in Petersburg, Wrangell, or Kake.

Table 4 Unit 1B black bear harvest chronology by percent, 1990–2000

Regulatory year	Month						
	September	October	November	April	May	June	*n*
1990/1991	31	31	0	0	38	0	13
1991/1992	33	0	0	13	47	7	15
1992/1993	21	7	0	0	64	7	14
1993/1994	8	8	0	15	38	31	13
1994/1995	0	0	0	8	84	8	12
1995/1996	17	0	0	3	76	4	29
1996/1997	18	9	4	0	55	14	22
1997/1998	0	0	0	27	55	18	11
1998/1999	4	0	0	13	70	13	24
1999/2000	31	0	0	7	46	16	13
2000/2001	22	0	0	14	50	14	22

Table 5 Unit 1B black bear harvest in percent by transport method, 1990–2000

Regulatory year	Airplane	Boat	Highway vehicle	Foot	Unknown	*n*
1990/1991	15	77	0	0	8	13
1991/1992	0	100	0	0	0	16
1992/1993	0	100	0	0	0	14
1993/1994	7	93	0	0	0	14
1994/1995	8	84	0	8	0	12
1995/1996	7	93	0	0	0	29
1996/1997	14	82	0	4	0	22
1997/1998	0	100	0	0	0	11
1998/1999	0	100	0	0	0	24
1999/2000	0	100	0	0	0	13
2000/2001	0	100	0	0	0	22

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BLACK BEAR MANAGEMENT REPORT

From: 1 July 1998
To: 30 June 2001

LOCATION

GAME MANAGEMENT UNIT: 1C (7,600 mi^2)

GEOGRAPHICAL DESCRIPTION: The Southeast Alaska mainland and the islands of Lynn Canal and Stephens Passage lying between Cape Fanshaw and the latitude of Eldred Rock, including Sullivan Island and the drainages of Berners Bay.

BACKGROUND

HABITAT DESCRIPTION

Most high-quality Unit 1C black bear habitat is confined to a relatively narrow band forest between saltwater and the coast mountains. A large portion of the unit encompasses high elevation peaks and ice fields. A few large river valleys, such as the Taku, Speel, Endicott, Chuck, Port Houghton, and Berners Bay have streams that support salmon and other anadromous fish. Portions of the unit have been logged and contain clearcuts that are in various seral stages. As elsewhere in Southeast Alaska, habitat changes continue to occur from clearcut logging. Although early successional stages (3–20 years post logging) provide black bears with an abundance of forage, later stages result in the disappearance of understory plant species as conifer canopies close and light does not penetrate to the forest floor. Second growth stands also lack large hollow trees and root masses that are used for denning. Therefore, although logging may result in an increase in black bear forage in the short term, the long-term result of logging will be a decline in bear numbers due to the disappearance of a productive understory (Suring et al. 1988). The Alaska Department of Fish and Game (ADF&G) has estimated approximately 1,300 square miles of forested habitat in Unit 1C with approximately 38–50 mi^2 having been logged by clearcutting. These logging operations occurred from the time of World War II in Excursion Inlet, to 1999 near Echo Cove. There are several proposed logging operations that could take place over the next few years, including two at Pt. Courverdon and Hobart Bay.

Unit 1C black bears primarily eat vegetation during early spring, although they likely prey on moose calves and Sitka black-tailed deer fawns where available. Important foraging areas are beach lines, estuaries, small forest openings, sub alpine meadows, and disturbed areas such as wetlands, avalanche chutes, and clearcuts. Major vegetative foods include grasses and sedges, skunk cabbage, devils club, *Equisetum,* and berries that have persisted through the winter. During summer and fall bears accumulate fat for hibernation, and their diets may change from mostly vegetative to largely fish for individuals with access to salmon streams. Berries are also

important during summer and fall. Poor fish runs or berry crops are thought to result in low cub production and survival in the following spring because of low fat accumulation prior to den-up. Mainland black bears share ranges with brown bears, especially in major river valleys. Brown bears are rare to non-existent on the Unit 1C islands and are seen only occasionally in the immediate Juneau area.

Bear habitat near Juneau is presently affected by one significant non-natural factor, human garbage. Although bears are numerous locally due to productive natural habitat, the availability of garbage as an attractive alternative or additional food source promotes high bear densities. With restrictions against firearms discharge within the city and borough of Juneau, these urban areas provide a "refuge" where bears are not subjected to hunter harvest, while at the same time the high human density in the area ensures a high level of conflict with bears.

HUMAN USE HISTORY

Black bears have been hunted for many years in Unit 1C, although harvest information was not collected until 1973 when sealing was first required. Since then all successful hunters have been required to take hides and skulls to a sealing agent, allowing ADF&G to acquire information on harvested bears and hunter effort. Because permits or harvest tickets are not required for black bear hunting, we have no way of gathering effort data from unsuccessful hunters.

Regulatory history

For most years since statehood the black bear hunting season has been from September 1 through June 15 or June 30 and the bag limit for residents has been 1–3 bears annually, only one of which could be a blue or glacier bear. Since 1990, the bag limit for residents has been two bears (not more than one glacier bear) and for nonresidents, one bear per year.

Historical harvest patterns

The harvest percentage by residency status has not changed significantly during the past 30 years. Resident hunters historically accounted for 60–70% of the annual harvest. Approximately half of nonresidents hunt without a guide in the unit. Nonresident hunters must purchase tags to affix to each bear harvested. The fact that black bear hunting opportunities exist in most other states and the cost of these tags ($225 for nonresident citizens and $300 for nonresident aliens) probably reduces the number of nonresidents who hunt black bears in Unit 1C.

The Unit 1C annual harvest has risen steadily over the past 30 years, with a mean of 47 in the 1970s, 73 in the 1980s, and 96 bears in the 1990s. Approximately 80% of the harvest has occurred in the spring season, with males outnumbering females in the harvest about 3 to 1. There are differences though slight in the sex ratio of the harvest in spring vs. fall likely due to higher percentage of female bears being without cubs in the fall. From 1992–2000 the percent males in the harvest during spring ranged from 81–98 with a mean of 89%, while the fall ranged from 59–100% males in the harvest, with a mean of 78%.

From 1990 through 1993, black bear movement, disease, and toxicology studies were conducted in the areas of 2 proposed gold mines. Through cooperative agreements between the mining companies and ADF&G, black bears were captured and radio-collared at each mine site, hair and blood samples were collected, and data on bear movements was recorded. The studies were

designed to provide baseline data prior to the mines' development. Since then, one of the 2 projects was abandoned, leaving the Kensington Mine north of Berners Bay as the sole prospect for large mine development in the near term. Due partly to the limited resources devoted to the studies, results were inconclusive. Findings suggested that bears in the study area have smaller home range sizes than reported elsewhere, and the sites are rich environments for bears, capable of supporting higher densities than other study sites (Robus and Carney 1995, Robus and Carney 1996). We believe roads, settlements, and development nodes associated with mine development have the potential for changes in disturbance levels, access, and availability of refuse which could adversely affect bears.

Historical harvest locations

The black bear harvest in Unit 1C is fairly well distributed with the areas with the most harvest being the west side of Lynn Canal and the area south of the Taku River (Table 6). WAA's 2304 is the St. James Bay area that attracts mostly local residents of Unit 1C. It contains several good anchorages for boaters, and the estuary provides bear hunters with ample opportunity to spot and stalk bears. WAA's 2305 and 2306 are at the southern end of the Chilkat range and have been partially logged. The road system in this area provides opportunities for hunters to use ATV's to hunt bears. This is a very popular area for Hoonah residents because of its proximity to their community, and because it is the nearest area to Hoonah where black bears are present. WAA's 2823–2927 (Table 6) are located between Snettisham and Cape Fenshaw in the southern portion of the subunit. Nonresidents who are on combination hunts for brown and black bears harvest many of the bears taken in this area. A typical hunt begins in Unit 4 for brown bears, and then finishes in this area for black bears.

Urban bear management

The tendency for black bears to take advantage of human food/garbage as alternative foods has been the greatest management problem regarding black bears within this unit. Bears that have become conditioned to human food are difficult to discourage, and it has often been necessary to move or destroy such animals. In 1986 the number of complaints involving nuisance bears received by the Juneau Police Department (JPD) and ADF&G far exceeded those of previous years. In an effort to reduce the bear population around Juneau, the Unit 1C bag limit, lowered to one bear per year from 1980–1986, was increased to 2 bears per year in 1987. In spite of the liberalized bag limit, 17 bears were killed in 1987 because of public safety concerns over aggressive behavior of garbage-conditioned bears. Despite enforcement and public education efforts, the number of bear-human conflicts and resulting complaints to ADF&G and public safety agencies required a significant and growing expenditure of effort and resources. A weak municipal ordinance requiring garbage cans to have tight-fitting lids was passed in 1987, but garbage conditioning and conflicts with residents continued. Studies to determine the usefulness of aversive conditioning to discourage bears were conducted in 1989 and 1990, but little success was seen with garbage-conditioned bears, and intensive and repeated treatment of bears was not practical (McCarthy and Seavoy 1992).

In 1991, 21 garbage-conditioned bears were killed. In subsequent years, bear kills related to garbage was low (4 from 1992–1994), due more to the high 1991 harvest rather than an active refuse management program. We speculate that the bear population grew, and in 1995 five bears were killed; that number doubled to 10 in 1996. In 1997, as expected, the kill declined to just one

bear. It became increasingly apparent that killing or removing urban bears was nothing but a short-term fix to the so-called "bear problem" in Juneau.

Along with the sporadic killing of urban bears, Douglas Area staff also trapped and moved bears throughout the 1990s, in spite of the general ADF&G policy to not move bears (Bear Policy Manual, 1990). In many cases a combination of public sentiment and staff incentive made moving bears a less onerous option than destroying them, especially after a single incident for an animal. In some cases bears were simply hauled to the end of the Juneau road system, while at other times they were transported to a more remote mainland location by boat. As one would expect, translocation of bears is not effective, as many problem animals returned to former urban neighborhoods and habits. In addition, moving bears is expensive in terms of transportation costs and staff time. Altogether, from 1986 through 1997 ADF&G staff captured and relocated 90 bears.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain a mean annual male skull size (length plus width) of at least 17.5 inches.

- Maintain a 3:1 male to female ratio in the harvest.

It is difficult to obtain direct population information on black bears (such as aerial surveys for population size and composition), so we collect sealing data as an indirect method of monitoring the populations. Skull measurements and sex ratios are indices we have historically used in this effort. Hunters will generally select the largest bear they encounter on a hunt, and these large bears tend to be males. If the availability of larger male bears decreases, then hunters are likely to shoot smaller bears, male and female.

The 3:1 male to female objective in the harvest was arrived at by consensus among ADF&G biologists as a means to manage the harvest in a conservative manner. The reasoning is that there is a 50:50 sex ratio at birth, and ½ of the breeding-age sows are legal for harvest each year (sows with cubs are protected). Because of the relative low productivity of black bears, it is imperative to protect the female portion of the population as much as possible. By monitoring the female portion of the harvest, we can also gain insight into the availability of male bears in the population.

The objective of maintaining a 17.5 inch mean male skull size is based on the long term average for male bears harvested in Unit 1C. If skull size or age of harvested bears changes over time significantly, this could be an indication that the population parameters have changed. In a situation where the mean skull size declines, this may mean that availability of larger bears has declined as well.

As black bear managers, we use the above indices as trend indicators more than decision trigger points. We continually look for ways to interpret these data in a meaningful manner, and measures such as hunter effort and guided hunters vs. unguided hunters can affect the size and sex of bears harvested. Harvest data, collected during sealing, may or may not reflect any real changes in the population as a whole. Management biologists take these variables into

consideration when interpreting the above indices, as well as changes to habitat, weather, and access patterns. We stress that skull size and age of harvested bears is at best a general, indirect measure of what is happening with a portion of the population, and whether these indices can measure real changes to populations to be of management use has not yet been demonstrated.

There was much discussion about black bear management and management objectives in Region 1 during this report period, focusing on the value and rationale of using skull sizes and ages to measure population change. Harvested bears are not representative of the population as a whole, but rather a measure of hunter selectivity. Thus, hunter demographics and selectivity may have more to do with changes in skull size and age as changes in the population structure. Also, there could be several scenarios that lead to changes in these indices, and without population information we have no way of determining what is causing the change. If the average age of bears declines, this could be due to fewer older bears being available, or due to a productive bear population where younger bears are more prevalent and more likely to be taken. Based on Sterling Millers work (lit cite), skull size and age are not sensitive enough to show changes in a population until major changes have already taken place. Therefore, managers need to be careful when interpreting the meaning behind any such changes.

METHODS

Staff of the Departments of Fish and Game and Public Safety sealed black bear hides and skulls taken by successful hunters. Hunters were legally required to seal bears within 30 days of the date of kill. Biological and hunt information collected at the time of sealing included pelage color, sex, skull size (length and width), date and location of kill, number of days hunted, transportation method, and use of commercial services, including guides. All bears were checked for tattoos or ear tags, an indication that ADF&G personnel captured the bear previously. A premolar was collected from each bear and sent to Matson's Laboratory in Montana for age determination. Tissue samples were collected from a sample of bears, to be sent to the University of Alaska Fairbanks for DNA analysis. In addition, we collected 2 premolars, a tissue sample, and a toe bone for tetracycline marker analysis from bears killed on Kuiu Island, as part of a mark recapture population estimate study.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population estimates are not available for Unit 1C black bears. Information obtained during sealing cannot be used to measure population trends. While harvest information gained from sealing records, such as skull size, age, and sex ratios may provide some indication of population trends, correlations between these measures and harvest sustainability will continue to elude us in the absence of accompanying demographic data. Research is needed to identify population parameters so we might better assess population trends and harvest sustainability.

Population size

There have been no black bear population studies in Unit 1C. Estimates of population size or density are difficult to obtain. The species generally inhabits forested areas, where aerial surveys are impractical. Vast remote areas in the unit also make studies difficult and expensive to

undertake. Density estimates for Unit 1C are based on studies conducted in similar habitats in western Washington State in the 1960s (Poelker and Hartwell 1973). We believe minimum densities in mainland Southeast Alaska are slightly higher than the 1.4 bears per mi^2 found in the Washington study area. Assuming a density of 1.5 bears per mi^2 of forested habitat, ADF&G estimates 1,950 black bears in Unit 1C. Black bear densities are probably similar in Unit 1C to other Southeast mainland areas, and we have assumed density to be consistent throughout the forested areas of the unit. Depending on the availability of human food to bears, mainly garbage, and the tolerance of the human population, bear density near communities may differ from elsewhere in the unit. For example, in comparing bear densities near Juneau vs. Gustavus, because of conditions noted above, the bear density near Juneau is likely higher than the extended natural habitat. In Gustavus, where there are no restrictions on firearms discharge and most bears that frequent residential areas are killed, there is undoubtedly a lower bear density near the community than away from it.

Our estimate of black bear population status is based on data collected during the sealing process. There have been no significant changes in skull size and age data we have collected over the past three report periods. We consider this indicative of a population that has not changed significantly. The harvest increase is reason for concern, but thus far other indices do not indicate a problem. If our population estimate of 1,950 bears is reasonable, the mean annual harvest during this report period of 147 bears is about 8% of the population, and therefore considered sustainable.

The number of bears near the city of Juneau appears to be increasing, based on the number of nuisance bear calls to the JPD and ADF&G. This is as likely the result of learned behavior by bears to where they are more persistent and visible thus giving the impression of an increase in bear numbers. If this is the case it may result from female bears teaching their cubs to feed on refuse, resulting in a generational increase of nuisance bears.

Population composition

Our management objective of a 3:1 male to female harvest ratio is aimed at assuring a minimal harvest of female bears. We lack reliable information on the composition of the bear population, but use the indirect index of the harvest sex ratio for insight into the availability of male bears in the population. On a very gross scale, if the harvest of females' increases, we interpret that as meaning fewer large male bears are available to hunters.

Distribution and movements

Bears are present throughout the mainland and on most islands in Unit 1C. The larger mainland river drainages harbor brown bears that likely displace black bears from some locations. The distances black bears move in and around the unit is generally unknown, except in the areas adjacent to two proposed mining sites: the AJ mine in the Sheep Creek valley just southeast of Juneau, and the Kensington mine just north of Berners Bay. Home ranges for black bears were estimated at both of these sites using radio-collared animals (n=7 and n=12 respectively). Average home range sizes were 6 km^2 and 8 km^2 respectively at the 2 sites (Robus and Carney, 1995; Robus and Carney 1996). These compare similarly to home ranges of bears in Washington state (Poelker and Hartwell 1973) giving some credibility to our rational of using black bear density data from the Washington state study for Southeast Alaska.

Unit 1C black bears exhibit a wide range of colors, including black, cinnamon, and blue (glacier) color. We have received one report of a white bear in the Petersen Creek drainage from ADF&G fisheries staff. Glacier bears are more likely to be found from the Taku River north, and reports of them seem to be increasing. In recent years at least 4 glacier bears were seem from Juneau north to Petersen Creek. A relatively high proportion of bears between the Taku River and Tracy Arm have an amber tint, and are often referred to as cinnamon bears by hunters. However, ADF&G staff records them as black during sealing.

MORTALITY

Harvest

Season	Bag Limit
Sept. 1–June 30	Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear
Sept. 1–June 30	Nonresident hunters: 1 bear

Game Board Action and Emergency Orders. No Board of Game actions were taken pertaining to this unit, nor were any emergency orders issued.

Hunter Harvest. Hunters reported killing 152, 135, and 154 bears in regulatory years 1998, 1999, and 2000, respectively (Table 1). This is a 65% increase over the mean harvest of 89 during the previous 3-year reporting period. Males comprised 95, 86, and 77% of the harvest, exceeding the management objective of 75%. Average skull size for male bears was 17.8 inches, slightly lower than the 17.9 from the previous reporting period. The mean age of male bears decreased a larger amount, going from 8.5 years of age during the previous reporting period to 7.7 years in 1998–2000 (Table 5). The majority of bears harvested had black pelage, although one glacier bear was taken in 1999 adjacent to the Juneau road system, and two others died in non-hunting situations. Successful hunters spent an average of 2.7 days afield (Table 5), similar to the 2.8 days of effort expended per successful hunter during the previous reporting period.

Hunter Residency and Success. Nonlocal Alaskans took 16% of all black bears harvested during the reporting period, while local residents harvested 51%. Nonresident hunters took an average of 32% of the harvest, ranging from 25 to 40%. This compares to a nonresident mean kill of 31% during 1992–1997.

Harvest Chronology. During the reporting period, 87% of the bears taken were killed in the spring season, ranging from 80% in 1999 to 93% in 1998 (Table 1). This compares to the previous 3-year mean of 82%.

Harvest in Particular Areas (WAAs). The harvest during this reporting period was again concentrated in the handful of WAAs that produced most of the bears in the preceding 2 reporting periods. These areas were again centered on the south end of the Chilkat Range and the area between Snettisham and Cape Fanshaw (Table 6).

Guided Hunter Harvest. Nonresidents harvested 33% of the bears taken during this reporting period, similar to the previous 6 years. Surprisingly this sector of the hunting population has not been a major factor in the large increase in harvest over the past 10 years.

Transport Methods. Boats continued to dominate means of transport to the field, used by 79% of hunters (Table 1). Other methods included foot, highway vehicles, airplanes, and off-road vehicles. The reason boat access is so prevalent is that during the spring black bears can be found on nearly any uninhabited beach as they forage for newly emergent sedges. By using a boat, hunters can cover a lot of area with relative ease, and likely will have opportunity to pursue one or more bears.

Other Mortality. During this reporting period, ADF&G, the Juneau Police Department , and private citizens killed one, seven, and four bears respectively. The bears were killed either in defense of life or property, or because they were garbage conditioned and considered to be a public safety concern. Three of these bears were killed during regulatory year 1998, none in 1999, and 9 in 2000. During this same time period there were 7 bears killed on the road system by vehicles, 2 additional animals were found dead from unsubstantiated causes, another died after becoming entangled in a rope, and 1 bear was taken illegally.

The number of nuisance kills was down slightly from the previous report period when 16 were destroyed. The number of bears struck and killed by highway vehicles has averaged 2–3 per year for the past 6 years, with most of them being killed in the Mendenhall Valley.

HABITAT

Assessment

The most critical impacts to habitat in this unit have been associated with logging operations in Hobart Bay, Port Houghton, and Pt. Couverdon. Clearcutting at Pt. Couverdon began in 1975, and continued into the mid 1980's. There is presently a proposal to continue logging in this area. Hobart Bay and Port Houghton logging operations took place in the late 1980's, and there is additional logging proposed for Port Houghton. A 1999 clearcut of about 3–400 acres borders the north side of Cowee Creek near Echo Cove. There has also been some helicopter logging on the southwest side of Douglas Island near Pt. Hilda. Helicopter operations are much less destructive to forest habitat and will probably not have the long-term negative affect on bears as traditional clearcuts. These areas could benefit bears in the short term, but older clearcuts will soon become less valuable to bears as second growth takes over.

