
CHAPTER 6: BLACK BEAR MANAGEMENT REPORT

From: 1 July 2010
To: 30 June 2013

LOCATION

GAME MANAGEMENT UNIT: 3 (3,000 mi²)

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 also 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 3, 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. The Alaska Department of Fish and Game (ADF&G) has estimated that of the 3,000 mi² of terrestrial habitat in Unit 3, about 1,500 mi² is forested. More than 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 postlogging 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 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, harvest records and anecdotal evidence indicate that the unit's black bear population has declined over the last decade (RY00–RY09). We now believe the population has stabilized at moderate levels.

Regulation History

Sealing of black bears was first required in 1973. Prior to 2009, hunters were not required to obtain a hunt harvest ticket or registration permit for black bear; thus, effort data for unsuccessful hunters had previously been unavailable and information on hunt effort was available only for successful hunters.

For most years since statehood black bear hunting season extended from 1 September through 30 June, and the bag limit for residents has been 2 bears annually, only 1 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 1 bear. Nonresident bag limits were the same as for residents until 1990, when the nonresident bag limit was reduced from 2 bears to 1 bear per year. In 1982 it became legal to use bait to hunt black bears year-round. In 1988 the Board of Game (board) limited baiting in Southeast Alaska to 15 April–15 June. From 1989 to 1997 the department issued an average of 4 bear baiting permits per year in the unit. Each baiting permit allows the permittee to establish 2 individual bear baiting stations in the unit. The highest number of baiting permits issued was 11 in 2004. 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 one has requested a permit to hunt bears with dogs in the unit. Since 1996 hunters have been required to salvage the edible meat of all black bears killed in Southeast Alaska from 1 January to 31 May.

In fall 2000, due to concerns over the steadily increasing harvest of black bears by nonresident hunters, the board established a harvest guideline of 120 bears annually for nonresidents on Kuiu Island. In 2001, the first year it was implemented, the new harvest guideline resulted in the emergency closure of the entire fall nonresident season on Kuiu after nonresidents harvested 110 bears, or 92 percent of the allowable quota, during the spring season. Since that time, no additional emergency closures have been necessary and the nonresident harvest on Kuiu has stabilized at an average of 112 bears annually.

Due to concerns about wounding loss, at its Region I meeting in November 2004 the board passed a regulation requiring a wounded black or brown bear to count against the bag limit of the hunter for the regulatory year in Units 1–4. At its statewide meeting in February 2004, the board passed a regulation allowing the sale of handicraft articles made from the fur of black bears.

At its Region I meeting in November 2008 the board passed a regulation requiring black bear hunters in Units 1–7, 11–17, 19D and 20 to obtain a black bear harvest ticket prior to hunting.

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 1980s, rising from 81 bears in 1981 to 166 bears in 1992. By the early 1990s the unit had gained worldwide recognition for producing trophy-sized black bears, and in 1993 the harvest increased to 232 bears. By 2000 the annual harvest had increased over ten-fold since 1973, when 29 bears were killed. In the 2000–2001 regulatory year the Unit 3 harvest was 309 bears, with 165 (53%) of those taken on Kuiu Island. From 2000 to 2009, approximately 73–85% of the annual harvest occurred during the spring season. Since 1973, males have outnumbered females in the harvest about 4 to 1. The percentage of the harvest attributable to nonresident hunters increased from less than 50% in 1990 to 80% in 2000. 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 grew at an annual rate of 7% between 1990 and 2000. The Kuiu Island harvest increased more rapidly, at 9% annually, during the same period. The increasing harvest by nonresident hunters, particularly on Kuiu Island, resulted in concerns about the sustainability of increasing harvest levels. In 2001 the department implemented a newly authorized harvest guideline for Kuiu limiting the nonresident harvest to 120 bears annually. Since that time the Unit 3 harvest distribution has changed slightly and the proportion of the unitwide harvest coming off Kuiu annually has been reduced.

Historical harvest locations

Kuiu Island accounts for 25% of the Unit 3 land area and produced about 55% of the unitwide black bear harvest from 1990 to 1999. 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. Compared to other Unit 3 islands, Kuiu Island has a relatively high number of salmon streams and 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. After increasing dramatically during the late 1990s, the percentage of successful hunters using motor vehicles on Kuiu has decreased in recent years. The decrease in motor vehicle use on Kuiu is primarily attributable to the departure of one transporter who had previously provided highway vehicles to his clients on the island. 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. Over the last decade (RY00–RY09), the percentage of the unitwide harvest from Kuiu decreased to 50%, while the percentage of the harvest from Kupreanof increased to 43%, and the percentage from Mitkof Island decreased to 4%. The percentage of the unitwide harvest from the remainder of the Unit 3 islands has remained stable at 3%.