A number of proposed developments in Unit 1C could have local impacts on bear populations. A proposed 400-acre golf course on north Douglas Island will likely lead to additional development by private homeowners as lands becomes available. This area is attractive to bears because of the salmon in Petersen Creek, as well as abundant skunk cabbage and blueberries in the area. Undoubtedly this development will impact bears more from a human bear interaction standpoint rather than from the footprint of the golf course itself. Another potential area of development is the mainland coast from Echo Cove to Cascade Point. Plans are in the making to build a road between these areas along with additional development that includes store, dock, and fuel storage. This could affect the bear population in that area due to increased highway traffic,

increased access to the area by recreationalists, and interactions between bears and refuse at the newly developed area.

Enhancement

No habitat enhancement projects specifically intended to benefit black bears have been attempted in the unit. Although primarily intended as a silvicultural practice, precommercial thinning and pruning has been performed in some young second growth stands in unit. While not the primary intent, this effort does provide a secondary benefit to wildlife by improving and extending habitat suitability in the short-term by reducing canopy cover which permits sunlight to reach the forest floor and increase the production of understory forage plants. These benefits are relatively short-lived, approximately 20–25 years, after which time canopy closure again results in loss of understudy vegetation. The long-term effects of clearcut logging will be detrimental to black bear populations. Enhancement of habitat for black bears in Southeast Alaska is not a very realistic endeavor, because of the highly productive state of the natural habitat. So, the best way to provide good habitat for black bears is to limit the development of productive natural habitat.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Urban Bear Management Activities. During the report period staff continued a substantial effort to shift ADF&G involvement away from instant response to nuisance bear reports to advising callers on how to reduce the attraction for bears in the hopes that the animals would return to wild habitats. Only in the case of an intractable bear that repeatedly caused problems did we make an effort to trap and remove or relocate an animal. Even so, we captured and handled 10, 8, and 6 garbage conditioned bears in 1998, 1999, and 2000 respectively.

We continued to work to provide the public with bear and refuse information through PSA's via the daily newspaper, a weekly newspaper, radio spots, TV spots, and advertising with signs on city buses. In addition, ADF&G staff took part in a local radio program each year to reinforce the message that bears are only a symptom of a refuse problem. Throughout the report period ADF&G staff presented information to local groups and interested parties such as the Rotary Club, the USFS, the local Bar organization, and UAS housing personnel about bears and refuse and the need for a comprehensive refuse plan led by the city and borough of Juneau. By fall 2000, many people in the community were pushing the bear issue during the mayoral election, and the newly elected mayor established an Ad Hoc Bear Committee in November 2000 to address the issue. This committee submitted a set of recommendations to the city assembly, resulting in an ordinance that included some of the recommendations. One of the most important ordinance stipulations was the requirement to keep garbage cans off the street until the morning of pickup. The ordinance also required residents to keep garbage in a bear resistant garage or container. Although this was a step in the right direction, there was little to no enforcement regarding this ordinance during the summer of 2001. The result was as many or more bear calls to ADF&G (400+ calls) and JPD (1000 calls) as ever before. In addition, 10 bears were killed by ADF&G or JPD, and another 8 were transported out of town by ADF&G staff.

The level of bear activity in Juneau and local public opposition to killing bears led to a renewed effort to implement the recommendation of the Ad Hoc Bear Committee, and to keep refuse

away from bears. At present this conflict continues, but it appears the CBJ has finally assumed this task in a serious manner.

CONCLUSIONS AND RECOMMENDATIONS

The Unit 1C bear harvest continued an upward trend throughout this report period, and reached 3% of the estimated population of 4,940. The mean number of days hunted per bear did not change significantly from the previous report period, and along with the stable skull size and age structure of the harvest, this indicates the existing harvest is not negatively affecting the bear population. The continued increase in harvest is largely due to local residents' hunting, and results in part from a large increase in the June harvest. This is an interesting development, because most hunters take bears for the hide, and hide quality generally decreases over time after early May. Despite a rapid increase in harvest over the past decade, the current harvest seems to be sustainable.

We should continue to monitor the bear harvest through sealing requirements, while gathering more specific information on kill locations. Eventually we will need more detailed information on kill and effort location to anticipate areas of concern with black bear harvest. We will continue to assess the results of Kuiu Island research to determine the feasibility of conducting a similar project in Unit 1C. Work should continue toward a strategy for refuse management in the City and Borough of Juneau, and success in this issue should be made available to other ADF&G offices.

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Table 1 Unit 1C black bear harvest and other mortality, regulatory years 1992 through 2000

Regulatory year	Reported														
	Hunter kill					Nonhunting kill[a]				Total estimated kill					
	M	F	Unk	Total	Baited	M	F	Unk	Total	M	(%)	F	(%)	Unk	(%)	Total
199/1993																
Fall 1992	18	6	0	24	NA	1	1	0	2	19	(73)	7	(27)	0	(0)	26
Spring 1993	35	5	1	41	NA	0	0	0	0	35	(85)	5	(12)	1	(3)	41
Total	53	11	1	65	NA	1	1	0	2	54	(81)	12	(18)	1	(1)	67
1993/1994																
Fall 1993	7	3	0	10	NA	0	0	0	0	7	(64)	3	(36)	0	(0)	10
Spring 1994	45	1	0	46	NA	1	0	0	1	46	(98)	1	(2)	0	(0)	47
Total	52	4	0	56	NA	1	0	0	1	53	(93)	4	(7)	0	(0)	57
1994/1995																
Fall 1994	7	1	0	8	NA	1	1	0	0	8	(80)	2	(20)	0	(0)	10
Spring 1995	43	4	0	47	NA	2	0	0	0	45	(92)	4	(8)	0	(0)	49
Total	50	5	0	55	NA	3	1	0	4	53	(90)	6	(10)	0	(0)	59
1995/1996																
Fall 1995	10	3	0	13	NA	4	1	0	5	14	(78)	4	(22)	0	(0)	18
Spring 1996	65	6	0	71	NA	1	0	0	1	66	(92)	6	(8)	0	(0)	72
Total	75	9	0	84	NA	5	1	0	6	80	(89)	10	(11)	0	(0)	90
1996/1997																
Fall 1996	26	2	0	28	NA	7	5	1	13	33	(80)	7	(17)	1	(3)	41
Spring 1997	61	6	1	68	NA	1	1	1	3	62	(87)	7	(10)	2	(3)	71
Total	87	8	1	96	NA	8	6	2	16	95	(85)	14	(13)	3	(2)	112
1997/1998																
Fall 1997	8	0	0	8	NA	0	0	0	0	8	(100)	0	(0)	0	(0)	8
Spring 1998	67	12	0	79	NA	1	1	0	2	68	(84)	13	(16)	0	(0)	81
Total	75	12	0	87	NA	1	1	0	2	76	(85)	13	(15)	0	(0)	89

Table 1 continued

Regulatory year	Reported														
	Hunter kill					Nonhunting kill				Total estimated kill					
	M	F	Unk	Total	Baited	M	F	Unk	Total	M	(%)	F	(%)	Unk	(%)	Total
1998/1999																
Fall 1998	9	1	0	10	NA	4	0	0	4	13	(93)	1	(7)	0	(0)	14
Spring 1999	136	5	1	142	NA		0	0	0	136	(96)	5	(3.5)	1	(.5)	142
Total	145	6	1	152	NA	4	0	0	4	149	(96)	6	(3.5)	1	(.5)	156
1999/2000																
Fall 1999	22	4	0	26	NA	0	2	0	2	22	(79)	6	(21)	0	(0)	28
Spring 2000	94	16	0	109	NA	1	1	0	2	95	(85)	17	(15)	0	(0)	112
Total	116	19	0	135	NA	1	3	0	4	117	(84)	23	(16)	0	(0)	140
2000/2001																
Fall 2000	8	8	0	16	NA	10	4	0	14	18	(58)	13	(42)	0	(0)	31
Spring 2001	112	24	2	138	NA	0	1	0	1	112	(82)	25	(18)	2	(2)	139
Total	120	32	2	154	NA	10	5	0	15	130	(76)	38	(22)	2	(1)	169

Table 2 Unit 1C black bear successful hunter residency, regulatory years 1992 through 2000

Regulatory year	Local resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Unknown residency	(%)	Total
1992/1993	35	(54)	9	(14)	21	(32)	0	(0)	65
1993/1994	30	(53)	6	(11)	20	(36)	0	(0)	56
1994/1995	36	(63)	9	(16)	10	(17)	2	(4)	57
1995/1996	50	(60)	15	(18)	19	(22)	0	(0)	84
1996/1997	51	(56)	6	(7)	34	(37)	0	(0)	91
1997/1998	47	(55)	7	(8)	32	(37)	0	(0)	86
1998/1999	86	(57)	27	(17.5)	38	(25)	1	(.5)	151
1999/2000	68	(50)	24	(18)	44	(32)	0	(0)	136
2000/2001	73	(47)	20	(13)	62	(40)	0	(0)	155

Table 3 Unit 1C black bear harvest chronology by month, regulatory years 1992 through 2000

Regulatory	Harvest periods												
year	Sep	(%)	Oct	(%)	Nov	(%)	Apr	(%)	May	(%)	Jun	(%)	*n*
1992/1993	19	(30)	4	(6)	1	(1.5)	2	(3)	37	(58)	1	(1.5)	64
1993/1994	6	(10.5)	0	(0)	1	(2)	6	(10.5)	37	(65)	7	(12)	57
1994/1995	6	(10)	2	(3)	0	(0)	1	(2)	41	(70)	9	(15)	59
1995/1996	11	(13)	3	(3)	1	(1)	5	(6)	55	(63)	12	(14)	87
1996/1997	29	(28)	6	(6)	0	(0)	0	(0)	54	(51)	16	(15)	105
1997/1998	6	(7)	2	(2)	0	(0)	3	(3)	71	(80)	7	(8)	89
1998/1999	8	(5)	2	(1)	0	(0)	4	(3)	106	(70)	31	(21)	151
1999/2000	21	(15.5)	4	(3)	1	(.5)	3	(2)	89	(66)	18	(13)	136
2000/2001	14	(9)	2	(1)	1	(.5)	12	(8)	101	(66)	24	(15.5)	154

Table 4 Unit 1C black bear harvest percent by transport method, regulatory years 1992 through 2000

Regulatory	Transport												
					Highway								
year	Air	(%)	Boat	(%)	vehicle	(%)	Walk	(%)	Other	(%)	Unk	(%)	*n*
1992/1993	5	(8)	49	(79)	4	(6)	4	(6)	1	(1)	0	(0)	63
1993/1994	2	(3)	51	(92)	1	(2)	2	(3)	0	(0)	0	(0)	56
1994/1995	0	(0)	46	(82)	2	(3)	6	(10)	1	(2)	2	(3)	57
1995/1996	1	(1)	67	(80)	6	(7)	10	(12)	0	(0)	0	(0)	84
1996/1997	7	(8)	68	(74)	8	(9)	7	(8)	0	(0)	1	(1)	91
1997/1998	5	(6)	71	(82)	6	(7)	4	(5)	0	(0)	0	(0)	86
1998/1999	2	(1)	125	(83)	16	(10.5)	7	(5)	1	(.5)	0	(0)	151
1999/2000	7	(5)	106	(78)	11	(8)	9	(7)	3	(2)	0	(0)	136
2000/2001	5	(3)	117	(76)	16	(10)	7	(5)	8	(5)	2	(1)	155

Table 5 Unit 1C successful black bear hunter effort, mean skull size, and mean age, regulatory years 1992 through 2000

Regulatory year	Successful hunter effort			Mean skull size[a] (inches)				Average age (years)			
	Total days	No. hunters	Mean days per hunter	Male	*n*[c]	Female	*n*	Male	*n*	Female	*n*
1992/1993											
Fall 1992	46	24	1.9	16.0	18	15.8	6				
Spring 1993	150	41	3.7	17.8	31	16.1	5				
Total	196	65	3.0	17.1	49	15.9	11	9.0	6	11	2
1993/1994											
Fall 1993	16	7	2.3	18.1	7	16.2	3				
Spring 1994	145	49	3.0	17.8	44	15.7	1				
Total	161	56	2.9	17.8	51	15.8	4	8.2	50	14.8	4
1994/1995											
Fall 1994	18	6	3.0	18.6	7	11.3	1				
Spring 1995	124	49	2.5	18.1	43	16.1	4				
Total	142	55	2.6	18.1	50	15.2	5	8.0	42		
1995/1996											
Fall 1995	50	17	2.9	18.3	10	16.9	3				
Spring 1996	200	67	3.0	18.2	63	16.2	6				
Total	250	84	3.0	18.2	73	16.4	9	9.6	62	8.1	9
1996/1997											
Fall 1996	90	29	3.1	17.0	24	---	---				
Spring 1997	167	67	2.5	18.1	57	16.0	6				
Total	257	96	2.7	17.8	81	16.0	6	8.7	80	6.2	6
1997/1998											
Fall 1997	15	8	1.9	17.5	8	---	---				
Spring 1998	228	79	2.9	17.7	64	15.7	12				
Total	243	87	2.8	17.7	72	15.7	12	7.3	64	7.0	10
1998/1999											
Fall 1998	21	10	2.1	18.2	8	17.4	1	4.5	9	19	1
Spring 1999	385	141	2.7	17.7	133	15.6	5	7.9	126	6.2	5

Regulatory year	Successful hunter effort			Mean skull size[a] (inches)				Average age (years)			
	Total days	No. hunters	Mean days per hunter	Male	*n*[c]	Female	*n*	Male	*n*	Female	*n*
Total	406	151	2.7	17.7	141	15.9	6	7.7	135	8.3	6
1999/2000											
Fall 1999	49	26	1.9	16.9	21	16.8	4	6.5	21	12.0	4
Spring 2000	292	110	2.7	18.0	90	15.3	16	7.9	84	6.2	15
Total	341	136	2.5	17.7	111	15.6	20	7.6	105	7.5	19
2000/2001											
Fall 2000	36	14	2.6	17.9	8	16.3	9	6.3	8	10.0	9
Spring 2001	377	135	2.8	17.9	111	16.1	23	7.9	104	12.0	23
Total	413	154	2.8	17.9	119	16.2	32	7.6	112	11.5	32

Table 6 Unit 1C black bear harvest from all Wildlife Analysis Areas (WAA), regulatory years 1992 through 2000

	Regulatory year									
WAA	1992	1993	1994	1995	1996	1997	1998	1999	2000	Total
2202	0	0	0	3	0	1	4	4	2	14
2203	3	1	1	2	1	4	0	3	0	15
2304	8	3	4	2	13	2	10	12	14	68
2305	1	1	3	4	6	4	14	7	6	46
2306	9	3	9	10	4	8	14	15	23	95
2307	4	0	0	0	9	1	5	7	7	33
2408	1	2	1	2	1	2	6	1	4	20
2409	3	1	4	3	5	2	4	1	3	26
2410	0	1	1	2	0	0	0	0	0	4
2411	0	0	0	2	0	0	1	1	0	4
2412	0	0	0	0	1	0	0	0	0	1
2413	0	0	0	0	0	0	0	0	0	0
2514	3	3	5	4	4	4	11	5	6	45
2515	2	1	1	3	6	4	10	7	2	36
2516	0	0	0	0	0	0	0	0	0	0
2517	4	4	4	12	8	2	6	5	7	52
2518	4	2	1	2	9	2	2	5	7	34
2519	0	1	2	2	0	2	1	1	1	10
2722	0	1	3	2	4	0	2	2	3	17
2823	9	11	6	17	14	13	32	25	17	144
2824	6	4	1	2	7	4	4	11	6	45
2825	3	2	3	6	2	10	7	6	20	59
2926	2	8	6	0	4	14	14	17	18	83
2927	5	8	3	8	13	9	10	5	7	68
TOTAL	67	57	58	88	111	88	157	140	163	919

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BLACK BEAR MANAGEMENT REPORT

From: 1 July 1998
To: 30 June 2001

LOCATION

GAME MANAGEMENT UNIT: 1D (2,700 mi^2)

GEOGRAPHICAL DESCRIPTION: That portion of the Southeast Alaska lying north of the latitude of Eldred Rock, excluding Sullivan Island and the drainages of Berners Bay.

BACKGROUND

HABITAT DESCRIPTION

Unit 1D contains approximately 210 mi^2 of forested habitat. About 160 mi^2 is owned by the state (ADNR 1979), and the remainder is in federal ownership including the Tongass National Forest (37 mi^2) and Klondike Gold Rush National Historic Park (13 mi^2). The Alaska Chilkat Bald Eagle Preserve consists of 75 mi^2 along the Chilkat River. Many large river systems with abundant fish populations, notably salmon, are in the southern portion of the Unit 1D. These include the Chilkat River and its major tributaries, the Klehini, Tsirku, Little Salmon, Kelsall, and Takhin rivers. Two other rivers, the Chilkoot and Ferebee, also have important anadromous fish runs as does the Katzehin River on the east side of Lynn Canal. In the Skagway area, the Taiya and Skagway rivers support anadromous fish runs.

Small openings and disturbed areas, such as wetlands, avalanche chutes, clearcuts, and subalpine meadows are important foraging areas. In some areas during some seasons, black bear diets may range from mostly vegetarian to mostly carnivorous, and the species may subsist by scavenging or by predation on small mammals or fish. In Unit 1D, black bears primarily eat vegetation during early spring. Major foods include grasses, sedges and horsetail (*Equisetum* spp.) in estuarine areas, cow parsnip (*Heracleum lanatum*), skunk cabbage (*Lysichiton americanum),* and berries (*Vaccinium* spp. and *Viburnum edule*) that have persisted through the winter. Later in spring, Unit 1D black bears may also prey on moose calves. During summer and fall when bears accumulate fat reserves for winter hibernation, bears with access to salmon streams eat large quantities of fish. Berries are also important during summer and fall. Poor fish runs or berry crops are thought to result in low cub production and survival the following spring. Unit 1D black bears share habitats with brown bears and in some areas, such as the Chilkoot River valley, may have been displaced by them. Research in other areas where black and brown bears occur

sympatrically indicates that although overlap may occur, temporal and spatial partitioning occurs to effect some separation between the two species (Holm et al. 1999).

Large areas of the Klehini, Kelsall, and Chilkat river valleys are encompassed by the Haines State Forest and portions of the forest have experienced clearcut logging over the past few decades. More areas may be cut in the future, as the forest is on a 125-year cutting rotation. Similar to elsewhere in Southeast Alaska, habitat changes continue to occur from clearcut logging. Although early succession stages (3–20 years) provide black bears with an abundance of plant foods, later stages result in the disappearance of understory as conifer canopies close and light cannot penetrate to the forest floor. Second growth stands lack large hollow trees and root masses, important for denning. An increase in the number of logging roads in Unit 1D has resulted in more human access to areas that formerly experienced lighter use. We believe that although logging may create food for bears in the short term, the long-term result will be a decline in bear numbers (Suring et al. 1988), at least partly due to increased access and decreased forage.

HUMAN USE HISTORY

Black bears have long been hunted in Unit 1D. Sealing of black bears was first required in 1973. Hunters are not required to have hunting permits, thus information of unsuccessful hunter effort has never been available. We have information only for successful hunts.

Regulatory history

Since statehood, the black bear hunting season has extended from September 1 through June 30 and the annual bag limit for residents has been two bears, only one of which can be a blue or glacier bear. Nonresident bag limits were the same as those for residents until 1990 when the nonresident limit was reduced to one bear per year. The use of dogs for hunting black bears has been allowed since 1966; hunting with dogs requires a permit issued by ADF&G. No permits to hunt with dogs have been issued in Unit 1D, nor has there been any interest expressed in this pursuit. Following a regulatory change in 1996, hunters must salvage the edible meat of all black bears killed in Southeast Alaska during the period 1 January–31 May. In 1982 using bait to hunt black bears became legal year round. However, in 1988 the Board of Game limited baiting in Southeast Alaska to the spring period 15 April–15 June.

Historical harvest patterns

Unit 1D average annual harvest in the 1970s was about 18 bears; in the 1980s it rose to 30 bears. Within each decade, no trends have been apparent, possibly because harvest can vary greatly from year to year. During 1990–1994 the harvest declined from 34 to 20 bears, but it has increased since then to an annual average of 38 bears during 1995–1997. The annual average has been 42 black bears during this report period. Local residents have regularly accounted for about three-quarters of the annual harvest. Most hunters use highway vehicles for transport, probably because of the abundance of logging roads in the unit. During the last report period more than half of the successful black bear hunters used highway vehicles and approximately one-third used boats. During this report period, more hunters reported "by foot" as their means of

transportation. However, this may be misleading, as "transportation" can be interpreted varyingly.

Males constituted an overall average of 87% of the harvest during the 11-year period 1990–2000. Overall, nonresident hunters killed 14% females in this period, versus 23% by local residents and 26% by nonlocal residents.

A relative high percentage of bears harvested in Unit 1D have been killed over bait in recent years. During 1992–1994, 19% of the harvest was killed over bait. That percentage increased to 39% during 1995–1997 (Barten 1999). A recent increase in the percentage of bears taken in the spring probably resulted from increased popularity of hunting over bait. During the 7-year period 1986–1992, an average of 64% of the harvest occurred in the spring. However, during 1993–1997 (5 years), spring harvest averaged 86% of the annual hunter kill. In the last 3 years, spring harvest has decreased slightly to 79%; the September kill has crept up to 20%.

Historical harvest locations

The majority of the Unit 1D black bear harvest has been confined to two WAAs, 4302 (along the Haines Highway and Chilkat and Klehini rivers) and 4303 (the Kelsall River drainage) (Table 6). To a lesser extent, WAA 4405, which includes Taiya Inlet and the immediate area west of Skagway, is also used. Because 4302 and 4303 are relatively accessible by highway vehicles and boats, most hunters use these areas as well as establish bait stations there in the spring.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain a mean annual male skull size of at least 17.0 inches
- Maintain a 3:1 male to female ratio in the harvest

Because population information, either estimate or census, is costly and difficult to obtain, we collect data on other biological parameters, such as skull size and sex of harvested bears, as a means of monitoring the status of the population over time. Theoretically, a change in the sex ratio or in skull size over time might reflect a change in population structure that would need to be addressed through some regulatory change. In reality, changes in skull size or sex ratio are likely subtle and would need to be extreme in order for us to recognize the need for a regulatory change. However, we will continue to collect the information and to pursue other ways of examining these data that will be more perceptive to change over time, and thus more useful for managers.

Using a 3:1 ratio of males to females is one way of managing relatively conservatively. If we assume a 1:1 male to female ratio at birth, half the animals in the population are females. Theoretically, the breeding interval is 2 years, meaning that half the adult females are accompanied by young in a given year. It is illegal to shoot a female accompanied by young; thus, half the females are protected annually. However, breeding intervals may be longer than 2

years (Garshelis 1994), and we have no data on age at first reproduction, which might also result in a higher number of females in unprotected status each year.

The 17.5-inch skull size objective is based on long-term data from this unit. A significant change could reflect a change in age composition of this population, possibly signifying overharvest. However, population changes resulting in such a difference would likely need to be extreme.

METHODS

Staff of the Departments of Fish and Game and Public Safety sealed black bear hides and skulls taken by successful hunters. Biological and hunt information collected at the time of sealing included pelage color, sex, skull size (length and width), date and location of kill, number of days hunted, transportation method, and hunter use of commercial services. A premolar was collected from most bears and sent to Matson's Laboratory for age determination. Tissue samples collected from some bears are currently being analyzed for DNA and other information. All black bear hunters using bait stations were required to register with ADF&G. Bait station registration has recently been changed to a statewide, computer-based system. Hunters desiring a bait station permit are registered in the statewide database at the time of permit issuance.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

No black bear population studies have been conducted in Unit 1D. Estimates of population size or density are difficult to obtain. The species generally inhabits forested areas, where aerial surveys are impractical. Vast, remote areas in the unit also make studies difficult and expensive to undertake.

Population size

Black bear densities are probably lower in Unit 1D than in any other Southeast Alaska mainland area. Brown bear numbers, on the other hand, appear to be relatively high. ADF&G estimated 275 black bears in Unit 1D in 1990, an average of 1.3 bears per forested mi^2. However, if we use estimates based on work by Linzey et al. (1986) that estimated an average of 3.8 black bears per mi^2, there might be 1357 bears in forested habitat in the unit. Without having more direct estimates of black bear numbers, it is virtually impossible to have a sense of the population size in this unit. Numbers may be higher because of productive salmon streams in the area. Conversely, black bear populations may be affected by brown bears and perhaps suppressed by them.

A relatively high proportion of black bears harvested in Unit 1D exhibit cinnamon pelage. One glacier (blue) pelage bears has been reported in the harvest during this reporting period.

Population composition

More than one-third of the black bears harvested in Unit 1D exhibit cinnamon pelage, although this designation depends somewhat on the experience of the sealing agent. A guided nonresident hunter took the only glacier bear in Unit 1D, according to sealing records in June 2000. During this report period, about 25% of the harvested bears were females, meeting our management objective.

Distribution and movement

We have little information about black bear distribution in this unit. Human population growth is resulting in increasing interactions between bears and rural dwellers. Because the status of the Haines refuse disposal is in flux, we expect to continue to see bears killed in defense of life and property.

MORTALITY

Harvest

Season	Bag Limit
Sept. 1–June 30	Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear
Sept. 1–June 30	Nonresident hunters: 1 bear

Game Board Action and Emergency Orders. No Board of Game actions were taken pertaining to this unit, nor were any emergency orders issued.

Hunter Harvest. Hunters reported killing 36, 44, and 45 black bears in 1998, 1999 and 2000, respectively. This was slightly higher than the previous three years' harvest. However, the ratio of males to females was well within management objectives.

Hunter Residency and Success. Roughly three-quarters of the black bear harvest is by local residents, who primarily use bears for meat.

Hunter Effort. Using days hunted (Table 5) as an indicator of the presence of bears may be misleading, as several hunters reported bear hunts lasting for months. The lack of Wildlife Conservation personnel in Haines may have resulted in the collection of inconsistent data in some instances.

Harvest Chronology. Spring months account for most Unit 1D harvest, with May and June accounting for 53% and 26% of the report period kill. September accounted for about 18% of the most recent 3-year harvest.

Harvest in Particular Areas (WAAs). Since 1990, about 57% of the harvest has come from along the Haines Highway and the lower Chilkat River, WAA 4302. Another 24% has come from the upper Chilkat, and about 11% originated from the Chilkoot and Ferebee watersheds.

Bait Stations. Data on percentages of bears taken over bait in earlier years is not readily available. The increasing popularity of black bear baiting in this unit has raised several management concerns. First, the increase in harvest over the past 2 report periods is largely the result of successful baiting operations and may reach a non-sustainable level if the trend continues. Second, there is some concern from local Fish and Wildlife Protection Troopers and other unit residents that the harvest of brown bears at or near black bear bait stations may be occurring. Furthermore, some residents are highly concerned that black and particularly brown bears may become food conditioned at bait stations and thus have a higher likelihood of becoming nuisance bears. Because there are no wildlife personnel stationed in Haines, hunters are not likely to be queried consistently by ADFG personnel sealing bears. Thus, bears killed over bait may be underreported.

Hunting with Dogs. No permit requests have been made to hunt bears with dogs in the unit.

Guided Hunter Harvest. We did not do an exhaustive review of guided black bear hunting in Unit 1D, but nonresident hunters took only 11% of the 1990–2000 harvest (Table 2). We are aware of increased interest in guided brown bear hunting in the unit, and because hunts for both species are common, we speculate that there may be increased effort toward black bear hunts as well.

Transport Methods. As Table 4 indicates, most successful black bear hunters used highway vehicles (42%) or boats (32%) during the report period. This unit also had a high percentage of hunters claiming walking only (20%) in the last 3 years.

Other Mortality

During 1998–2000, 1 black bear was killed in defense of life or property (DLP), compared with 3 during the last reporting period. No other DLP bears have been reported since 1990.

HABITAT

Assessment

Logging continues to have a large effect on black bear habitat in this Unit 1D. In addition, the number of land sales of University of Alaska holdings has increased the number of residents moving to rural locations in the unit, which is also expected to have negative influences on black bears.

Enhancement

We performed no habitat enhancement work during this reporting period.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Nuisance Bear Problems/Urban Bear Management Activities. The Haines dump was closed in 1999, and collected garbage is now compacted, baled, and barged out of the area. Since that time, garbage disposal in Unit 1D has been problematic. Rather than pay the fees for refuse disposal (regular pickup at this time costs more than $40/month), some residents have constructed garbage sheds on their property. They accumulate garbage over time, and then haul it to the baling facility. These stockpiles attract bears. Also, several landowners in Haines grow fruit trees, particularly apples and cherries. One owner of several cherry trees shot black bears in his orchard in 1999 and in 2000.

A toll-free number was installed to allow unit residents to make direct contact with the area Wildlife Conservation office in Douglas. The amount of information about black (and brown) bears that we dispense to the public has increased, and has elicited positive responses.

CONCLUSIONS AND RECOMMENDATIONS

During the report period, regulatory years 1998–2000, the harvest was composed of 86% male bears, surpassing our 3:1, male to female harvest ratio management objective. We did not evaluate skull size for the 3-year report period. We will evaluate this parameter to determine if there is a continuing trend in the decline noted in the previous report. The increasing popularity of baiting raises several concerns, notably the possible illegal killing of brown bears over bait. We continue to collect teeth for aging bears, and we will assess reproductive history of females using tooth analysis by Matson's lab (Milltown, MT). High brown bear numbers and habitat changes may cause a decline in black bear numbers and harvest in the future.

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Table 1 Unit 1D black bear harvest, regulatory years 1990 through 2000

Regulatory year	Hunter kill					Nonhunting kill[a]				Illegal kill	Total reported kill						
	M	F	Unk	Total	Baited[b]	M	F	Unk	Total		M	(%)	F	(%)	Unk	(%)	Total
1990–1991																	
Fall 1990	4	5	1	10	0	0	0	0	0	0	4	(40)	5	(50)	1	(10)	10
Spring 1991	16	8	0	24	0	0	0	0	0	0	16	(67)	8	(33)	0	(0)	24
Total	20	13	1	34	0	0	0	0	0	0	20	(59)	13	(38)	1	(3)	34
1991–1992																	
Fall 1991	6	7	0	13	0	0	0	0	0	0	6	(46)	7	(54)	0	(0)	13
Spring 1992	17	2	0	19	0	0	0	0	0	0	17	(89)	2	(11)	0	(0)	19
Total	23	9	0	32	0	0	0	0	0	0	23	(72)	9	(28)	0	(0)	32
1992–1993																	
Fall 1992	15	2	0	17	0	0	0	1	1	0	15	(83)	2	(11)	1	(6)	18
Spring 1993	10	2	0	12	3	0	0	0	0	0	10	(83)	2	(17)	0	(0)	12
Total	25	4	0	29	3	0	0	1	1	0	25	(83)	4	(13)	1	(4)	30
1993–1994																	
Fall 1993	2	0	0	2	0	0	0	0	0	0	2	(100)	0	(0)	0	(0)	2
Spring 1994	14	6	0	20	4	1	0	0	1	0	15	(71)	6	(29)	0	(0)	21
Total	16	6	0	22	4	1	0	0	1	0	17	(74)	6	(26)	0	(0)	23
1994–1995																	
Fall 1994	3	1	0	4	0	0	0	0	0	0	3	(75)	1	(25)	0	(0)	4
Spring 1995	13	3	0	16	2	0	0	0	0	0	13	(81)	3	(19)	0	(0)	16
Total	16	4	0	20	2	0	0	0	0	0	16	(75)	4	(25)	0	(0)	20
1995–1996																	
Fall 1995	0	1	0	1	0	0	0	0	0	0	0	(0)	1	(100)	0	(0)	1
Spring 1996	27	4	1	32	6	0	1	0	0	1	27	(82)	4	(15)	1	(3)	33
Total	27	5	1	33	6	0	1	0	0	1	27	(79)	5	(18)	1	(3)	34
1996–1997																	
Fall 1996	4	0	0	4	0	0	1	0	1	0	4	(80)	1	(20)	0	(0)	5
Spring 1997	31	5	0	36	15	1	0	0	1	0	32	(86)	5	(14)	0	(0)	37
Total	35	5	0	40	15	1	1	0	2	0	36	(86)	6	(14)	0	(0)	42

Regulatory year	Hunter kill					Nonhunting kill[a]				Illegal kill	Total reported kill						
	M	F	Unk	Total	Baited	M	F	Unk	Total		M	(%)	F	(%)	Unk	(%)	Total
1997–1998																	
Fall 1997	6	5	0	11	0	1	0	0	1	0	7	(58)	5	(42)	0	(0)	12
Spring 1998	23	6	1	30	18	0	0	0	0	0	23	(77)	6	(20)	1	(3)	30
Total	29	11	1	41	18	1	0	0	1	0	30	(71)	11	(26)	1	(2)	42
1998–1999																	
Fall 1998	4	1	0	5	0	0	0	0	0	0	4	(80)	1	(20)	0	(0)	5
Spring 1999	23	8	0	31	12	0	0	0	0	0	23	(74)	8	(26)	0	(0)	31
Total	27	9	0	36	12	0	0	0	0	0	27	(75)	9	(25)	0	(0)	36
1999–2000																	
Fall 1999	9	3	0	12	0	0	1	0	1	0	9	(69)	4	(31)	0	(0)	13
Spring 2000	26	6	0	32	2	0	0	0	0	0	26	(81)	6	(19)	0	(0)	32
Total	35	9	0	44	2	0	1	0	1	0	35	(78)	10	(22)	0	(0)	45
2000–2001																	
Fall 2000	6	0	0	6	0	0	0	0	0	0	8	(100)	0	(0)	0	(0)	8
Spring 2001	30	9	0	39	18	0	0	0	0	0	30	(77)	9	(23)	0	(0)	39
Total	36	9	0	45	18	0	0	0	0	0	38	(81)	9	(19)	0	(0)	47

[a] Includes defense of life or property kills, research mortalities, and other known human-caused mortality.
[b] May be underreported.

Table 2 Unit 1D black bear successful hunter residency, regulatory years 1990 through 2000

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Unknown[b] residency	(%)	Total
1990–1991	26	(76)	7	(21)	1	(3)	0	(0)	34
1991–1992	28	(88)	0	(0)	4	(12)	0	(0)	32
1992–1993	24	(84)	4	(13)	1	(3)	1	(0)	30
1993–1994	15	(66)	4	(17)	3	(13)	1	(4)	23
1994–1995	15	(75)	2	(10)	3	(15)	0	(0)	20
1995–1996	27	(79)	3	(9)	4	(12)	0	(0)	34
1996–1997	35	(83)	2	(5)	3	(7)	2	(5)	42
1997–1998	31	(74)	3	(7)	7	(17)	1	(2)	42
1998–1999	27	(75)	3	(8)	6	(17)	0	(0)	36
1999–2000	32	(71)	9	(20)	3	(7)	1	(2)	45
2000–2001	33	(70)	5	(11)	7	(15)	2	(4)	47

[a] Local hunters are those hunters that reside in Unit 1D.
[b] Includes defense of life or property kills, research mortalities, and other known human-caused mortality.

Table 3 Unit 1D black bear harvest chronology by month[a], regulatory years 1990 through 2000

Regulatory year	Month												
	Sep	(%)	Oct	(%)	Nov	(%)	Apr	(%)	May	(%)	Jun	(%)	*n*
1990–1991	5	(15)	5	(15)	0	(0)	1	(3)	14	(41)	9	(26)	34
1991–1992	10	(33)	2	(6)	0	(0)	2	(6)	10	(32)	7	(23)	31
1992–1993	14	(47)	3	(1)	1	(3)	1	(3)	5	(17)	6	(20)	30
1993–1994	2	(9)	0	(0)	0	(0)	0	(0)	15	(65)	6	(26)	23
1994–1995	3	(15)	1	(5)	0	(0)	1	(5)	13	(65)	2	(10)	20
1995–1996	1	(3)	0	(0)	0	(0)	3	(9)	23	(68)	7	(20)	34
1996–1997	3	(7)	1	(2)	0	(0)	0	(0)	27	(66)	10	(25)	41
1997–1998	11	(27)	0	(0)	0	(0)	0	(0)	23	(56)	7	(17)	41
1998–1999	4	(11)	1	(3)	0	(0)	1	(3)	18	(50)	12	(33)	36
1999–2000	13	(29)	0	(0)	0	(0)	0	(0)	25	(55)	7	(16)	45
2000–2001	6	(13)	2	(4)	0	(0)	0	(0)	26	(55)	13	(28)	47

[a] Does not include bears killed during closed season

Table 4 Unit 1D black bear harvest percent by transport method, regulatory years 1990 through 2000

Regulatory	Transport												
	Highway												
year	vehicle	(%)	Boat	(%)	Walk	(%)	Plane	(%)	Other[a]	(%)	Unk[b]	(%)	*n*
1990–1991	6	(18)	9	(26)	5	(15)	0	(0)	5	(15)	9	(26)	34
1991–1992	8	(25)	6	(19)	6	(19)	0	(0)	7	(22)	5	(15)	32
1992–1993	15	(50)	1	(3)	5	(17)	3	(10)	2	(7)	4	(13)	30
1993–1994	16	(70)	1	(4)	5	(22)	0	(0)	1	(4)	0	(0)	23
1994–1995	8	(40)	10	(50)	2	(10)	0	(0)	0	(0)	0	(0)	20
1995–1996	13	(38)	12	(35)	4	(12)	2	(6)	2	(6)	1	(3)	34
1996–1997	26	(62)	7	(17)	6	(14)	0	(0)	1	(2)	2	(5)	42
1997–1998	25	(59)	12	(29)	1	(2)	0	(0)	0	(0)	4	(9)	42
1998–1999	18	(50)	11	(31)	5	(14)	0	(0)	2	(5)	0	(0)	36
1999–2000	14	(31)	16	(35)	11	(24)	0	(0)	3	(7)	1	(2)	45
2000–2001	20	(44)	14	(31)	10	(22)	1	(3)	0	(0)	0	(0)	45

[a] Includes 3 or 4 wheelers or other ORV

[b] Includes DLP, or other known human caused mortality

Table 5 Unit 1D black bear hunter effort, mean skull size, and mean age, regulatory years 1990 through 2000. Days hunted over30 are excluded from table. Ages not available for all years.

Regulatory year	Hunter effort			Mean skull size[a] (inches)				Average age (years)[b]			
	Total days	No. hunters	Mean days per hunter	Male	*n*[c]	Female	*n*	Male	*n*	Female	*n*
1990–1991											
Fall 1990	16	10	1.6	15.1	3	14.8	5				
Spring 1991	104	24	4.3	17.0	16	14.6	8				
Total	120	34	3.5	16.7	19	14.7	13	7.7	128	8.1	33
1991–1992											
Fall 1991	22	13	1.7	16.5	4	15.9	5				
Spring 1992	82	19	4.3	17.9	14	15.3	2				
Total	104	32	3.3	17.6	18	15.7	7				
1992–1993											
Fall 1992	28	17	1.6	17.5	15	15.1	2	11.3	7	4	1
Spring 1993	32	10	3.2	17.7	9	14.1	2				
Total	60	27	2.2	17.5	24	14.6	4				
1993–1994											
Fall 1993	2	2	1.0	16.4	2		0	6	2		
Spring 1994	102	20	5.1	16.8	14	15.9	6				
Total	104	22	4.7	16.7	16	15.9	6				
1994–1995	4	4	1.0	15.6	3	16.7	1				
Spring 1995	43	16	2.7	18.1	13	15.1	2				
Total	47	20	2.4	17.6	16	15.6	3				
1995–1996											
Fall 1995	1	1	1.0			12.3	1				
Spring 1996	84	33	2.5	17.1	26	16.2	5				
Total	85	34	2.5	17.1	26	15.6	6	6.8	17	9.3	6
1996–1997											
Fall 1996	15	4	3.8	16.9	4						
Spring 1997	154	36	4.3	16.7	31	15.8	5				

Regulatory year	Hunter effort			Mean skull size[a] (inches)				Average age (years)[b]			
	Total days	No. hunters	Mean days per hunter	Male	*n*[c]	Female	*n*	Male	*n*	Female	*n*
Total	169	40	4.2	16.8	35	15.8	5	7.4	36	7.0	3
1997–1998											
Fall 1997	20	11	1.8	14.8	6	16.5	5				
Spring 1998	171	29	5.9	16.9	23	16.1	6				
Total	191	40	4.8	16.5	29	16.3	11	6.2	24	6.3	8
1998–1999											
Fall 1998	10	5	2.0	16.7	4	16.0	1				
Spring 1999	187	31	6.0	16.8	22	15.5	7				
Total	197	36	5.5	16.8	26	15.6	8	5.5	28	10.0	7
1999–2000											
Fall 1999	28	12	2.3	16.7	9	16.2	3				
Spring 2000	83	32	2.6	17.1	26	15.5	6				
Total	111	44	2.5	17.0	35	15.7	9	6.8	22	9.7	6
2000–2001											
Fall 2000	8	6	1.3	16.6	7						
Spring 2001	236	39	6.1	17.3	30	15.5	9				
Total	244	45	5.4	17.2	37	15.5	9	7.0	37	9.6	9

[a] Skull sizes equal length plus zygomatic width.

[b] Bear ages not available for 1980–1981 and 1989–1990.

[c] *n* represents sample size.