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 composed 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 the skull size data 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 data from previous years 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 population's age structure.

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 (Milltown, Montana) 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. Comparison of current and historical data indicates harvest trends and may offer indirect evidence of population trends.

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 population estimation study conducted on northern Kuiu Island (Peacock 2004), harvest sealing records, anecdotal public reports, and observations by ADF&G staff.

Population Size

Except for the 2000 and 2002 estimates for northern Kuiu Island, precise population estimates have never been available for black bears in the unit. Because the northern Kuiu population estimates were derived from studies conducted in 2000–2002 they may no longer be applicable. This is because changes in habitat post logging on Kuiu can greatly influence the ability of this habitat to support forage that is conducive to high bear densities. Also, the harvest of black bears during the past 10 years on Kuiu may have been above a sustainable level, and some evidence suggests black bear numbers on Kuiu have declined significantly since the late 1990s. 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.

Information collected during sealing cannot be used to measure population trends. Prior to the study on northern Kuiu Island, no black bear population studies had been conducted in Unit 3. Estimates of population size or density are difficult to obtain because 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 mi² found in the Washington study area. Assuming a density of approximately 1.5 bears per mi² of forested habitat, ADF&G estimated 3,340 black bears in Unit 3 in 1990 based on an estimate of 2,220 forested mi². 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, although black bears occur on Zarembo Island, their numbers remain very low. Bear densities are also relatively low on Etolin and other islands south of Sumner Strait. Density is believed to be 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 small 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 to 1973, when sealing began. No Kermody bears (those with white pelage) have been reported in the unit.

A declining harvest trend since 2000 combined with anecdotal reports of fewer bear sightings by hunters and guides suggests that the Unit 3 black bear population has decreased during the last decade (RY00–RY09).

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 changes in population status than average skull size. Considering their high reproductive potential, survival of breeding females is critical to sustained yield management.

Prolonged overharvests 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 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.

In addition to seeing fewer bears in general, in recent years hunters and guides have reported seeing relatively few sows accompanied by cubs, particularly on Kuiu Island. It is therefore possible that low recruitment may be partially responsible for the suspected decline in the Unit 3 black bear population.

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 in October and November.

MORTALITY

Harvest

RY 2010 and 2011

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

RY 2012

<u>Season</u>	<u>Bag Limit</u>
1 September–30 June	Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear
1 September–30 June	<u>Bag Limit</u> Nonresident hunters with guide: 1 bear

1 September–30 June

Bag Limit

Kuiu Island: Nonresident hunters without guide: 1 bear by drawing permit only (DL029)

1 September–30 June

Bag Limit

Kupreanof Island: Nonresident hunters without guide: 1 bear by drawing permit only (DL030)

1 September–30 June

Bag Limit

Unit 3 remainder: Nonresident hunters without guide: 1 bear by drawing permit only (DL031)

Game Board Action and Emergency Orders. In order to address the relatively high harvest of female bears during the fall season, in November 2008 the Board of Game created a controlled use area prohibiting the use of motorized land vehicles for black bear hunting in Units 2 and 3 during the month of September, with the exception of transportation directly to and from public transportation facilities and boat launches. In RY11 the Unit 3 controlled use area was modified to include only Kupreanof, Mitkof, and Wrangell islands. In RY12 the regulation was allowed to “sunset” in Unit 3.

Recent declines in harvests, following a long-term trend of increasing harvests, raised department concerns about whether black bear harvests were being managed at sustainable levels in Southeast Alaska. This, along with concerns expressed by agency biologists, big game guides, hunters, and members of the general public about what appeared to be fewer bears in parts of the region, prompted the department and others to seek regulatory action at the Alaska Board of Game meeting in November 2010 on black bear harvests. At the meeting, the board adopted a proposal submitted by the Alaska Professional Hunters Association (APHA) requiring non-resident black bear hunters who do not enlist the services of a registered hunting guide to obtain a drawing permit before hunting black bears in Units 1–3. APHA’s contention was that whereas the guides were held to a limited number of hunts by the United States Forest Service, there was no such limit on hunter effort existed for independent unguided nonresident hunters and those enlisting the services of transporters or outfitters.

During testimony on APHA’s proposal, the board asked the department to provide estimates of bear numbers and densities for specific geographical areas that were believed to constitute discrete black bear management areas. In response, the department identified 10 discrete management areas in Units 1–3, and provided estimates of bear numbers and densities within each bear management area.

After reviewing population and density data, the board asked the department to use regulatory years 2007–2009 as base years for analyzing black bear harvest data. Using the mean annual black bear harvests by residents, and guided and unguided nonresident hunters during regulatory

years 2007–2009, the department allocated harvests between guided and unguided nonresident hunters and established the numbers of unguided nonresident draw permits to be made available within each of the 10 established geographic black bear management areas. Three of the 10 bear management areas are located in Unit 3; they are Kuiu Island, Kupreanof Island and the remainder of unit 3.