Table 6 Unit 1D black bear harvest[a] by Wildlife Analysis Areas (WAA), regulatory years 1990 through 2000

Regulatory years	WAA							Total
	4302	4303	4304	4405	4406	4407	4408	
1990–1991	24	9	0	1	0	0	0	34

1991–1992	22	3	2	5	0	0	0	32
1992–1993	20	6	1	2	1	0	0	30
1993–1994	14	7	0	2	0	0	0	23
1994–1995	12	5	0	1	0	0	1	19
1995–1996	14	10	1	8	0	0	1	34
1996–1997	19	17	0	4	0	2	0	42
1997–1998	19	16	0	4	0	1	1	41
1998–1999	23	7	0	5	0	1	0	36
1999–2000	28	5	1	3	1	2	5	47
2000-2001	24	8	1	7	7	0	0	47

[a] Includes defense of life or property kills, research mortalities, and other known human-caused mortality.

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BLACK BEAR MANAGEMENT REPORT

From: 1 July 1998
To: 30 June 2001

LOCATION

GAME MANAGEMENT UNIT: 2 (3,600 mi^2)

GEOGRAPHICAL DESCRIPTION: Prince of Wales Island and adjacent islands south of Sumner Strait and west of Kashevarof Passage.

BACKGROUND

HABITAT DESCRIPTION

Prince of Wales (POW) and adjacent islands have some of the best black bear habitat in Southeast Alaska. Unit 2 has an abundance of productive salmon streams, many large estuaries, and subalpine and alpine areas at lower, more hospitable elevations compared to mainland locations, thus supporting a large number of bears. The larger average skull sizes of Unit 2 bears compared to other Southeast Alaska bears also suggests that Unit 2 bears have access to extremely productive, healthy habitats.

Small openings and disturbed areas, such as wetlands, avalanche chutes, clearcuts, and subalpine meadows are important areas for foraging. In some areas during some seasons, black bear diets range from mostly vegetarian to mostly carnivorous, and the species may subsist by scavenging or by predation on a variety of mammals or fish. Unit 2 black bears primarily eat vegetation during early spring. Major foods include grasses and sedges, *Equisetum* spp., skunk cabbage (*Lysichiton americanum*), and berries (*Vaccinium and Rubus sp*.) that have persisted through the winter. Later in spring, bears may be efficient predators of Sitka black-tailed deer fawns. During summer and fall, bears accumulate fat reserves necessary for winter hibernation. Bears with access to salmon streams consume large quantities of fish, and poor fish runs (or reduced berry crops) can result in low cub production and survival (Jonkel and Cowan 1971). If food supplies have been poor during the previous summer and the female has not accumulated adequate energy reserves, the fertilized egg may not implant and consequently will not produce cubs. Poor food may also cause losses after implantation or may result in the death of cubs that are born. In most years, cub survival is around 20% but may be as high as 50% during good food years. The most critical period is when a bear becomes independent at 16–17 months old (Jonkel and Cowan 1971). The age when females first produce cubs is also related to available food supply and ranges from 3–7 years of age, depending on their nutritional plane, a measure of habitat quality (Kolenosky and Strathearn 1987).

Despite the abundance of healthy and productive habitats, however, more clearcut logging has occurred in Unit 2 than in other Southeast black bear habitats. Counting national forest and private lands, ADF&G estimates about 470 mi^2 of forested black bear habitat has been cut during the past 50 years, including over 40% of the old growth forest once found in Unit 2. Logging associated road building in Unit 2 has created the highest density of roads in Southeast, with over 2200 miles of drivable roads on National Forest land and additional large tracts of road on private Native corporation lands. Only a few roads have been closed after logging operations conclude, as required by the Forest Plan (USFS 1997). As a result, habitat changes continue to occur from clearcut logging. Although early seral stages (3–20 years post logging) provide black bears with an abundance of plant foods, later stages result in the disappearance of understory as conifer canopies close and light does not penetrate to the forest floor. Second growth stands also lack large hollow trees and root masses important for denning. We believe that although logging may create food for bears in the short term, the long-term result will be a decline in bear numbers (Suring et al. 1988).

HUMAN USE HISTORY

Black bears are indigenous to Unit 2 and have traditionally been hunted for food and trophies. Information about black bears in the unit is limited to sealing records, anecdotal public reports, and observations by our staff.

Regulatory history

Statewide sealing of black bears began in 1973. Hunters have not been required to obtain a hunt registration permit for black bear, thus effort data for unsuccessful hunters has never been available. We have information on hunt effort only for successful hunters.

Seasons and bag limits. Since statehood the bear hunting season has extended from September 1 through June 30 and the annual bag limit for residents has been two bears, only one of which can be a blue bear. Nonresident and resident bag limits were the same until 1990 when the nonresident limit was reduced to one bear per year. In 1982 it became legal to bait black bears year round. However, in 1988, the Board of Game limited baiting in Southeast Alaska to the 15 April–15 June period. This was the same year that ADF&G records began to accurately document the number of bait permits issued. Beginning in 1996, hunters were required to salvage the edible meat of all spring black bears killed in Southeast Alaska during 1 January 1–31 May. The salvage rule is a contentious issue with both big game guides and hunters.

Hunting with dogs. POW is the only place in Southeast with a history of hunting bears with dogs, and unlike other areas of the state, such hunters are primarily nonresidents. Many other states have eliminated the use of dogs for bear hunting, but the practice has been allowed since 1966 in Alaska. In the early 1990s, numerous complaints about this practice on POW prompted ADF&G to develop a policy for hunting bears with dogs in the region. That policy, adopted in 1992, restricts hunting bears with dogs to the fall, September–December, because deer fawns, bear cubs, and other young wildlife are most vulnerable to disruption during the spring. Currently, a maximum of 5 permits are issued in Unit 2 during any year, to keep this hunt within manageable limits and to minimize disruption to wildlife and other user groups. Prior to 1998 the annual 5-permit limit had never been reached. In 1994 the Board of Game adopted additional

permit conditions into regulation, and Region I added additional conditions requiring a report of the number of bears treed and harvested and proof of health certificates for all dogs used. Many of the same hunters consistently apply for the permits each year. Approximately 2–4 bears are harvested with dogs each year, a small portion of the overall bear harvest. In contrast, outside of Alaska, dog related hunting harvests have been increasing, and have accounted for up to 15% of the annual take in other states. For example, hound hunters may take up to 50% of the bear harvest in a state that does not allow baiting or hunting during the deer season; a state that allows baiting may show houndsmen taking 20 percent or less of the harvesta hunting method is available that the general public can use effectively, the percentage of bears taken with hounds is usually low. The later is true for Southeast Alaska, hunters find spot and stalk methods very effective.

Historical harvest patterns

After averaging 123 bears per year during 1980–1988, and 221 bears annually from 1989–1995, the Unit 2 black bear harvest increased to a yearly average of 253 bears during 1995–1998. Males have accounted for about 72% of the harvest during the past 18 years, exceeding our management objective. On average about 65% of the harvest occurs during the spring season. Black bear hunting by nonresidents in Unit 2 has steadily increased over the past decade and now accounts for 61% of the harvest. During the past 10-year period, Alaska residents living in Unit 2 accounted for 15% and nonlocal residents another 22% of the harvest. Most nonresidents do not use a registered guide when black bear hunting in this unit. Nonresident hunters must purchase a locking tag to affix to each bear harvested. Neither the cost of these tags ($250–$300) nor the cost of travel to the area appears to limit the number of nonresident hunters.

Until 1985 Unit 2 bear hunters used airplane, boat, and highway transportation in relatively equal amounts. However, logging associated road construction peaked in the 1980s and beginning in 1986 most hunters used the road system to access hunting areas. During 1986–1998, highway vehicles accounted for 56% of the transportation used by successful hunters.

Historical harvest locations

Wildlife Analysis Areas (WAAs) 1318 and 1422 accounted for about 23% of the harvest during 1980–1998. WAA 1318 encompasses the area around the communities of Craig and Klawock, POW's primary population center that affords hunters easy road access. WAA 1422, which includes Tuxekan and El Capitan passages on west POW, also offers easy road access. Additional WAAs that have received notable hunting pressure more recently include 1420 (Ratz Harbor to Coffman Cove on the east side of POW), 1317 (the area south and west of Hollis), and 1530 (Whale Pass and Exchange Cove on the northeast corner of the island). Many of these areas also offer good access from saltwater along protected bays and passages.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain an average skull size of at least 19.1 inches for male bears harvested each spring (January–June) or 18.8 inches for all males taken during a regulatory year.

- Maintain a male to female sex ratio of 3:1 in the harvest.

- Minimize human-bear conflicts by providing information and assistance to the public and to other agencies.

- Maintain a harvest of at least 65% males in the combined harvest during the most recent 3 years.

Age, genetics, and environmental factors such as habitat and forage quality combine to influence black bear skull size. Sealing records indicate that harvested mature black bears in Unit 2 generally have larger skulls than bears from the nearby mainland. The skull size management objective of 19.1 inches for males harvested in the spring was established in the late 1980s after analysis of several previous years data showed this to be the long-term average. We wanted to maintain skull size in the harvest at the long term high, and we have looked at any reduction in this mean as a possible indication of changes in the populations' age structure.

Skull size is used as a management tool because we believe that average skull size trends may indicate changes in population size and composition, and they provide some measure of the sustainability of the harvest. A decreasing average skull size may indicate a decline in that segment of the population comprised of large, older bears and could indicate an overall population decline. However, an increasing average skull size could also indicate a reduction in the proportion of younger bears in the population. Probably the most important and safest use of skull size data is as an indicator of some change in the population or in hunter effort. We do not have a technique to tell us precisely what such a change might indicate, but use it in conjunction with other data to make our best assessment of the current population.

Sex ratio is another parameter commonly used when monitoring black bear harvests. It is relied upon as a primary means of assessing population status in 19 states and provinces and as supporting information for population assessment in another eight areas (Garshelis, 1990). Harvest sex ratio is thought by some bear biologists to suggest changes in the population. A 3:1 male to female sex ratio in the harvest has been suggested to be a sustainable yield from a healthy bear population (Sterling Miller, pers. Comm).

In January 2002 Region I management biologists met to evaluate existing management objectives for black bears. We anticipate our management objectives will change prior to the next report period.

METHODS

Hunters are required to submit bear skulls and hides for sealing within 30 days of the kill. Fish and Game Staff, designated sealers, or Fish and Wildlife Protection Troopers must seal black bear hides and skulls taken by successful hunters. Biological and hunt information collected at the time of sealing includes hide color, sex, skull length and width, date and location of kill, number of days hunted, transportation method, and any use of commercial services, including guides. A premolar is collected and sent to Matson's Laboratory for age determination. During this report period tissue samples were collected from harvested bears for DNA and stable isotope analysis.

We currently are conducting research on predator prey relationships in Unit 2. This study, currently focused on deer and wolves, may include black bears in the future. A pilot study in 2000, using radio collars on newborn Sitka black-tailed deer, confirmed bears are efficient predators of young deer. Adding bears to this research project will provide valuable data on hunting vulnerability due to road density, wounding loss, habitat use, and home ranges.

Human dimension information about bear hunting in Southeast has never been collected. We are currently developing a survey to poll hunters on several aspects of Unit 2 black bear hunting. This survey will ask what hunters desire from a hunt, how they rate hunt satisfaction, and whether their hunting experience met with their expectations. These measures of the Unit 2 human dimensions of bear hunting will assist us in making future management decisions.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population estimates are not currently available for black bears in this unit. Information obtained during sealing cannot be used to measure population trends. While harvest information gained from sealing records, such as average skull size, average age, and sex ratio may provide some indication of black bear population trends, in the absence of accompanying demographic data, correlations between these measures and harvest sustainability will continue to elude us. Research is needed to identify population parameters so we might better assess population trends and harvest sustainability.

Population Size

No black bear population studies have been conducted in Unit 2. Density estimates of North American black bears vary between 0.3 and 3.4 bears/mile^2 depending on the region and habitat conditions. At the high end, a Washington State study in forested Sitka spruce habitat that included logged areas comparable to POW, resulted in the 3.4 bears/mile^2 estimate (Lindzey and Meslow 1977). Bear densities in Unit 2 may be similar or even higher than those found in western Washington State because of the abundance of salmon and the extended period that several species of salmon are available.

Elsewhere, Modafferi (1982) estimated 1 bear/mile^2 in eastern Prince William Sound, Alaska. Density estimates from forested habitat in Minnesota using biomarker mark-recapture methods resulted in higher values than we estimate for Unit 2, ranging from 4–6 bears/mile^2 (Garshelis 1989). The highest black bear density estimated in forested habitat outside of Alaska, Minnesota, or Washington was in Virginia and ranged from 0.96–1.49 bears/mile^2 (Carney, D. W. 1985).

Wood (1990) indicated that unlogged portions of Unit 2 contain some of the best black bear habitat in Southeast Alaska. Based on population estimates from other North American coastal areas (Poelker and Hartwell, 1973), Wood estimated the Unit 2 black bear density at 1.5 bears/mi^2. Using Wood's density estimate, we derived a population estimate of 5,400 bears for the unit (Larsen 1995). In making this estimate we assumed a consistent bear density throughout the unit, but some areas undoubtedly have more bears than others.

In 2000, ADF&G began supporting a study on a 400-mile^2 portion of Kuiu Island in Unit 3 that uses tetracycline biomarkers to estimate black bear density. Preliminary results estimate density at 1.3 bears/mile^2 (range 0.91–1.8) (Peacock and Berger 2001). Because this effort is focused on an island adjacent to Unit 2 with similar logging patterns, its results may be more applicable to Unit 2 bear populations than studies done elsewhere.

Population Composition

We lack quantitative information with which to estimate the sex and age composition of the Unit 2 black bear population. The male to female harvest ratio may provide a better indicator of harvest sustainability and population status than does average skull size. Considering their high reproductive potential, survival of breeding females is critical to sustained yield management. Prolonged overharvest of females is likely to result in population declines. A decreasing trend in the male to female harvest ratio could signal a decline in that segment of the population comprised of older, larger males. Region I staff established the 3:1 male to female guideline in the late 1980s, based on work done on black bears elsewhere.

Information on the reproductive history of harvested females is now available from cementum annuli analysis, and can indicate in which years sows give birth. Preliminary information from 43 harvested female bears from Units 1A and 2 suggests that age at first reproduction varies, with 9% of females producing cubs at age 4, 37% at age 5, 35% at age 6, and 17% from 7–9 years of age. In general females in this sample had young in alternate years.

Distribution and Movements

As stated above, Unit 2 black bears are probably not evenly distributed. For example, islands in the POW archipelago that lack productive salmon streams likely support fewer bears/mi^2 than those with fish streams. Also a high proportion of southern POW is characterized by muskeg and low volume timber, and probably supports a lower density of bears than the more productive northern half of the island. Quantitative information about home ranges and movement patterns of Unit 2 black bears is not available.

Unlike mainland Southeast Alaska, Unit 2 black bears occur in the absence of brown bears. The cinnamon colored black bear, which occurs in mainland populations, is absent from Unit 2, as are the glacier (blue) and Kermody (white) bears which occur infrequently in nearby British Columbia and occasionally along the mainland of Southeast Alaska.

MORTALITY

Harvest

Season	Bag limit
Sept. 1–June 30	Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear.
Sept. 1–June 30	Nonresident hunters: 1 bear

Board of Game Action and Emergency Orders. No Board actions or emergency orders were issued for during the report period. However, a Board of Game action in fall 2000 regarding Unit

3 black bears may affect Unit 2. This action placed an annual nonresident harvest cap of 120 bears for Kuiu Island. Currently nonresidents account for 80% of the annual Kuiu bear harvest. The access to and availability of bears on Kuiu is similar to Unit 2, and consequently we anticipate a deflection of effort from Kuiu to POW. The Kuiu harvest was within 10 bears of the cap by the end of the spring 2001 season, resulting in an emergency closure of the subsequent nonresident fall season. Similar closures are expected in the future. The harvest deflection issue was discussed during fall 2000 Board deliberations, and will likely be revisited during the fall 2002 Board meeting. We also anticipate the Forest Service will experience an increase in the number of guide and transporter requests for Unit 2 Special Use Permits.

Hunter Harvest. The 1998–2001 average of 343 bears per year indicates a continuing upward harvest trend. Bunnell and Tait (1985) developed a deterministic simulation model showing that maximum allowable annual hunting mortality on black bears over one year old is 14.2% of the estimated population. Using our population estimate of 5,400 bears (Larsen 1995), this percentage would result in a maximum annual harvest of 767 bears. To date the high-year harvest of 386 bears constituted only 7% of the population estimate. This shows that the current harvest is within sustainable levels according to this simulation model. However, we feel it is important to evaluate site-specific harvests in order to track potential over-harvest and to evaluate our population estimate based simply on available habitat in Unit 2.

During the past 6 years the Unit 2 male-to-female ratio of sealed bears averaged 2.9:1 (range 2.4:1–3.3:1). In North-central POW, the location of the highest Unit 2 kill, the sex ratio has been decreasing slightly during that same period from 2.8:1 to 2.3:1.

The mean or median age of the harvest (or some ratio among age classes) is often assumed to directly reflect the level of exploitation. If mortality is age-biased, as bear hunting appears to be, changes in the age structure will lag well behind changes in population size (Garshelis 1990). The mean age of harvested Unit 2 bears has remained fairly constant during the past 10 years, with males averaging 6.9 and females 8.0 years. However, during 1999 the male mean age dropped to 6.6 years and the female average to 7.2 years. The previous season (1998) female average age was also below the 10-year mean of 7.8 (Table 5). Although a high proportion of the harvest has come from north-central POW, during the past 10 years the median age of this portion of the harvest has fluctuated slightly, but has not changed significantly (female 7.0, male 5.5). We will continue to evaluate the age trends of harvested male bears because of slight but steady declines during 6 of the past 9 seasons.

Hunter Residency and Success. Nonresident hunters continue to harvest more bears in Unit 2 than local and nonlocal residents combined. During this report period nonresidents took 75% of the reported harvest. Unit 2 residents took only 9% of the harvest during the same period, down from an average of 14% during the past 10 years. Successful nonlocal Alaskans have declined from a 10-year average of 21% to an average of 15% during this report period. Between 1980 and 1990, nonresidents represented less than 50% of the Unit 2 bear harvest. During the past 10 years residents accounted for 35% of the harvest (range 21–51%). This is radically lower than the previous 10 years (1980–1990) when residents averaged 59% (range 38–71%) of the harvest (Table 2). Most strikingly, the Unit 2 human population has changed in the past 5 years with the closure of many logging camps and overall reductions in timber related activities. During the

past 30–40 years the logging industry provided a steady flow of new hunters into the area. These were often new residents to Alaska and avid hunters. The remote locations of the many operations allowed workers easy access to game populations. Prior to these developments, bears in remote timber sale locations had rarely been exposed to hunters. Since the decline of the timber industry, newer Unit 2 residents are more involved in tourism and charter fishing, and less invested in a lifestyle that involves hunting. This latter fact may explain some of the reduced resident harvest.

The abundance and accessibility of Unit 2 black bears, due in part to the ease of access along the road system, is attractive to many bear hunters. The recent release of several bear hunting videos and articles in popular hunting magazines likely contributes to an increasing nonresident interest. POW has gained recognition for producing large bears, with regular entries into the Boone and Crockett and Pope and Young record books. A strong economy with more hunters having disposable income during the past several years may also be a factor driving nonresident hunter activity. Bear hunting closures and or shorter seasons in other states and in Canada have likely contributed to the increased attraction of black bear hunting in Southeast Alaska.

Harvest Chronology. Spring seasons have accounted for the majority of the increased effort and harvest in Unit 2. The spring mean male skull size met our management objective of 19.0 inches during all three years, 1999 ($\bar{x}$ = 19.1), 2000 ($\bar{x}$ = 19.2) and 2001 ($\bar{x}$ =19.3). Most Unit 2 bears are taken in the spring (71%) with May consistently ranking as the peak harvest month. The May 2000 harvest represented 58% of the year's total, the highest in the past 16 years, and much higher than the past 10-year average ($\bar{x}$ = 49%). September consistently has the second highest harvest (25%) with only a few bears taken in October and November (Table 3). Spring 2001 had the most hunters (230) and the most hunter-days (987) for a spring hunt on record. Fall 1998 was the first fall on record when more females than male bears were killed. That year was also the first time we fell below the management objective of maintaining a harvest ratio of three males to one female (Table 5). We will soon be looking at the harvest sex ratio on a spatial scale by WAA.

Harvest in particular areas (WAAs). As stated earlier, two WAAs on POW, 1318 and 1422, have accounted for almost one quarter of the total harvest in Unit 2. WAA 1422 showed the most obvious increase during recent years, increasing from a 10-year average of 35 bears to 63 during the 2000 season. Additional WAAs that have received notable hunting pressure more recently include 1420, 1317, and 1530. All include sizeable communities and extensive road access. These same areas have been areas of concern prior to this report because of the rapidly growing harvest.

Bait Stations. Hunting bears over bait accounts for only a small percentage of the Unit 2 harvest. During the past 6 years an average of 8 bears (range 1–15) were reportedly harvested over bait. In contrast, in several other state game management units, hunters using bait take up to 70% of the total harvest. Consequently, in many parts of Alaska, hunters are required to attend department bear baiting clinics prior to registering a bait station, but not in Unit 2. Hunters must register with ADF&G before placing bait in the field. Hunters are allowed 2-bait sites per year, and can bait only during spring. Sealing certificates specifically request information about whether bears were killed over bait, but hunters frequently avoid relaying this information. The

number of bait permits issued peaked at 53 in spring 1995 with an 8-year average of 37 (range 24–53). Most hunters using bait prefer archery equipment. The majority of hunters using bait in Unit 2 are nonresidents. On average 62% of registered bait stations are established by nonresidents (range 57–78%), which represents 16–42 bait permits.

Hunting with Dogs. Currently, hunting with dogs in Unit 2 requires a permit issued by the Ketchikan Area Wildlife Biologist. Hunting bears with dogs is restricted to the fall, a maximum of 5 permits are issued per year, and permittees must report the number of bears treed and harvested. Proof of health certificates for all dogs used is required.

Guided Hunter Harvest. Nonresidents accompanied by a licensed Big Game Guide are allowed to harvest one bear. Historically, 2–4 licensed big game guides have operated in Unit 2 annually. Guides must first be licensed by the state for specific Guide Use Areas and then be permitted by the US Forest Service under a Special Use Permit. Guided hunters are not guaranteed success although personal contact with many Southeast guides suggest between 95–100 % of guide-assisted hunters take bears. Successful guided hunts have increased recently and reached a high during 1999. A total of 33 bears were taken by nonresidents accompanied by guides during 1999 and 15 were taken in 1998, compared to an average of 5 guided kills from 1980 to 1999. One guide was responsible for 24 of the 33 bears taken during 1999.

We are concerned about instances of nonresident black bear hunters being guided illegally in Unit 2, under the guise of hunting with friends. The simple access to good bear hunting locations enables unlicensed "guides" to bring multiple out-of-state hunters with them and assist them in harvesting bears. Repeat nonresident hunters return to POW, usually with a different group of friends. There are currently several investigations into this form of abuse, but investigating or prosecuting the activity is difficult and time consuming.

The use of outfitters and transporters to access hunting areas, especially by nonresidents, is also increasing. Outfitters using boats as floating hotels and transportation are the most troublesome. This increase is difficult to monitor or manage. Outfitters must obtain a state Transporter license, and those operating on marine waters must also have Coast Guard approval. Outfitters are not legally allowed to assist hunters in locating or stalking game, or help clients care for trophies. These regulations are frequently abused yet few cases are ever prosecuted due to the difficulty of gathering evidence and monitoring outfitters' activities. The Forest Service is currently evaluating outfitters' activities and may eventually change their Special Use Permit system to provide better records across the Tongass National Forest.

Transport Methods. During the past 10 years 57% of successful hunters used highway vehicles to reach hunting destinations. Another 28% reported using boats and the remaining 6% went by air. The remaining 9% did not disclose what transportation type they used (Table 4). Preliminary analysis of the data suggests that for northcentral POW, the harvest of bears/mile^2 has increased from 0.10 in 1990 to 0.21 in 1999. This is in contrast to Revilla Island near Ketchikan, where the harvest has remained constant during the past 10 years at about 0.04 bears/mile^2. The harvest of on Kuiu Island (Unit 3) has increased at a faster rate than on POW, going from 0.10 in 1990 to 0.34 bears/mile^2 in 1999.

A new highway improvement and paving project began recently and will upgrade a large tract of the main road from Klawock to Thorne Bay and eventually connect to Coffman Cove. Beginning in early 2002 a new ferry will connect Ketchikan and POW with daily ferry service, making the area more accessible.

Other mortality

Wounding loss is thought to be a significant source of mortality for Unit 2 bears, but this is based on anecdotal information with little documentation. Forest understory is dense and frequent rainfall complicates the task of tracking wounded animals. At the time of sealing, hunters sometimes volunteer that they shot at or hit additional bears while hunting, and were subsequently unable to find them. Hunters are unlikely to report such incidents officially out of shame or fear of enforcement repercussions. Nonresident hunters may wound more animals than residents because of unfamiliarity with local conditions.

At this time we are not aware of any large-scale poaching or other illegal activity associated with Unit 2 bears. However, these activities are difficult to detect due to the ease of access and large area with relatively few protection officers.

In the past few years we have documented a few DLP kills, but prior to that few cases were ever reported. Bears killed at logging camps and in the many small Unit 2 communities have historically gone mostly unreported. Locals tend to avoid involving law enforcement or Fish and Game officials and the subsequent investigation and paperwork. Even law enforcement officers are slow to relay information about nuisance or DLP killed bears. Fish and Game is making a greater effort to build relationships with enforcement officials to foster better documentation and data collection in the future.

HABITAT

Assessment

Timber harvest continues to pose the most serious threat to black bear habitat in the unit. Post logging increases in berry production, primarily *Vaccinium* sp., may contribute to short-term bear population growth. This forage source will be lost as the canopy closes, as will habitat diversity associated with old-growth forests, accompanied by a loss of denning trees. The long-term effects of logging will be detrimental to black bears. Roads associated with logging increases human access and can make bears increasingly vulnerable to harvest.

Enhancement

No habitat enhancement projects specifically intended to benefit black bears have been attempted in the unit. Although used as a silvicultural practice, precommercial thinning and pruning has been performed in some young second growth stands in Unit 2. While not the primary intent, this effort does provide a benefit to wildlife by improving and extending habitat suitability in the short-term by reducing canopy cover, permitting sunlight to reach the forest floor, and increasing the production and availability of understory forage. These benefits are relatively short-lived, approximately 20–25 years, after which time canopy closure again results in loss of understory. The long-term effects of clearcut logging will be detrimental to black bear populations.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Nuisance Bear Problems. Historical records are inaccurate regarding of the number of bears killed while getting into garbage in Unit 2. We receive only one or two defense of life or property (DLP) reports from POW each year, and anecdotal information suggests there have been a number of bears killed around logging camps and near communities each year, however very few of these were ever reported or documented. Until recently there have been open landfills near many communities luring bears near people and consequently creating generations of food-conditioned bears. A recent effort by the Department of Environmental Conservation to bring landfill managers into compliance with state regulations will eventually result in fewer refuse attractions for Unit 2 bears. The city of Thorne Bay recently relocated and fenced their landfill. The city of Hydaburg was found to be out of compliance and is now looking at other waste management alternatives. The city of Klawock was found to be out of compliance and is currently developing a barge transfer site, and is scheduled to be complete in 2002. We entered a cooperative agreement with the Craig Police Department (CPD) to help prepare for this change. Up to 30 black bears have been known to frequent the Klawock landfill, with 12–15 bears on-site being very common. The CPD estimates 2–8 bears are killed each year under DLP terms, but with no ADF&G wildlife staff on hand we have little data from nuisance bear kills or those killed by vehicles.

CONCLUSIONS AND RECOMMENDATIONS

Considerable effort is being expended to obtain better DLP kill records. Past records are incomplete and underestimate the number of nuisance bears killed in Unit 2. With several open landfills on POW scheduled for closure during 2002, this issue will be given higher priority.

The Unit 2 black bear harvest has been steadily increasing and is at a record level. Research is needed to estimate black bear density to determine if the harvest is sustainable and to better address future management needs**.** Research is also needed to ascertain the relationship between sealing data (such as skull size and age) and sustainability of the increasing harvest. Current Kuiu Island research in developing indirect population estimation techniques will be applicable to Unit 2 if these methods prove to be effective. There are also plans to extend the ongoing Unit 2 predator prey research to include black bears. This will provide better information on wounding loss, vulnerability in high use areas, home range size, habitat use, and other useful biological information for managing Unit 2 bears.

Hunting Unit 2 black bears with dogs continues to be a contentious issue. We have capped the number of permits issued each year at 5, which appears to be keeping the practice within manageable limits and minimizing disruption to other wildlife and other user groups. At this point hound hunters are acting responsibly by avoiding high use areas and human population centers, thereby minimizing complaints.

The issue of hunting bears over bait is controversial and we expect continued scrutiny from groups that have been successful in eliminating bear baiting in other states. We are currently evaluating the methods used to gather baiting-related information to provide better records for future management. There is a statewide plan to use ADF&G offices for issuing and recording bait permits, and hopefully this approach will make registration simpler for the staff and public

and produce immediate up-to-date records. We believe our records significantly underestimate the number of bears killed over bait. We will evaluate the need for hunters to attend mandatory bear baiting clinics before they obtain baiting permits for Unit 2.

We will continue to evaluate the age trends of harvested male bears because of slight but steady age declines during 6 of the past 9 seasons.

We plan to poll hunters on several aspects of Unit 2 black bear hunting, which will provide valuable management information.

Unit 2 hunters would benefit from an educational video on identifying male bears in the field and concerns about wounding loss. Such a video would benefit hunters and managers by promoting more male specific hunting.

We will continue to monitor specific harvest locations in order to track harvest and adjust future population estimates. This is especially important because two WAAs, both easily accessible along the road system, make up nearly one-quarter of the past 18 season's harvest. Based on available literature, data collected, and crude density estimates, we believe the existing harvest is within sustained yield limits.

As logging continues, and large tracts of previously logged habitat rapidly converts to second growth forest, we anticipate reductions in Unit 2 bear numbers. Research is needed to better identify and understand the dynamics of Unit 2 black bears.

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Table 1 Unit 2 black bear harvest, regulatory years 1980 through 2000

Regulatory year	Reported																	
	Hunter kill					Nonhunting kill[a]				Estimated kill		Total estimated kill						
	M	F	Unk	Total	Baited[b]	M	F	Unk	Total	Unrep	Illegal	M	(%)	F	(%)	Unk	(%)	Total
1980																		
Fall 1980	17	13	0	30		0	0	0	0	0	0	17	(57)	13	(43)	0	(0)	30
Spring 1981	49	7	0	56		0	0	0	0	0	0	49	(87)	7	(13)	0	(0)	56
Total	66	20	0	86	--	0	0	0	0	0	0	66	(77)	20	(23)	0	(0)	86
1981																		
Fall 1981	19	4	1	24		0	0	0	0	0	0	19	(79)	4	(17)	1	(4)	24
Spring 1982	71	8	0	79		1	0	0	1	0	0	72	(90)	8	(10)	0	(0)	80
Total	90	12	1	103	--	1	0	0	1	0	0	91	(88)	12	(11)	1	(1)	104
1982																		
Fall 1982	20	14	1	35		0	0	1	1	0	0	20	(55)	14	(39)	2	(6)	36
Spring 1983	48	10	6	64		0	0	0	0	0	0	48	(75)	10	(16)	6	(9)	64
Total	68	24	7	99	--	0	0	1	1	0	0	68	(68)	24	(24)	8	(8)	100
1983																		
Fall 1983	16	8	0	24		0	0	0	0	0	0	16	(67)	8	(33)	0	(0)	24
Spring 1984	79	15	1	95		0	0	1	1	0	0	79	(82)	15	(16)	2	(3)	96
Total	95	23	1	119	--	0	0	1	1	0	0	95	(79)	23	(19)	2	(2)	120
1984																		
Fall 1984	20	12	0	32		0	0	0	0	0	0	20	(63)	12	(37)	0	(0)	32
Spring 1985	46	11	1	58		0	0	0	0	0	0	46	(79)	11	(19)	1	(2)	58
Total	66	23	1	90	--	0	0	0	0	0	0	66	(73)	23	(26)	1	(1)	90
1985																		
Fall 1985	26	20	2	48		4	0	1	5	0	0	30	(57)	20	(38)	3	(5)	53
Spring 1986	95	24	2	121		0	0	0	0	0	0	95	(79)	24	(20)	2	(1)	121
Total	121	44	4	169	--	4	0	1	5	0	0	125	(72)	44	(25)	5	(3)	174
1986																		
Fall 1986	23	16	0	39		1	0	0	1	0	0	24	(60)	16	(40)	0	(0)	40
Spring 1987	107	7	0	114		0	0	0	0	0	0	107	(94)	7	(6)	0	(0)	114
Total	130	23	0	153	--	1	0	0	1	0	0	131	(85)	23	(15)	0	(0)	154

Table 1 continued

Regulatory year	Reported											Estimated kill		Total estimated kill						
	Hunter kill					Nonhunting kill[a]														
	M	F	Unk	Total	Baited[b]	M	F	Unk	Total			Unrep	Illegal	M	(%)	F	(%)	Unk	(%)	Total
1987																				
Fall 1987	27	12	1	40		0	0	0	0			0	0	27	(68)	12	(30)	1	(2)	40
Spring 1988	100	12	0	112		0	2	0	2			0	0	100	(88)	14	(12)	0	(0)	114
Total	127	24	1	152	1	0	2	0	2			0	0	127	(82)	26	(17)	1	(1)	154
1988																				
Fall 1988	63	28	1	92		2	0	1	3			0	0	65	(69)	28	(29)	2	(2)	95
Spring 1989	74	16	21	111		3	2	0	5			0	0	77	(66)	18	(16)	21	(18)	116
Total	137	44	22	203	5	5	2	1	8			0	0	142	(67)	46	(22)	23	(11)	211
1989																				
Fall 1989	27	17	27	71		1	1	2	4			0	0	28	(37)	18	(24)	29	(39)	75
Spring 1990	92	16	39	147		0	0	1	1			0	0	92	(62)	16	(11)	40	(27)	148
Total	119	33	66	218	22	1	1	3	5			0	0	120	(54)	34	(15)	69	(31)	223
1990																				
Fall 1990	44	21	16	81		4	3	2	9			0	0	48	(53)	24	(27)	18	(20)	90
Spring 1991	98	16	11	125		1	0	0	1			0	0	99	(79)	16	(13)	11	(9)	126
Total	142	37	27	206	14	5	3	2	10			0	0	147	(68)	40	(19)	29	(13)	216
1991																				
Fall 1991	34	26	5	65		0	2	0	2			0	0	34	(51)	28	(42)	5	(7)	67
Spring 1992	103	29	21	153		1	0	0	1			0	0	104	(67)	29	(19)	21	(14)	154
Total	137	55	26	218	1	1	2	0	3			0	0	138	(62)	57	(26)	26	(12)	221
1992																				
Fall 1992	42	26	12	80		0	0	1	1			0	0	42	(52)	26	(32)	13	(16)	81
Spring 1993	116	18	8	142		0	0	1	1			0	0	116	(81)	18	(13)	9	(6)	143
Total	158	44	20	222	24	0	0	2	2			0	0	158	(70)	44	(20)	22	(12)	224
1993																				
Fall 1993	52	35	3	90		0	0	0	0			0	0	52	(58)	35	(39)	3	(3)	90
Spring 1994	114	19	2	135		0	0	0	0			0	0	114	(84)	19	(15)	2	(1)	135
Total	166	51	5	225	18	0	0	0	0			0	0	166	(74)	54	(24)	5	(2)	225

Table 1 continued

Regulatory year	Reported																	
	Hunter kill					Nonhunting kill[a]				Estimated kill		Total estimated kill						
	M	F	Unk	Total	Baited[b]	M	F	Unk	Total	Unrep	Illegal	M	(%)	F	(%)	Unk	(%)	Total
1994																		
Fall 1994	59	25	2	86		2	1	0	3	0	0	61	(69)	26	(29)	2	(2)	89
Spring 1995	118	29	2	149		0	0	0	0	0	0	118	(79)	29	(20)	2	(1)	149
Total	177	54	4	235	14	2	1	0	3	0	0	179	(75)	55	(23)	4	(1)	238
1995																		
Fall 1995	50	35	0	85		0	0	0	0	0	0	50	(59)	35	(41)	0	(0)	85
Spring 1996	138	27	0	165		1	0	0	1	0	0	139	(84)	27	(16)	0	(0)	166
Total	188	62	0	251	8	1	0	0	1	0	0	189	(75)	62	(25)	0	(0)	251
1996																		
Fall 1996	49	39	0	88		0	0	1	1	0	0	49	(23)	39	(18)	1	(1)	89
Spring 1997	106	20	0	126		1	0	0	1	0	0	107	(50)	20	(9)	0	(0)	127
Total	155	59	0	214	8	1	0	1	2	0	0	156	(72)	59	(27)	1	(1)	216
1997																		
Fall 1997	65	37	1	103		0	0	1	1	0	0	65	(62)	37	(36)	2	(2)	104
Spring 1998	154	35	1	190		0	0	0	0	0	0	154	(81)	35	(18)	1	(1)	190
Total	219	72	2	293	3	0	0	1	1	0	0	219	(75)	72	(24)	3	(1)	294
1998																		
Fall 1998	53	66	0	119		0	0	2	2	0	0	53	(44)	66	(55)	2	(1)	121
Spring 1999	170	26	1	197		0	0	0	0	0	0	170	(86)	26	(13)	1	(1)	197
Total	223	92	1	316	1	0	0	2	2	0	0	223	(70)	92	(29)	3	(1)	318
1999																		
Fall 1999	50	46	0	96		1	0	0	1	0	0	51	(16)	46	(14)	0	(0)	97
Spring 2000	196	31	1	228		0	1	0	1	0	0	196	(60)	32	(10)	1	(0)	229
Total	246	77	1	324	15	1	1	0	2	0	0	247	(76)	78	(24)	1	(0)	326
2000																		
Fall 2000	88	58	0	146		0	1	0	1	0	0	88	(60)	59	(40)	0	(0)	147
Spring 2001	195	40	0	235		3	0	1	4	0	0	198	(83)	40	(17)	1	(0)	239
Total	283	98	0	381	12	3	1	1	5	0	0	286	(74)	99	(26)	1	(0)	386

[a] Includes DLP kills, research mortalities, and other known human-caused mortality.
[b] Bears reported harvested over bait.

Table 2 Unit 2 black bear successful hunter residency, regulatory years 1980 through 2000

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Unknown[b] residency	(%)	Total
1980/1981	15	(18)	39	(45)	32	(37)	0	(0)	86
1981/1982	23	(22)	51	(49)	29	(28)	1	(1)	104
1982/1983	22	(22)	44	(44)	33	(33)	1	(1)	100
1983/1984	28	(23)	46	(38)	45	(38)	1	(1)	120
1984/1985	20	(22)	48	(53)	22	(25)	0	(0)	90
1985/1986	49	(28)	71	(41)	49	(28)	5	(3)	174
1986/1987	44	(29)	53	(34)	56	(36)	1	(1)	154
1987/1988	38	(25)	46	(30)	62	(40)	8[c]	(5)	154
1988/1989	33	(16)	47	(22)	123	(58)	8	(4)	211
1989/1990	39[b]	(18)	52[b]	(23)	127	(57)	5	(2)	223
1990/1991	46	(21)	71	(33)	89	(41)	10	(5)	216
1991/1992	40	(18)	72	(33)	106	(48)	3	(1)	221
1992/1993	24	(11)	73	(32)	125	(56)	2	(1)	224
1993/1994	35	(15)	58	(26)	132	(59)	0	(0)	225
1994/1995	29	(12)	55	(23)	151	(64)	3	(1)	238
1995/1996	62	(25)	45	(18)	143	(57)	1	(0)	251
1996/1997	35	(16)	40	(19)	139	(64)	2	(1)	216
1997/1998	46	(16)	38	(13)	209	(71)	1	(0)	294
1998/1999	35	(11)	55	(17)	226	(71)	2	(1)	318
1999/2000	26	(8)	44	(13)	254	(78)	2	(1)	326
2000/2001	29	(8)	53	(14)	299	(77)	5	(1)	386
Average	34	(18)	52	(30)	117	(51)	3	(1)	206

[a] Local hunters are those hunters that reside in Unit 2

[b] Includes DLP kills, research mortalities, and other known human-caused mortality.

[c] Six unknown and 2 DLPs.