As a result of the board’s action, starting in RY12 non-resident black bear hunters who do not employ the services of a registered guide are required to possess a drawing permit prior to hunting black bears in Units 1–3. By adjusting the numbers of drawing permits issued, the department now has the ability to control the numbers of bears taken by unguided nonresident hunters. At the same time, registered guides are also expected to limit their harvests of black bears, to the mean annual harvests they experienced during regulatory years 2007–2009. In addition, guides will also be expected to limit their harvests geographically based on each of their previous harvest distributions within the 10 individual black bear management areas during the regulatory 2007–2009 base years.

Implementation of the new regulation was delayed until the start of RY 2012, in order to afford hunters and guides with preexisting hunt arrangements enough time to adjust to and comply with the new regulation.

We issued no emergency orders during this report period.

Hunter Harvest. Unit 3 hunter harvests ranged from 177 to 185 bears annually during this report period (Table 1). The average annual harvest of 181 bears annually during this report period was well below the preceding 10-year average (RY00–RY09) of 229 bears annually. The 177 bears killed by hunters in RY10 represent the second lowest annual harvest since the 1992–1993 season. (Table 1)

Beginning in RY12, non-resident black bear hunters who do not employ the services of a registered big game guide are required to possess a drawing permits prior to hunting black bears in the unit. Three separate unguided nonresident drawing permit areas have been established in Unit 3, including Kuiu Island (DL029), Kupreanof Island (DL030), and the Remainder of Unit 3 (DL031). In 2012, a total of 40 permits were issued for Kuiu, 28 people hunted and 15 bears were killed for a success rate of 54 percent. A total of 83 permits were issued for Kupreanof, 59 people hunted and 30 bears were killed for a success rate of 51 percent. A total of 21 permits were issued for the remainder of Unit 3, 17 people hunted and 5 bears were killed for a success rate of 29 percent (Table 2).

Males made up 79%, 78% and 84% of the Unit 3 harvest in 2010, 2011 and 2012, respectively. In RY08–09 the average male skull size fell below the management objective and began a declining trend that continued into the current report period. During this report period, the average male skull size ranged from 17.8 inches to 18.1 inches, well below the management objective of 18.5 inches (Table 3). The average age of harvested males during the report period was 7.1 years, which was below the preceding 5-year average (RY05–09) of 8.0 years (Table 4). The male to female ratio during this report period was over 4:1—above the management objective of 3:1.

Harvest in Particular Areas. Harvest occurred in 22 individual Unit 3 Wildlife Analysis Areas (WAAs) during this report period. Of the 544 bears harvested, 45% were taken from 6 WAAs on Kuiu Island, and 42% were taken from 9 WAAs on Kupreanof Island. WAA 5012 alone, on northern Kuiu Island, accounted for 16% of the total unit wide harvest. Combined, the harvest from 6 other Unit 3 WAAs, including those on Mitkof, Wrangell, Etolin, and Woronkofski, Rynda and Greys Islands, accounted for just 13% of the unit wide harvest (Table 6).

Hunter Residency and Success. Although the percentage varies annually, during this report period nonresidents took approximately 76% of the bears harvested in the unit, nonlocal Alaskans took about 13%, and local residents about 11% (Table 8).

Harvest Chronology. During this report period, 83–86% of the overall harvest occurred during the spring season, with 54–59% of all bears killed in May (Table 9).

Bait Stations. A total of 14 individuals were issued bear baiting permits during the report period. Each bear baiting permit allows a hunter to establish up to 2 individual bait stations. Seven permittees requested authorization to establish 2 bait stations, and 7 individuals requested a permit to establish a bait station at a single site.

A record number of permits were issued in 2004, when 11 individuals requested authorizations to establish up to 20 bait stations. In 2010, 6 individuals were authorized to establish 10 bait stations. In 2011, 4 individuals were issued permits to establish 6 bait stations. In 2012, 6 individuals were issued permits to establish 10 bait stations.

Guided Hunter Harvest. During the report period, harvest by guided nonresident hunters accounted for 37% of the overall harvest. Guided nonresidents accounted for 40% of the harvest in 2010, 30% in 2011, and 43% in 2012.

Transport Methods. Hunter transportation is primarily by boat, highway vehicle and airplane, respectively (Table 10). During this report period the unitwide percentage of hunters using highway vehicles to access hunt areas increased from the previous report period.

Other Mortality

No DLPs were documented during the report period; however, some DLPs likely go unreported, particularly in the communities of Wrangell and Kake. We continue to receive unconfirmed reports of bears being shot and left in the field by individuals believing that bears are detrimental to deer and moose populations.