Table 3 Unit 2 black bear harvest chronology by month[a], regulatory years 1980 through 2000

Regulatory	Harvest periods												
year	Sep	(%)	Oct	(%)	Nov	(%)	Apr	(%)	May	(%)	Jun	(%)	*n*
1980/1981	16	(19)	6	(7)	7	(8)	5	(6)	45	(53)	6	(7)	85
1981/1982	11	(11)	11	(10)	2	(2)	6[b]	(6)	64	(61)	10	(10)	104
1982/1983	18	(20)	11	(11)	5	(5)	8	(8)	37	(38)	18	(18)	97
1983/1984	15	(13)	4	(3)	5	(4)	7	(6)	76[b]	(63)	13	(11)	120
1984/1985	26	(29)	5	(6)	1	(1)	8	(9)	40	(44)	10	(11)	90
1985/1986	26[b]	(15)	17[b]	(10)	8	(5)	21	(12)	91	(53)	8	(5)	171
1986/1987	21	(14)	13	(9)	5	(3)	23	(15)	69	(45)	21	(14)	152
1987/1988	24	(15)	14	(9)	1	(1)	21	(14)	80[c]	(52)	14	(9)	154
1988/1989	72	(35)	21[b]	(10)	1	(1)	9	(4)	92[e]	(44)	13	(6)	208
1989/1990	55	(25)	14	(6)	2[b]	(1)	14[b]	(6)	115	(53)	19	(9)	219
1990/1991	63[c]	(30)	17[c]	(8)	7[c]	(3)	16	(8)	88[c]	(41)	22	(10)	213
1991/1992	38	(17)	17[b]	(8)	8	(4)	28	(13)	107[b]	(49)	19	(9)	217
1992/1993	56	(25)	23[b]	(10)	2	(1)	19	(8)	116[b]	(52)	8	(4)	224
1993/1994	67	(30)	14	(6)	9	(4)	15	(7)	94	(42)	26	(11)	225
1994/1995	62[b]	(26)	20	(8)	6[b]	(3)	12	(5)	119	(50)	18	(8)	237
1995/1996	67	(27)	12	(5)	5	(2)	16	(6)	137[b]	(55)	13	(5)	250
1996/1997	75	(35)	9	(4)	4	(2)	14	(7)	100	(46)	13[b]	(6)	215
1997/1998	82	(28)	21	(7)	0	(0)	30	(10)	152	(52)	9	(4)	294
1998/1999	96	(30)	22	(7)	2[c]	(1)	25	(8)	149	(47)	23	(7)	317
1999/2000	82	(25)	10	(3)	4	(1)	18	(6)	187	(58)	23[b]	(7)	324
2000/2001	129	(34)	17	(4)	0	(0)	27	(7)	176[c]	(46)	36[c]	(9)	385
Average	52	(24)	14	(7)	4	(2)	16	(8)	102	(50)	16	(9)	205

[a] Does not include bears killed during closed season
[b] Includes 1 DLP, or other known human caused mortality.
[c] Includes 2 DLPs, or other known human caused mortality.
[d] Includes 3 DLPs, or other known human caused mortality.
[e] Includes 4 DLPs, or other known human caused mortality.

Table 4 Unit 2 black bear harvest percent by transport method, regulatory years 1980 through 2000

Regulatory	Transport												
					Highway								
year	Air	(%)	Boat	(%)	vehicle	(%)	Walk	(%)	Other[a]	(%)	Unk[b]	(%)	*n*
1980/1981	13	(15)	16	(19)	23	(27)	0	(0)	31	(36)	3	(3)	86
1981/1982	24	(23)	19	(18)	19	(18)	7	(7)	34	(33)	1	(1)	104
1982/1983	13	(13)	26	(26)	36	(36)	4	(4)	17	(17)	4	(4)	100
1983/1984	35	(29)	35	(29)	33	(28)	0	(0)	14	(12)	3	(2)	120
1984/1985	16	(18)	39	(43)	26	(29)	1	(1)	8	(9)	0	(0)	90
1985/1986	26	(15)	39	(22)	80	(46)	5	(3)	11	(6)	13	(8)	174
1986/1987	16	(10)	53	(34)	73	(48)	0	(0)	3	(2)	9	(6)	154
1987/1988	14	(9)	39	(25)	99	(64)	0	(0)	0	(0)	2	(1)	154
1988/1989	30	(14)	68	(32)	102	(48)	0	(0)	3	(2)	8	(4)	211
1989/1990	18	(8)	70	(31)	118	(53)	0	(0)	6	(3)	11	(5)	223
1990/1991	7	(3)	69	(32)	118	(55)	0	(0)	12	(5)	10	(5)	216
1991/1992	11	(5)	64	(29)	126	(57)	5	(2)	5	(2)	10	(5)	221
1992/1993	18	(8)	59	(26)	135	(60)	10	(5)	0	(0)	2	(1)	224
1993/1994	15	(7)	63	(28)	124	(55)	23	(10)	0	(0)	0	(0)	225
1994/1995	13	(5)	53	(22)	159	(68)	10	(4)	0	(0)	3	(1)	238
1995/1996	19	(9)	69	(27)	134	(53)	27	(11)	1	(0)	1	(0)	251
1996/1997	11	(5)	56	(26)	114	(53)	32	(15)	1	(0)	2	(1)	216
1997/1998	19	(6)	82	(28)	170	(58)	22	(7)	0	(0)	1	(1)	294
1998/1999	8	(3)	98	(31)	175	(55)	33	(10)	0	(0)	4	(1)	318
1999/2000	13	(4)	107	(33)	196	(60)	8	(2)	0	(0)	2	(1)	326
2000/2001	13	(3)	146	(38)	197	(51)	21	(5)	4	(1)	5	(2)	386
Average	17	(10)	60	(29)	107	(49)	10	(4)	7	(6)	4	(2)	206

[a] Includes 3 or 4 wheelers or other ORV

[b] Includes DLP, or other known human caused mortality

Table 5 Unit 2 black bear hunter effort, mean skull size, and mean age, regulatory years 1980 through 2000

Regulatory year	Hunter effort			Mean skull size[a] (inches)				Average age (years)[b]			
	Total days	No. hunters	Mean days per hunter	Male	*n*[c]	Female	*n*	Male	*n*	Female	*n*
1980											
Fall 1980	92	30	3.1	18.8	15	17.2	10				
Spring 1981	190	55	3.5	18.7	40	16.7	7				
Total	282	85	3.3	18.7	55	16.9	17	----		-----	
1981											
Fall 1981	70	23	3.0	18.1	15	15.4	3				
Spring 1982	235	79	3.0	19.2	58	17.3	8				
Total	305	102	3.0	19.0	73	16.8	11	8.0	61	11.0	8
1982											
Fall 1982	76	34	2.2	18.2	16	17.4	13				
Spring 1983	224	64	3.5	19.7	44	16.8	10				
Total	300	98	3.1	19.3	60	17.1	23	7.2	56	9.4	19
1983											
Fall 1983	49	24	2.0	18.0	15	16.8	7				
Spring 1984	237	96	2.5	19.3	72	17.0	14				
Total	286	120	2.4	19.1	87	16.9	21	7.4	89	9.6	20
1984											
Fall 1984	76	32	2.4	18.5	15	16.4	9				
Spring 1985	190	58	3.3	19.7	42	16.6	9				
Total	266	90	3.0	19.3	57	16.5	18	7.5	55	8.7	19
1985											
Fall 1985	119	48	2.5	18.4	22	16.5	17				
Spring 1986	398	121	3.3	19.1	74	16.8	18				
Total	517	169	3.1	18.9	96	16.7	35	7.2	95	8.5	32
1986											
Fall 1986	131	40	3.3	17.7	17	16.4	6				
Spring 1987	349	114	3.1	19.6	19	16.4	7				
Total	480	154	3.1	19.3	36	16.4	13	8.1	104	6.9	20

Table 5 continued

Regulatory year	Hunter effort			Mean skull size[a] (inches)				Average age (years)[b]			
	Total days	No. hunters	Mean days per hunter	Male	*n*[c]	Female	*n*	Male	*n*	Female	*n*
1987											
Fall 1987	105	40	2.6	17.2	23	16.7	9				
Spring 1988	293	113	2.6	19.5	94	17.2	12				
Total	398	153	2.6	19.0	117	17.0	21	8.0	99	7.7	20
1988											
Fall 1988	328	92	3.6	18.0	57	16.9	26				
Spring 1989	414	114	3.6	19.4	70	16.7	18				
Total	742	206	3.6	18.8	127	16.8	44	58	7.8	8.4	10
1989											
Fall 1989	231	71	3.3	18.4	22	17.0	12				
Spring 1990	442	147	3.0	19.5	89	16.9	16				
Total	673	218	3.1	19.3	111	16.9	28	----		----	
1990											
Fall 1990	228	86	2.7	17.8	39	16.6	19				
Spring 1991	448	124	3.6	19.1	93	16.5	16				
Total	676	210	3.2	18.7	132	16.5	35	7.7	128	8.1	33
1991											
Fall 1991	184	67	2.7	18.1	31	16.8	25				
Spring 1992	653	154	4.2	19.4	103	17.0	28				
Total	837	221	3.8	19.1	134	16.9	53	7.6	132	8.2	56
1992											
Fall 1992	231	80	2.9	17.3	37	16.6	25				
Spring 1993	774	141	5.5	19.0	115	16.7	18				
Total	1005	221	4.5	18.6	152	16.6	43	7.1	153	8.4	42
1993											
Fall 1993	295	90	3.3	17.6	52	16.9	35				
Spring 1994	480	135	3.6	19.3	112	16.9	18				
Total	775	225	3.4	18.8	164	16.9	53	7.1	161	7.2	49

Table 5 continued

Regulatory year	Hunter effort			Mean skull size[a] (inches)				Average age (years)[b]			
	Total days	No. hunters	Mean days per hunter	Male	*n*[c]	Female	*n*	Male	*n*	Female	*n*
1994											
Fall 1994	223	85	2.6	18.2	60	16.8	24				
Spring 1995	601	149	4.0	19.2	112	17.3	27				
Total	824	234	3.5	18.9	172	17.1	51	7.1	177	8.4	55
1995											
Fall 1995	233	85	2.7	18.3	50	16.8	35				
Spring 1996	588	166	3.5	19.2	135	17.0	26				
Total	821	251	3.3	18.9	185	16.9	61	7.1	185	8.0	62
1996											
Fall 1996	355	88	4.0	17.2	48	16.8	38				
Spring 1997	543	127	4.3	19.5	102	16.6	19				
Total	898	215	4.2	18.8	150	16.7	57	6.9	154	8.7	57
1997											
Fall 1997	345	103	3.3	17.6	63	16.5	36				
Spring 1998	704	187	3.8	19.2	151	17.0	34				
Total	1049	290	3.6	18.8	214	16.8	70	6.5	215	8.2	71
1998											
Fall 1998	397	119	3.3	17.7	51	16.6	65				
Spring 1999	709	189	3.8	19.1	163	17.3	25				
Total	1106	308	3.6	18.8	214	16.8	90	7.1	215	7.8	89
1999											
Fall 1999	281	96	2.9	17.0	48	16.5	44				
Spring 2000	984	228	4.3	19.2	190	17.1	32				
Total	1265	324	3.9	18.7	238	16.7	76	6.6	237	7.2	71

Table 5 continued

Regulatory year	Hunter effort			Mean skull size[a] (inches)				Average age (years)[b]			
	Total days	No. hunters	Mean days per hunter	Male	*n*[c]	Female	*n*	Male	*n*	Female	*n*
2000											
Fall 2000	557	143	3.9	17.4	88	16.6	57				
Spring 2001	987	230	4.3	19.3	193	17.2	40				
Total	1544	373	4.1	18.7	281	16.8	97	6.5	276	8.8	94

[a] Skull sizes equal length plus zygomatic width.
[b] Bear ages not available for 1980–1981 and 1989–1990.
[c] *n* represents sample size.

Table 6 Unit 2 black bear harvest[a] from the most heavily harvested Wildlife Analysis Areas (WAA), regulatory years 1991 through 1999

WAA	Regulatory years									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1107	7	11	8	14	8	8	12	12	16	21
1210	6	6	8	8	7	6	10	20	15	11
1211	4	2	12	6	8	8	7	9	11	24
1213	2	7	2	2	7	1	6	6	7	13
1214	18	15	15	10	18	11	36	28	31	13
1315	18	12	15	6	14	16	17	22	16	16
1316	3	4	0	4	10	1	2	1	3	3
1317	14	20	14	17	23	13	17	25	29	33
1318	16	17	19	21	18	19	15	22	16	16
1319	17	14	13	14	15	14	15	19	23	30
1332	9	9	8	6	8	12	6	9	10	13
1420	16	20	18	22	14	18	21	26	30	21
1421	6	6	9	9	5	6	8	14	14	16
1422	23	25	25	38	36	33	37	28	40	63
1526	2	1	12	1	6	7	20	12	15	19
1527	2	7	7	8	5	5	21	13	15	15
1529	12	13	10	15	9	9	23	14	7	24
1530	23	17	13	25	19	7	9	12	6	8
1531	0	1	6	7	5	2	4	7	3	17

[a] Includes DLP kills, research mortalities, and other known human-caused mortality.

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BLACK BEAR MANAGEMENT REPORT

From: 1 July 1998
To: 30 June 2001

LOCATION

GAME MANAGEMENT UNIT: 3 (3,000 mi^2)

GEOGRAPHIC DESCRIPTION: Islands of the Petersburg, Kake, and Wrangell area.

BACKGROUND

HABITAT DESCRIPTION

Most high quality black bear habitat in Unit 3 is associated with low-elevation, old-growth forest with abundant and productive salmon streams. Small openings and disturbed areas, such as wetlands, avalanche chutes, clearcuts, and subalpine meadows are important black bear foraging areas. Black bear diets may range from mostly vegetarian to mostly carnivorous, and the species may subsist by scavenging or by predation on large and small mammals or fish. In Unit 1B, black bears primarily eat vegetation during early spring. Major foods include grasses and sedges, *Equisetum* spp., and berries, primarily *Vaccinium* sp., that persist through winter. Later in spring, black bears may be efficient predators of moose calves and/or Sitka black-tailed deer fawns. During summer and fall when bears accumulate fat reserves for winter hibernation, those bears with access to salmon streams eat large quantities of fish. Berries are also important during the summer and fall months. Poor fish runs or berry crops are thought to result in low cub production and survival the following spring.

We remain concerned about the extensive habitat changes occurring throughout the unit due to logging. ADF&G has estimated that of the 3,000 square miles of terrestrial habitat in Unit 3, about 1,500 square miles is forested. Over 129,000 acres of forested habitat in Unit 3 have been logged to date. As a result, timber harvest poses the most serious threat to black bear habitat in the unit over the long term. Black bears are able to exploit increases in forage in early-successional plant communities immediately after logging, and may temporarily benefit from clearcutting. However, this food source is lost approximately 20–25 years post-logging with canopy closure, and second-growth forests provide little bear habitat. Precommercial thinning and pruning of second growth stands can extend the short-term benefits to bears, but the long-term effects of logging will be detrimental. Large clearcuts on Mitkof, Wrangell, and northwest Kupreanof islands will diminish in value as bear habitat over the next few decades (Suring et al. 1988). The proliferation of roads associated with logging is also of concern as roads increase human access and make bears increasingly vulnerable to harvest.

HUMAN-USE HISTORY

Black bears are indigenous to Unit 3 and traditionally have been hunted for food and trophies. Information about black bears in the unit is limited to sealing records, anecdotal public reports, and staff observations. Although we lack quantitative demographic information on black bears in the unit we believe the population is stable.

Regulation History

Sealing of black bears was first required in 1973. Hunters are not required to obtain registration permits or harvest tickets prior to black bear hunting, so information on the effort of unsuccessful hunters has never been available.

For most years since statehood black bear hunting season extended from September 1 through June 30 and the bag limit for residents has been two bears annually, only one of which could be a blue or glacier bear. From 1980 through 1983 the season closed on 15 June and the resident bag limit was only one bear. Nonresident bag limits were the same as residents until 1990, when the nonresident bag limit was reduced from two bears to one bear per year. In 1982 it became legal to use bait to hunt black bears year round. In 1988 the Board of Game limited baiting in Southeast Alaska to April 15–June 15. From 1989 to 1997 the department issued an average of 3 bear baiting permits per year in the unit. The highest number of baiting permits issued was 12 in 1991. Hunting bears with dogs requires a permit issued by ADF&G. The use of dogs for black bear hunting has been allowed since 1966. No permit requests to hunt bears with dogs have been received for the unit. Since 1996 hunters have been required to salvage the edible meat of all black bears killed in Southeast Alaska from 1 January– 31 May.

Historical harvest patterns

Annual harvests remained relatively stable from 1973 to 1980, averaging 43 bears per year. The harvest began to increase in the early 1980's, rising from 81 bears in 1981, to 166 bears in 1992. By the early 1990's the unit had gained worldwide recognition for producing trophy-sized black bears, and in 1993 the harvest increased to 232 bears. By 1997 the annual harvest had increased nearly ten-fold since 1973 when 29 bears were killed. In the 1997/98 regulatory year the Unit 3 harvest was 244 bears, with 151 (62 %) of those taken on Kuiu Island.

Approximately 75–80% of the annual harvest occurs during the spring season. Since 1973 males have outnumbered females in the harvest about 4 to 1. Nonresident hunters have accounted for a growing percentage of the harvest in the past 10 years, growing from less than 50% in 1990 to 70% in 1997. Since 1992 the majority of black bears taken in the unit by nonresidents have come from Kuiu Island. Most nonresidents hunt without a guide in the unit. Nonresident hunters must purchase tags to affix to each bear harvested. The cost of these tags ($225 for nonresident citizens and $300 for nonresident aliens) may limit the number of nonresident hunters who hunt black bears.

As a result of increasing interest by nonresident hunters, the Unit 3 black bear harvest has grown at an annual rate of 7% since 1990. The increasing harvest by nonresident hunters, particularly on Kuiu Island, has given rise to concerns about the sustainability of current harvest levels.

Historical harvest locations

Kuiu Island accounts for 25% of the Unit 3 land area and produced about 53% of the total black bear harvest from 1990 to 1997. Kuiu Island male skull sizes are larger on average than those from any other area of the state except Prince of Wales Island in Unit 2. Kuiu Island has more salmon streams than other Unit 3 islands and may have better hunter access with more shoreline miles per square mile of area than other islands. Roads associated with logging also provide easy access to the north end of Kuiu where the highest harvest occurs. The percentage of successful hunters using motor vehicles on Kuiu has increased dramatically in recent years.

Kupreanof and Mitkof islands produced annual black bear harvests averaging 33% and 8% of the Unit 3 bear harvest, respectively, throughout the 1990s. These percentages correspond closely to the percentage of Unit 3 land area on each island, 36% and 7%, respectively. Both islands have several highly productive salmon streams, and extensive logging road networks which aid hunter access.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain an average spring skull size and an average annual male skull size of at least 18.5 inches.

- Maintain a male to female ratio of 3:1 in the harvest.

We have been using skull size as a management objective since the late 1980s because we believe that year-to-year trends in average skull size may indicate changes in population size and composition, and provide some measure of the sustainability of harvest levels. A decreasing average skull size may indicate a decline in that segment of the population comprised of large, older bears and could indicate an overall population decline. However, an increasing average skull size could also indicate a reduction in the proportion of younger bears in the population. Probably the most appropriate use of skull size data at this time is as an indicator of some change in the population or in hunter effort. We do not have a technique to tell us precisely what such a change might indicate, but use it in conjunction with other data to make our best assessment of the current population.

Age, genetics, and environmental factors such as habitat and forage quality all combine to influence black bear skull size. Sealing records and anecdotal evidence indicate that mature mainland black bears generally have smaller skull sizes compared to those found on Southeast Alaska islands. The skull size management objective of 18.5 inches was established in the late 1980s after analysis of previous years data showed this to be the long term average. We wanted to maintain skull size in the harvest at the long term high, and we have looked at any reduction in this mean as a possible indication of changes in the populations' age structure.

In January 2002 Region One management biologists met to evaluate existing management objectives for black bears. We anticipate that management objectives will change prior to the next report period.

METHODS

Hunters are required to submit bear skulls and hides for sealing within 30 days of the kill. State-appointed sealing agents and staff from the departments of Fish and Game and Public Safety sealed hides and skulls of black bears. Biological and hunt information collected included pelage color, sex, skull size (length and width), date and location of kill, number of days hunted, transportation method, and hunter use of commercial services including guide use. A premolar was collected from most bears and sent to Matson's Laboratory for age determination. We also sealed any bear killed under defense of life or property provisions (DLP), or any that died as road kill, illegal kill, or during research efforts. To estimate the Kuiu Island black bear population size, successful hunters were asked to submit a bone sample from bears harvested in 2000, allowing researchers to determine a tetracycline marked-to-unmarked ratio. During this report period tissue and hair samples were collected opportunistically from bears harvested in the unit for DNA and stable isotope analysis. Comparison of current and historical data indicates harvest trends and may offer indirect evidence of population trends. No effort data is collected from unsuccessful hunters.

KUIU ISLAND RESEARCH

In May 2000, ADF&G entered into a cooperative agreement with The University of Nevada initiating a pilot study to assess the feasibility of using tetracycline biomarking and non-invasive DNA sampling as means of estimating the black bear population on northern Kuiu Island. To obtain a preliminary population estimate, tetracycline baits were used to mark bears on the north portion of Kuiu in summer 2000. In June 2000, 188 tetracycline baits were set out north of the Bay of Pillars/Port Camden isthmus. Black bears consumed 138 baits, and adjusting for half-eaten baits, Ph.D. candidate Elizabeth Peacock estimated that 134 bears were marked. Double marking was estimated to be 9.09% (estimated from the prevalence of double marks in retrieved bones), resulting in 126 marked bears on Kuiu before the fall of 2000.

The genetic sampling component of the study was to determine whether collecting hair samples using barbed wire snares was feasible at bait stations and along bear trails on salmon streams. Barbed wire was fitted around bait boxes to collect a hair sample of the baited animal. DNA from the hair samples was extracted and amplified with Y-chromosome SRY gene primers (Taberlet *et al.* 1993); the ratio of female to male marked bears was determined to be 51:49. A total of 825 hair samples were collected from hair snares positioned along salmon streams in five independent watersheds. DNA will be extracted from these hair samples to obtain a genetic and sex identity of baited and free ranging bears.

Six of 28 (21.4%) bears harvested in fall 2000 from North Kuiu were marked. During the following spring hunt, 3 of 53 (5.6%) North Kuiu harvested bears were marked. In the spring 2001 sample, two additional marked bears were harvested south of study site. According to the ratio equation of Lincoln-Petersen, we can expand the model to estimate the number of bears on the entire island, by including marked and unmarked bears harvested south of the isthmus (D. Garshelis, pers. comm.). Using harvest data from the entire island for both hunting seasons, 11 of 166 harvested bears (6.6%) were marked. Preliminary density estimates based on these data range from 1.75 to 6.18 bears per mi^2 for northern Kuiu, and from .98 to 3.36 bears per mi^2 for the entire island.

Plans are underway to expand the tetracycline biomarking efforts in 2002 in an attempt to obtain an island-wide estimate of the Kuiu bear population with reduced bias and increased precision.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Information about Unit 3 black bears is limited to a Mitkof Island denning study (Erickson et al, 1982), a recently-initiated population estimation study on Kuiu Island (Peacock, 2001*a* and 2001*b*), harvest sealing records, anecdotal public reports, and observations by ADF&G staff.

Population estimates are not available for black bears in the unit. Information obtained during sealing cannot be used to measure population trends. Although harvest information gained from sealing records, such as average skull size, average age, and sex ratio may provide some indication of black bear population trends, in the absence of accompanying demographic data correlations between these measures and harvest sustainability will continue to elude us. Research is needed to identify population parameters so we might better assess population trends and harvest sustainability.

Population Size

Precise population estimates are not available for black bears in this unit. Information collected during sealing cannot be used to measure population trends. Except for the ongoing Kuiu Island study, no black bear population studies have been conducted in Unit 3. Estimates of population size or density are difficult to obtain, as the species generally inhabits forested areas and aerial surveys are impossible. Vast, remote areas in the unit also make studies difficult and expensive to undertake.

Past black bear density estimates for Unit 3 were based on studies in similar habitats in western Washington State in the 1960s (Poelker and Hartwell 1973). We believe minimum densities in most of Southeast Alaska are slightly higher than the 1.4 bears per mi^2 found in the Washington study area. Assuming a density of approximately 1.5 bears per mi^2 of forested habitat, ADF&G estimated 3,340 black bears in Unit 3 in 1990 based on an estimate of 2,220 forested mi^2. Since then, it has been necessary to revise forested acreage estimates downward. Bear density is probably not consistent throughout the forested areas of the unit. For instance, until recently black bears were unknown on Zarembo Island. Within the past 5 years a few resident bears have become established on Zarembo but numbers remain low. Bear densities are also relatively low on Etolin and other islands south of Sumner Strait. Density is much higher on Kuiu, Kupreanof, and Mitkof islands, which have more abundant and productive salmon streams.

Black bears with cinnamon pelage occur on a few islands in Unit 3. A relatively high proportion of bears taken from Mitkof, Wrangell, and Kuiu islands are cinnamon colored. Glacier bears are uncommon in the unit. Two records exist of glacier bears being harvested in the unit since 1973, both taken from Kuiu Island. We are aware of one anecdotal report of a glacier bear that was reportedly taken at Security Bay, Kuiu Island in the years prior 1973 when sealing began. No Kermody bears (those with white pelage) have been reported in the unit.

Population Composition

We lack quantitative information to estimate sex and age composition of the Unit 3 black bear population. The male to female ratio in the harvest may provide a better indicator of harvest sustainability and population status than average skull size. Considering their high reproductive potential, survival of breeding females is critical to sustained yield management. Prolonged overharvest of females will likely result in population declines. A decreasing trend in the male to female harvest ratio could signal a decline in that segment of the population comprised of older, larger males. Region I staff established the 3:1 male to female guideline in the late 1980s, based on work done on black bears elsewhere.

Distribution and Movements

Quantitative information about home ranges and movement patterns of Unit 3 black bears is not available. The only quantitative information on black bear movement patterns in Southeast comes from a single denning study conducted on Mitkof Island during 1980–1981 (Erickson et al. 1982). Black bear movement patterns are influenced to a large degree by seasonal changes and annual differences in the occurrence, abundance, and quality of preferred food items. Reproductive activities also influence bear movement patterns, particularly for males. As a result males typically have larger home ranges than females.

Black bears typically emerge from winter dens in March and April. Following emergence from dens, bears typically occupy low elevation habitats where they feed on greening vegetation. As spring proceeds into summer, bears typically disperse throughout forested and alpine habitats where they continue to feed on grasses, sedges, forbs, and berry producing shrubs. In the late summer and early fall, bears typically congregate near anadromous fish streams where they feed on spawning salmon. As fish runs decline in the late summer and fall, bears disperse from salmon streams and feed primarily on berries and alpine vegetation before denning again in October and November.

MORTALITY

Harvest

Season	Bag Limit
Sept. 1–June 30	Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear.
Sept. 1–June 30	Nonresident hunters: 1 bear.

Game Board Action and Emergency Orders. In fall 2000, due to concerns over the steadily increasing harvest of black bears by nonresident hunters, the Board of Game established a harvest guideline of 120 bears per year for nonresident hunters on Kuiu Island. In order that ADF&G might track the harvest in a more timely fashion the Board also implemented two additional regulatory changes, a 5-day notification of kill requirement and a 14-day sealing requirement for black bears taken by nonresidents on Kuiu.

Hunter Harvest. Unit 3 hunter harvest ranged from 287 to 309 bears annually during this report period (Table 1). The 309 bears killed in 2000/01 represents the highest annual harvest ever recorded.

The Unit 3 black bear harvest increased at a rate of 7% annually from 1990 to 2000. The Kuiu Island harvest increased more rapidly, at 9% annually, during the same period. Males made up 83%, 78%, and 81% of the Unit 3 harvest in 1998, 1999, and 2000, respectively. During this report period the average male skull size ranged from 18.5 inches to 18.6 inches (Table 2). The male to female ratio during this report period was 4:1 – above the management objective of 3:1.

Hunter Residency and Success. Although the percentage varies annually, from 1998–2000 nonresidents took approximately 75%, nonlocal Alaskans about 13%, and local residents about 10% of the bears harvested in the unit (Table 7).

Harvest Chronology. During this report period 75–79% of the overall harvest occurred during the spring season with 49–50% of all bears killed in May (Table 8).

Harvest in Particular Areas. Harvest occurred in 20 individual Unit 3 Wildlife Analysis Areas (WAAs) during this report period. Of the 885 bears harvested, over 55% were taken from 6 WAAs on Kuiu Island. WAA 5012, on northern Kuiu Island, alone accounted for 24% of the total unit-wide harvest.

Bait Stations. A total of 10 bear baiting permits were issued during this report period including 3, 3, and 4 respectively, in 1998, 1999, and 2000.

Hunting with Dogs. No permits were requested to hunt bears with dogs during this report period. However, in spring 2001 a special permit was issued to a registered big game guide interested in experimenting with the use of a dog to track and aid in the recovery of black bears wounded by clients. Although the dog failed to locate 3 bears that were struck and lost, the guide anticipates that there will be a necessary training period for the tracking dog. Information obtained as a result of a stipulated reporting requirement provided the only tangible information on wounding loss currently available in the region.

Guided Hunter Harvest. Harvest by guided nonresident hunters has increased slightly as a percentage of the overall harvest during the past 5 years. Guided nonresidents accounted for 34%, 31%, and 33% of the harvest in 1998, 1999, and 2000, respectively.

Transport Methods. Hunter transportation is primarily by boat and highway vehicle (Table 9). Although the unit-wide percentage of hunters using highway vehicles increased only slightly during this report period, the percentage of Kuiu Island hunters using vehicles has increased at a rate of 214% annually since 1995. This increase is primarily attributable to a single transporter who provides highway vehicles to his clients on the Kuiu road system. There has also been an increase in the number of guides using motorized vehicles to transport bear hunters on Kuiu. The highest percentage of highway vehicle use on Kuiu occurred in 1999 when 37% of successful hunters used highway vehicles to hunt bears.

Other Mortality

There was no confirmed illegal harvest during the report period, although unconfirmed reports were received of bears being shot and left in the field by individuals believing that bears are detrimental to deer populations. In spring 2001, Fish and Wildlife Protection reported the discovery of 2 black bear carcasses on Wrangell Island but the circumstances surrounding these mortalities could not be determined.

While possibly significant, little information is currently available on the amount of wounding loss that is occurring in the unit. One registered guide reported that despite the use of heavy caliber rifles and backup shots by professional guides, his clients had failed to recover 3 (23%) of 13 black bears struck in 2001. It is reasonable to assume that wounding loss rates for nonguided hunters are considerably higher than for guided hunters.

HABITAT ASSESSMENT

Assessment

Timber harvest continues to pose the most serious threat to black bear habitat in the unit. Post logging increases in berry production, primarily *Vaccinium* sp., may contribute to short-term bear population growth. This forage source will be lost as the canopy closes, as will habitat diversity associated with old-growth forests, accompanied by a loss of denning trees. Roads associated with logging increases human access and can make bears increasingly vulnerable to harvest. The long-term effects of logging will be detrimental to black bears.

During this report period timber harvest occurred on Kuiu, Kupreanof, Mitkof, Etolin, Deer, and Wrangell islands. Timber harvest is planned or already scheduled for additional sale areas on Kupreanof, Kuiu, Mitkof, Zarembo, Woronkofski, and Wrangell islands.

Enhancement

No habitat enhancement projects specifically intended to benefit black bears have been attempted in the unit. Although primarily intended as a silvicultural practice, precommercial thinning and pruning has been performed in some young second growth stands in unit. While not the primary intent, this effort does provide a secondary benefit to wildlife by improving and extending habitat suitability in the short-term by reducing canopy cover which permits sunlight to reach the forest floor and increase the production of understory forage plants. These benefits are relatively short-lived, approximately 20–25 years, after which time canopy closure again results in loss of understudy vegetation. The long-term effects of clearcut logging will be detrimental to black bear populations.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Nuisance Bear Problems. Black bears in close proximity to human settlements quickly learn to seek out human-related food sources, including livestock, pet food, and improperly secured garbage. During this report period there were 24 documented instances of black bears being killed in the unit under defense of life and property (DLP) regulations. These included 12, 7, and 5 bears killed during 1998, 1999, and 2000, respectively. Twenty-three of these DLP's occurred in Petersburg and 1 occurred in Wrangell. The majority of documented DLP's occurred during

late summer and early fall, when bears are drawn into communities as a result of improper waste management and the declining availability of natural food sources.

It is likely that additional DLP's in Wrangell and Kake went unreported. In 1998 ADF&G and the Petersburg Police Department (PPD) entered into a cooperative Black Bear Response Program. Under the terms of this agreement, PPD must report any bears destroyed due to public safety concerns. In the absence of similar agreements between ADF&G and the City of Wrangell and the Village of Kake, DLP's in these communities have a higher likelihood of going unreported. For example, in summer 2000 we received reports of carcasses or remains of 7 bears at the Kake landfill. While it is unclear if these mortalities were the result of DLP's or other legal or illegal harvests, the presence of unsealed skulls and hides with carcasses suggests that some of these mortalities were not the result of legal harvests.

CONCLUSIONS AND RECOMMENDATIONS

The Unit 3 black bear harvest increased at a rate of 7% annually from 1990 to 2000. The unit wide harvest of 309 bears in 2000 was the highest ever documented. The Kuiu Island harvest increased at a rate of 9% annually between 1990 and 2000. The Kuiu Island harvest of 168 bears in 1999 was the highest ever documented. In fall 2000, due to concerns over the steadily increasing harvest of black bears by nonresident hunters, the Board of Game established a nonresident harvest guideline of 120 bears per year on Kuiu Island. In 2001 the new harvest guideline resulted in the emergency closure of the entire fall nonresident season on the island. Similar nonresident fall season closures on Kuiu are expected in the future. In anticipation of future closures, guides and transporters are expected to take clients elsewhere. Nonguided nonresident bear hunters will also be forced to seek other areas in which to hunt. An associated increase in harvest is expected on Kupreanof Island and the Unit 1B mainland and will be monitored closely.

In order to ensure that the bear population is managed on a sustained yield basis, research is needed to estimate the black bear population in the unit. Research is also needed to identify possible correlations between sealing data and population trends. Based on the success of a pilot study, plans are currently underway to expand the tetracycline biomarking efforts in order to obtain an island-wide estimate of the Kuiu Island bear population. A better understanding of the short and long-term impacts of clearcut logging on black bear populations is needed. Some estimate of black bear mortality as a result of wounding loss is needed.

In the wake of steadily increasing harvest by both resident and nonresident hunters, ensuring that black bear populations are managed within sustainable harvest limits will remain a formidable challenge for wildlife managers. Although the Unit 3 black bear harvest continued to increase, the percentage of males in the harvest and average male skull size were slightly above the management objectives during this 3-year period, indicating no obvious changes to black bear populations in the unit. No management or regulatory changes are recommended at this time.

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Table 1 Unit 3 black bear harvest, 1993–2000

	Hunter kill						Non-hunting kill[a]			Total estimated kill					
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	M	(%)	F	(%)	Unk.	Total
Fall 93	23	17	53	2	42	NA	3	0	0	26	58	17	38	2	45
Spring 94	156	33	18	0	189	0	1	0	0	157	83	33	17	0	190
Total	179	50	24	2	231	0	4	0	0	183	78	50	21	2	235
Fall 94	19	13	41	0	32	NA	3	0	0	22	63	13	37	0	35
Spring 95	153	30	16	0	183	1	1	0	0	150	83	30	17	0	180
Total	168	43	20	0	215	1	4	0	0	176	80	43	20	0	219
Fall 95	33	13	28	0	46	NA	0	1	0	33	70	14	30	0	47
Spring 96	153	34	18	0	187	0	2	0	0	155	82	34	38	0	189
Total	186	47	20	0	233	0	2	1	0	188	80	48	20	0	236
Fall 96	33	24	42	0	57	NA	0	0	0	33	58	24	42	0	57
Spring 97	150	26	15	0	176	0	0	0	0	150	85	26	15	0	176
Total	183	50	21	0	233	0	0	0	0	183	79	50	21	0	233
Fall 97	41	21	34	0	62	NA	0	0	0	41	66	21	34	0	62
Spring 98	157	25	14	0	182	0	0	0	0	157	86	25	14	0	182
Total	187	46	19	0	244	0	0	0	0	198	81	46	19	0	244
Fall 98	52	21	29	0	73	NA	6	6	0	58	68	27	31	0	85
Spring 99	190	28	13	1	219	1	0	0	0	190	87	28	13	1	219
Total	242	49	17		292	1	6	6	0	248	82	55	18	1	304
Fall 99	29	31	52	0	60	NA	0	4	3	29	43	35	52	3	67
Spring 00	195	32	14	0	227	2	0	0	0	195	86	32	14	0	227
Total	224	63	22		287	2	0	4	3	224	76	67	23	3	294
Fall 00	47	24	33	0	71	NA	1	2	2	48	63	26	34	2	76
Spring 01	203	35	15	0	238	2	0	0	0	203	85	35	15	0	238
Total	250	59	19	0	309	2	1	2	2	251	80	61	19	2	314

[a] Includes defense of life or property kills, research mortalities, and other known human-caused accidental mortality.

Table 2 Unit 3 harvested black bear mean skull size[a], 1990–2000

Regulatory year	Males	*n*	Females	*n*
1990–1991	18.5	129	16.0	19
1991–1992	18.3	121	16.4	33
1992–1993	18.5	119	16.5	33
1993–1994	18.7	172	16.5	47
1994–1995	18.6	166	16.6	39
1995–1996	18.3	182	16.5	45
1996–1997	18.2	179	16.5	48
1997–1998	18.3	192	16.5	45
1998–1999	18.6	232	16.6	48
1999–2000	18.5	216	16.7	60
2000–2001	18.5	249	16.9	58

[a] Skull size = total length + zygomatic width in inches.

Table 3 Unit 3 harvested black bear mean age, 1990–2000

Regulatory year	Males	*n*	Females	*N*
1990–1991	7.5	100	5.3	8
1991–1992	7.3	108	7.8	33
1992–1993	8.4	117	9.4	35
1993–1994	7.6	173	8.5	51
1994–1995	8.0	169	8.5	43
1995–1996	7.2	179	9.7	46
1996–1997	7.2	180	8.2	49
1997–1998	6.8	181	8.5	42
1998–1999	7.3	222	8.5	46
1999–2000	7.4	217	9.4	59
2000–2001	7.2	245	9.3	58

Table 4 Unit 3 harvested black bear mean days hunted per successful hunter, 1990–2000

Regulatory year	Total days	Total hunters	Average days hunted
1990–1991	559	157	3.6
1991–1992	686	160	4.3
1992–1993	525	164	3.2
1993–1994	863	231	3.7
1994–1995	699	215	3.3
1995–1996	682	231	3.0
1996–1997	663	233	2.8
1997–1998	720	242	3.0
1998–1999	892	292	3.1
1999–2000	871	282	3.1
2000–2001	930	309	3.0

Totals do not include DLP.

Table 5 Unit 3 black bear hunter harvest by island and density, 1990–2000

	Kupreanof 1,090 mi^2				**Kuiu** 746 mi^2				**Mitkof** 211 mi^2			
			Average mi^2/ bear kill				Average mi^2/ bear kill				Average mi^2/ bear kill	
Regulatory year	Kill	Percent of Unit 3	Male	Female	Kill	Percent of Unit 3	Male	Female	Kill	Percent of Unit 3	Male	Female
1990	55	35	22	363	78	50	12	53	13	8	19	106
1991	51	32	25	156	74	47	13	44	17	11	18	42
1992	53	31	27	109	88	51	11	39	17	10	23	23
1993	81	34	16	91	120	51	8	25	22	9	13	35
1994	78	34	14	91	114	52	8	31	20	9	16	30
1995	91	39	16	50	124	53	7	36	9	4	35	70
1996	71	30	19	78	129	55	8	25	20	9	14	42
1997	74	30	18	73	151	62	6	26	8	3	30	211
1998	107	37	12	78	161	55	6	25	11	4	26	70
1999	104	38	13	52	168	59	6	19	5	2	42	No females
2000	124	40	11	40	166	54	5	25	10	3	26	106

Table 6 Unit 3 black bear mean male skull size[a] and percent of harvest by major island and season, 1992–2000

		1992				1993				1994			
Island	Season	No. males	(%)	Average	n	No. males	(%)	Average	*n*	No. males	(%)	Average	*n*
Kupreanof	Fall	7	64	17.6	7	7	58	18.6	7	7	64	19.2	7
	Spring	33	79	18.6	33	54	89	18.6	52	59	84	18.5	56
	Total	40	75	18.4	40	61	84	18.6	59	66	85	18.6	63
Kuiu	Fall	17	65	18.1	17	13	52	19.3	12	8	57	18.4	8
	Spring	50	81	19.1	47	72	78	18.8	71	82	82	18.8	78
	Total	67	76	18.8	64	85	73	18.9	83	90	79	18.7	86
Mitkof	Fall	5	56	15.4	5	2	40	16.1	1	5	63	16.9	5
	Spring	4	50	16.1	3	11	79	18.6	11	8	67	19.1	6
	Total	9	53	15.7	8	13	68	18.4	12	13	65	18.1	11
Kupreanof	Fall	13	76	17.6	12	12	60	15.5	12	4	40	17.7	4
	Spring	56	76	18.3	54	45	88	18.4	45	55	85	18.6	54
	Total	69	76	18.1	67	57	80	17.8	57	59	79	18.5	58
Kuiu	Fall	16	70	19.0	16	15	56	17.7	15	32	69	17.9	31
	Spring	87	86	18.3	96	84	82	18.6	82	90	85	18.3	88
	Total	103	83	18.4	112	99	77	18.5	97	122	80	18.2	119

		1998				1999				2000			
Island	Season	No. males	(%)	Average	n	No. males	(%)	Average	*n*	No. males	(%)	Average	*n*
Mitkof	Fall	1	33	18.3	2	4	57	16.7	4	3	100	17.7	2
	Spring	5	83	18.6	5	11	85	18.5	9	4	80	17.4	3
	Total	6	67	18.5	7	15	75	17.9	13	7	87	17.5	5
Kupreanof	Fall	21	70	18.1	20	5	45	17.8	5	16	59	18.1	15
	Spring	72	94	18.9	69	78	84	18.5	77	81	84	18.9	81
	Total	93	87	18.7	89	83	80	18.4	82	97	78	18.7	96
Kuiu	Fall	24	69	18.4	22	22	49	18.2	21	28	70	18.0	28
	Spring	107	85	18.4	104	107	87	18.7	103	108	86	18.6	108
	Total	131	81	18.4	126	129	77	18.6	124	136	82	18.5	136
Mitkof	Fall	5	100	20.3	4	1	100	NA	0	2	67	15.1	2
	Spring	3	50	19.2	3	4	100	18.6	4	6	86	17.2	6
	Total	8	73	19.8	7	5	100	18.6	4	8	80	16.7	8

[a]Skull size = total length + zygomatic width.

Table 7 Unit 3 black bear successful hunter residency, 1990–2000

Regulatory year	Local resident[a]	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
1990–1991	34	22	47	30	76	48	157
1991–1992	33	21	29	18	97	61	159
1992–1993	36	22	27	16	101	62	164
1993–1994	27	12	75	32	129	56	231
1994–1995	33	15	61	28	121	57	215
1995–1996	34	14	51	22	151	64	236
1996–1997	41	18	38	16	154	66	233
1997–1998	31	13	41	17	172	70	244
1998–1999	45	15	41	14	206	71	292
1999–2000	18	6	38	13	213	81	287
2000–2001	27	8	36	12	246	80	309

[a]Local residents are those that reside in Petersburg, Wrangell, or Kake.

Table 8 Unit 3 black bear harvest chronology by percent, 1990–2000

Regulatory year	Month									
	September	October	November	December	March	April	May	June	July	*n*
1990–1991	11	4	0	0	0	26	48	11	0	157
1991–1992	23	4	0	1	0	14	48	9	0	159
1992–1993	25	4	0	1	0	11	53	5	1	171
1993–1994	15	3	0	0	0	18	47	17	0	235
1994–1995	10	4	0	1	0	11	57	20	1	219
1995–1996	17	2	0	0	0	10	57	13	1	236
1996–1997	22	1	1	0	0	9	57	10	0	233
1997–1998	22	3	1	0	1	14	49	10	0	244
1998–1999	22	3	1	0	0	10	49	15	0	292
1999–2000	19	2	0	0	1	9	50	19	0	287
2000–2001	20	3	0	0	0	16	49	12	0	309

Table 9 Unit 3 black bear harvest, in percent by transport method, 1990–2000

Regulatory year	Airplane	Boat	3-4 wheeler	Snow machine	Off-road vehicle	Highway vehicle	Foot	Unknown	*n*
1990–1991	12	71	2	0	1	12	1	1	157
1991–1992	9	70	1	0	1	16	1	0	159
1992–1993	6	74	0	0	0	13	3	4	172
1993–1994	11	66	0	0	0	18	3	1	235
1994–1995	4	72	1	0	0	23	3	1	219
1995–1996	5	78	0	0	<1	15	<1	1	236
1996–1997	7	81	0	0	0	11	1	0	233
1997–1998	7	79	1	0	0	11	2	0	244
1998–1999	8	72	1	0	0	17	2	0	292
1999–2000	2	71	0	0	0	27	0	0	287
2000–2001	3	75	0	0	0	20	2	0	309

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BLACK BEAR MANAGEMENT REPORT

From: 1 July 1998
To: 30 June 2001

LOCATION

GAME MANAGEMENT UNIT: 5 5,800 Square Miles

GEOGRAPHICAL DESCRIPTION: Cape Fairweather to Icy Bay, Eastern Gulf Coast.

BACKGROUND

Within Game Management Unit 5, black bears are found almost exclusively in Unit 5A. Unit 5B, dominated by the Malaspina Glacier, has accounted for only a few harvested black bears since sealing records have been kept; all have been reported from the head of Disenchantment Bay, at the junction of the 2 subunits. "Glacier" (gray pelage color variant) bears occur more frequently in Unit 5 than in other management units and there are usually several harvested each year. The opportunity to harvest one of these unusual bears attracts hunters not only from other parts of Alaska, but also from throughout the world.

HABITAT DESCRIPTION

The entire Yakutat Forelands between the coast and the ice fields is potentially good black bear habitat. The forelands contains a variety of habitats including: open sedge meadows, willow flats, mixed stands of spruce and cottonwood, thick stands of spruce and hemlock, riparian stream corridors, beach fringes, and mountainous regions. These habitats contain vegetative forages such as grasses, sedges, devils club, skunk cabbage, cow parsnip, blueberries, salmon berries, strawberries, and cranberries, to name a few. In addition, the forelands are rich in salmon, including sockeye, chum, pink, Chinook, and coho. Streams containing salmon are distributed throughout the forelands and bears have widespread access to fish. There are also eulachon (*Thaleichtys pacificus*) present in some streams during the early spring. Calf moose might provide additional feeding opportunities in the spring, as the forelands harbor an estimated 600–800 moose. In spite of this apparently productive habitat for black bears, they are common only near the mountainous regions due to the presence of numerous brown bears in the remainder of the area. We estimate there are approximately 522 brown bears in Unit 5A (based on a habitat capability model), and they likely displace black bears from lower elevations. Probably the biggest testament to the scarcity of black bears in the non-mountainous regions of the Yakutat Forelands is the near absence of black bears taken during the moose-hunting season. Generally there are moose hunters scattered throughout the forelands, but seldom is a bear harvested.

Habitat alterations and concerns are mostly in the form of successional changes of logged areas. There are nine townships of land near the town of Yakutat that have been largely logged by clearcutting. These areas are presently in a productive stage for bears in that they contain abundant berry bushes as well as other forage. Although these early successional stages (3–20 years post logging) provide black bears with an abundance of forage, later stages result in the disappearance of understory forage species as conifer canopies close and light does not penetrate to the forest floor.

HUMAN USE HISTORY

Black bears have long been hunted in Unit 5. Statewide black bear sealing began in 1973. Hunters have not needed hunting permits, thus information on the effort of unsuccessful hunters has never been available. We have information only for successful hunts.

Regulatory history

Since statehood, black bear hunting season has extended from September 1 through June 30 and the bag limit for residents has been two bears annually, only one of which can be a blue or glacier bear. Nonresident bag limits were the same as residents until 1990, when the nonresident limit was reduced to one bear per year. Use of dogs for hunting black bears has been allowed since 1966. Hunting with dogs requires a permit issued by ADF&G. No permits to hunt with dogs have been applied for in Unit 5. Since 1996, hunters have had to salvage the edible meat of any black bears they kill in Southeast Alaska during the period January 1–May 31.

Historical harvest patterns

Black bear harvest averaged 14 bears per year during the 1970s. During the 1980s, the average annual harvest increased to 24 bears. The highest harvest occurred in 1985 when hunters took 39 bears. That year was the first that subsistence moose hunting regulations were in place and nonresidents, and many nonlocal residents, were prohibited from hunting moose. It may be that many nonlocals chose to hunt black bear rather than abandon their Yakutat area hunting trip entirely. Moose regulations in subsequent years reinstated a nonresident general season.

Annual harvests remained at about 24 black bears through the late 1980s then rose to 33 and 32 bears in 1990 and 1991, respectively; we have no explanation for this spike in harvest. Subsequent annual harvest through 1997 averaged only 14 bears. More glacier bears are taken in the Unit 5 harvest, an average of 2–3 a year, than from other areas of Southeast Alaska. The harvest of glacier bears was 13% of all black bears killed by hunters during 1971–1989, and 17% of bears killed during 1990–1997.

The spring season has accounted for 92% of the Unit 5 harvest, which has been made up of 77% males since 1971. The percentage of males in the harvest increases to 82% if only the years 1990–1998 are considered. Nonresidents have taken 65% of Unit 5 black bears since 1971 and 68% of the harvest from 1990–1998. Aircraft and boats are the 2 predominant means of transport for Unit 5 black bear hunters, regularly accounting for over 90% of reported hunts.

Historical harvest locations

There have been no changes in the primary locations where black bears have been killed in Unit 5.

MANAGEMENT DIRECTION

Management Objectives

- Maintain a 3:1 male-to-female ratio in the harvest.
- Maintain a mean annual male skull size (length plus width) of at least 17.0 inches.

METHODS

Staff members of the Departments of Fish and Game and Public Safety sealed black bear hides and skulls. Biological and hunt information collected at the time of sealing included pelage color, sex, skull size (length plus width), date and location of kill, transportation method, and the type of any commercial services used. A premolar was collected from most bears and sent to Matson's Laboratory for age determination. Anecdotal information about conditions in the field was gathered at the same time. Tissue samples were collected from a sample of bears during the first year of the report period and sent to the University of Alaska Fairbanks for DNA analysis.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population information is not available for Unit 5 black bears, and because only data from successful hunters are available (Tables 1 and 2), effort information is incomplete. Harvest increased by nearly 50% over the level of the previous reporting period (Table 3), and was similar to the harvest levels that occurred throughout the 1980's. Mean total skull size for male bears was well above the previous 3-year mean, and met the management goal of at least 17.0 inches in all three years. A 3:1 male to female harvest ratio continued to be maintained, with greater than 93% males in the harvest during the report period. The mean age of male and female bears was 7.6 and 9.3 years, respectively, either equal to or greater than the previous report period.

Population size

No Unit 5 black bear population studies have been conducted. Population size or density estimates are difficult to obtain. The species generally inhabits forested areas, where aerial surveys are impractical, and vast remote areas also make studies difficult and expensive. Density estimates for Unit 5 are based on studies conducted in similar habitats in western Washington State in the 1960s (Poelker and Hartwell 1973). We believe minimum densities in mainland Southeast Alaska are slightly higher than the 1.4 bears per mi^2 found in the Washington study area. This equates to about 600 black bears in Unit 5A. Although this density is used in Unit 1C, it likely overestimates the number of Unit 5 black bears due to their displacement from some habitats by brown bears.

Population composition

Our management objective of a 3:1 male to female harvest ratio is aimed at assuring a minimal harvest of female bears. We lack reliable information on the composition of the bear population, but use the indirect index of the harvest sex ratio for insight into the availability of male bears in the population. On a very gross scale, if the female harvest increases, we interpret that as an indication of fewer large male bears available to hunters. Based on the nearly 100% male harvest during this report period, it appears that there is no shortage of male bears in the population.

Glacier bears occur more frequently in Unit 5 than in other management units and are regularly harvested in small numbers. No cinnamon or Kermody (white) pelage black bears have been reported in Unit 5.

Distribution and movements

Our most reliable information on Unit 5 black bear distribution comes from hunter harvest. Unit 5B has few black bears, while Unit 5A has black bears distributed throughout. Unlike Unit 1C, brown bears are also abundant throughout the 5A, and displace black bears from many of non-mountainous locales. Because of this displacement, most of the black bear harvest and observations are either along the coast or in foothills and mountainous areas within the subunit.

One non-natural factor that may affect the Unit 5 black bear distribution is the presence of an open landfill at the city of Yakutat. Black bears have occasionally been seen foraging at the landfill, and some harvest occurs in nearby areas.

MORTALITY

HARVEST

Season	Bag Limits
Sept. 1–June 30	Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear.
Sept. 1–June 30	Nonresident hunters: 1 bear.

Game Board Actions and Emergency Orders. There were no emergency orders issued relating to black bears in Unit 5 during this report period.

Hunter Effort and Harvest. Black bear harvests ranged from 16 to 24 from 1998 to 2000, averaging 19.3 per regulatory year (Table 3), an increase of nearly 6 bears annually over the previous report period. More males were harvested than females, exceeding a 3:1 male-to-female ratio in all years. Six bears, or approximately 10% of the harvest during this reporting period, were glacier bears (Table 3).

Effort expended by successful hunters per bear killed was 4.7 days compared to 4.3 for the previous report period. This increased effort is largely due to more Yakutat and other Alaska residents participating in the hunt (Table 1). Although baiting is a legal method of pursuing black

bears during the spring season in Unit 5, our records indicate that there is very little interest in using this method.

Hunter Residency and Success. Nonresidents continue to take the majority of Unit 5 black bears. During the report period, the percentage of successful black bear hunters that were nonresidents was 62%, compared to 71% from 1995–1997 (Table 1). Alaskans residing outside of Unit 5 harvested 22%, and Unit 5 residents harvested 16% of the bears taken.

Harvest Chronology. Historically most Unit 5 black bears have been harvested during the spring. This trend continued throughout this report period, with only 1 of the 58 bears harvested taken during a fall season. The reason for the concentrated spring harvest has to do with black bear accessibility. In spring black bears forage along beaches that hunters can access by boat, allowing them to effectively hunt large areas fairly easily. In the fall, however, bears are much harder to locate and access because they are foraging either on fish streams bordered by dense vegetation, or in mountainous terrain that is difficult to access.

Harvest in Particular Areas (WAAs). No changes stand out in analysis of the harvest distribution. Since 1990 (Table 4) the area between the Dangerous and Alsek rivers has produced 43% of the kill, and the Puget Peninsula abutting Yakutat Bay has accounted for another 27%.

Bait Stations. Although baiting is legal during the Unit 5 spring season, we did not issue any permits for this type of hunt.

Guided Hunter Harvest. Guided hunters accounted for 31 of 58 bears harvested, or 53% of the total during the report period.

Transport Methods and Commercial Services Used. Aircraft and boats continue to be the two predominant transport means for Unit 5 black bear hunters (Table 1). Aircraft was the primary means of transportation on 36% of reported hunts and boats were used on 51 percent. Commercial services were used by 37 (63%) of the 58 hunters, with 31 of these using a commercial guide, and five others using only transportation to the field. Twenty-seven of the 31 nonresidents hired a guide, and surprisingly, 4 residents hired a guide. This may be due to the attraction of glacier bears, and the advantages provided by a guide with local knowledge (Table 2).

Other mortality

We do not have records of any DLP kills, road kills, or illegal kills during the period.

HABITAT

Assessment

Habitat alterations and concerns are mostly in the form of successional changes of logged areas. Future logging on Forest Service lands is likely to be confined to the area at the southern end of Russell Fjord. Most private land in the Yakutat area has already been logged.

Enhancement

No habitat enhancement projects intended to benefit black bears have been attempted in the unit. Although primarily intended as a silvicultural practice, precommercial thinning and pruning has been performed in some young second growth stands in Unit 5. While not the primary intent, this effort does provide a secondary benefit to wildlife by improving and extending habitat suitability in the short-term by reducing canopy cover which permits sunlight to reach the forest floor and increase the production of understory forage plants. These benefits are last only 20–25 years, after which time canopy closure again results in loss of understudy vegetation. The long-term effects of clearcut logging will be detrimental to black bear populations.

NONREGULATORY MANAGEMENT PROBLEMS

In small communities, fish camps, and remote areas it is unusual to receive nuisance bear complaints because such issues are often dealt with locally without ADF&G being alerted. We do not believe that we have a significant issue with illegal harvest in Unit 5, except for the situations associated with the Yakutat landfill.

CONCLUSIONS AND RECOMMENDATIONS

The management objective of maintaining a 3:1 male to female harvest ratio was achieved in all years of this report period. Our objective for male skull size was also met in each of the 3 years of the report period. The mean age of harvested bears remained the same for males but increased substantially for females – this is likely related to sample size (n=4). Although the number of black bears harvested from this unit is not great, we need to closely monitor trends in harvest parameters to keep us abreast of possible conservation concerns. It would be useful to know the number of unsuccessful guided black bear hunts. We intend to ask the USFS for this information as it might lead to better understanding of black bear population trends in Unit 5. In addition, a survey of Unit 5 guides regarding their perceptions of black bear numbers and distribution might also be a useful tool to consider.

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Table 1 Unit 5 residency, mean days hunted, and transportation used by successful black bear hunters, 1992 through 2000

Regulatory year	Unit resident hunters	Unit resident days	Other AK resident hunters	Other AK resident days	Nonresident hunters	Nonresident days	Total effort hunters	Total effort days	Plane	Boat	ORV	Hwy vehicle	Foot	Unk
1992	2	2.5	4	4.0	12	3.6	18	3.6	9	9	0	0	0	0
1993	0	0.0	1	10.0	9	3.6	10	4.2	5	5	0	0	0	0
1994	4	1.5	4	5.8	6	3.2	14	3.4	4	6	0	0	0	0
1995	1	1.0	2	5.5	9	3.4	12	3.6	9	3	0	0	0	0
1996	1	1.0	3	7.0	11	5.4	15	5.4	9	6	0	0	0	0
1997	5	2.6	0	0.0	9	4.8	14	4.0	2	10	0	1	1	0
1998	1	4.0	10	6.1	13	5.9	24	5.8	13	10	0	0	1	0
1999	6	2.8	2	5.5	10	3.3	61	3.3	5	10	1	0	1	1
2000	2	3.5	1	1.0	13	5.1	74	4.6	3	10	3	0	0	0
1995–1997 Mean	2.3	1.5	1.7	4.2	9.7	4.5	13.7	4.3	6.7	6.3	0	0.3	0.3	0
1998–2000 Mean	3.0	3.1	4.1	5.6	12	4.8	19.1	4.7	7.0	10.0	1.3	0	0.7	0.3

Table 2 Unit 5 commercial services used by successful black bear hunters, 1992 through 2000

Regulatory year	Unit residents		Other AK residents		Nonresidents		Total use		Transport	Registered guide
	No	Yes	No	Yes	No	Yes	No	Yes		
1992	2	0	2	2	1	13	5	15	7	8
1993	0	0	0	1	1	8	1	9	0	7
1994	4	0	4	0	2	5	7	5	0	0
1995	1	0	2	0	0	9	3	9	0	9
1996	1	0	2	1	0	11	3	9	0	9
1997	5	0	0	0	2	7	7	7	7	7
1998	1	0	7	3	2	11	10	14	3	10
1999	6	0	1	1	1	9	8	10	2	8
2000	2	0	1	0	0	13	3	13	0	13
1995–1997 Mean	2.3	0	1.3	0.3	0.7	9.0	4.3	8.3	2.3	8.3
1998–2000 Mean	3.0	0	3.0	1.3	1.0	11.0	7.0	12.3	1.6	10.3

Table 3 Unit 5 black bear harvest, 1992 through 2000

Regulatory year		Harvest	Males	Females	Unk.	Male Mean skull	Male (n)	Male Mean age	Male (n)	Female Mean skull	Female (n)	Female Mean age	Female (n)	Color variant black	Color variant blue
1992	Total	18	10	8	0	17.1	9	6.3	8	16.1	8	6.7	3	17	1
	Fall	1	0	1	0	--	0			15.8	1				
	Spring	17	10	7	0	17.1	9			16.2	7				
1993	Total	10	8	2	0	17.5	8	5.0	1	15.2	2	--	0	8	2
	Fall	0	0	0	0	--	0			--	0				
	Spring	10	8	2	0	17.5	8			15.2	2				
1994	Total	14	14	0	0	18.1	13	10.0	9	--	0	--	0	12	2
	Fall	0	0	0	0	--	0								
	Spring	14	14	0	0	18.1	13								
1995	Total	12	12	0	0	17.0	11	10.4	9	--	0	--	0	11	1
	Fall	0	0	0	0	--	0								
	Spring	12	12	0	0	17.0	11								
1996	Total	15	14	1	0	16.8	13	6.3	8	14.3	1	3.0	1	14	1
	Fall	0	0	0	0	--	0			--	0				
	Spring	15	14	1	0	16.8	13			14.3	1				
1997	Total	14	11	3	0	15.9	10	5.3	6	15.5	3	3.0	3	12	2
	Fall	2	1	1	0	13.6	1			16.9	1				
	Spring	12	10	2	0	16.1	9			14.8	2				
1998	Total	24	24	0	0	17.1	21	8.1	18	--	--	--	-	18	0
	Fall	1	1	0	0	16.3	1	5.0	1						
	Spring	23	23	0	0	17.1	20	8.3	17						

Table 3 Unit 5 black bear harvest, 1992 through 2000 (cont.)

Regulatory year		Harvest	Males	Females	Unk.	Male Mean skull	Male (n)	Male Mean age	Male (n)	Female Mean skull	Female (n)	Female Mean age	Female (n)	Color variant black	Color variant blue
1999	Total	18	15	3	0	17.6	15	7.6	15	15.8	3	10.3		14	4
	Fall	0	0	0	0	--	0								
	Spring	18	15	3	0	17.6	15								
2000	Total	16	15	1	0	17.2	15	6.9	15	15.8	1	6.0		15	2
	Fall	0	0	0	0	--									
	Spring	16	15	1	0	17.2	15								
1995–1997 Mean		13.7	12.3	1.3	0.0	16.6*		7.3*		14.9*		3.0*		12.3	1.3
1998–2000 Mean		19.1	18.0	1.3	0.0	17.6*		7.6*		15.8*		9.3*		15.7	

Weighted mean

Table 4 Unit 5A black bear harvest from all Wildlife Analysis Areas (WAA), regulatory years 1992 through 2000

	Regulatory year									
WAA	1992	1993	1994	1995	1996	1997	1998	1999	2000	Total
2101	0	0	1	0	2	0	0	4	0	7
2102	1	1	0	2	0	0	3	0	1	8
4503	7	5	4	7	5	5	7	4	5	49
4504	0	1	3	0	1	0	2	0	0	7
4505	3	0	0	1	2	4	1	1	3	15
4506	6	1	3	3	1	2	7	5	5	33
4508	1	0	3	0	1	4	4	4	1	18
4607	0	0	0	0	0	0	0	0	0	0
Unknown	0	2	1	0	2	1	0	1	2	9
TOTAL	18	8	14	13	12	15	24	18	15	137