Although the amount of wounding loss is possibly significant, little information is currently available on how much is occurring in the unit. Between spring 2001 and fall 2004 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. During a 3-year period, the guide reported that his clients failed to recover 13 (21%) of 63 black bears struck and wounded. Three wounded bears (5%) that might otherwise have been lost were successfully recovered with the aid of a tracking dog. Wounding loss experienced by nonguided hunters is likely much higher than that of guided hunters who have the benefit of expert advice on caliber selection, shot placement, shooting distance, back-up shots and tracking experience.

HABITAT ASSESSMENT

Assessment

Timber harvest continues to pose the most serious threat to black bear habitat in the unit. Clearcut logging reduces habitat diversity associated with old growth forests and eliminates denning trees. Although postlogging increases in berry production, primarily *Vaccinium* sp., may contribute to short-term bear population growth, this forage source will be lost as second growth stands regenerate and the canopy closes. Roads associated with logging increase human access and can make bears increasingly vulnerable to harvest. The long-term effects of logging will be detrimental to black bears. Roads associated with logging increase human access and can make bears increasingly vulnerable to harvest.

During this report period, timber harvest occurred on, Kupreanof, Mitkof, Zarembo, and Wrangell Islands. Timber harvest is planned or already scheduled for additional sale areas on Etolin, Kupreanof, Kuiu, Mitkof, Zarembo, 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 the unit. 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, before canopy closure again results in loss of understory vegetation. In the absence of additional thinning 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 no documented instances of a black bear killed in the unit under defense of life and property (DLP) regulations. Historically, the majority of documented DLPs occur 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 DLPs 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 Organized Village of Kake, DLPs in these communities have a higher likelihood of going unreported. For example, we continue to receive occasional reports of carcasses or remains of bears at the Kake landfill. It is unclear if these mortalities are the result of DLPs or other legal or illegal harvests, but 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

In recent years, declining black bear harvests across much of the region, including Unit 3, have led to concerns about potential overharvest. The Unit 3 black bear harvest steadily declined from 232 bears in 2006 to 169 in 2009, the lowest unitwide harvest since 1992–93. The average annual harvest of 181 bears during this report period was well below the preceding 10-year average (RY00–RY09) of 229 bears annually. In addition to the declining harvest, declining trends in both the average skull size and age of males harvested annually since RY08 further heighten concerns about black bear management in the unit. The average male skull size, which began a declining trend in RY08–09, continued to decline during the report period. The average male skull size during the report period was 18.0 inches, well below the preceding 10-year average (RY00–09) of 18.5 inches. The average age of harvested males was 7.1 years, also below the preceding 10-year average (RY00–09) of 7.6 years. The male-to-female harvest ratio during the report period was 4:1, slightly above the management goal of 3:1.

The reason for the declining trends in harvest, average male skull size and average male age remain unknown and are cause for concern. The decreasing harvest trend, combined with anecdotal reports from big game guides, hunters and agency biologists suggest that over the last decade black bear populations have declined on some Unit 3 islands. Guides report seeing fewer bears in general, and fewer sows accompanied by cubs in particular. The exact cause of the suspected population decline remains unclear and could be due to one or more contributing factors. Those factors may include overharvest, climatic or environmental changes, or reductions in carrying capacity resulting from clearcut logging. Guides and agency biologists have also noted that a high percentage of wolf scats examined on Kuiu Island contain the remains of black bears suggesting that predation by wolves may be contributing to the suspected decline in the unit's black bear populations.

One effort to address declining harvest trends is the new requirement that non-resident black bear hunters who do not employ the services of a registered guide possess a drawing permit prior to hunting black bears in Units 1–3. By adjusting the numbers of drawing permits issued, the department will now have the ability to control the number and distribution of bears taken by unguided nonresident hunters. At the same time, registered guides will be expected to limit their harvests of black bears both numerically and geographically, to the mean annual harvests they experienced during regulatory years 2007–2009.

In order to ensure that the bear population is managed on a sustained yield basis, additional research is needed to estimate the black bear population in the unit, particularly on Kuiu and Kupreanof Islands. Research is also needed to: 1) identify possible correlations between sealing data and population trends; 2) provide a better understanding of the short- and long-term impacts of clearcut logging on black bear populations; and 3) establish some estimate of black bear mortality as a result of wounding loss.

Although no additional management or regulatory changes are recommended at this time, in light of the unit's declining harvest trend and suspected population decline, we will continue to monitor the harvest and sealing data closely and adjust harvest quotas as necessary. In the absence of precise population estimates, ensuring that black bear populations are managed within sustainable harvest limits will remain a formidable challenge for wildlife managers.

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Table 1. Unit 3 black bear harvest, 1999–2012.

	Hunter kill						Nonhunting kill ^a			Total estimated kill					
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	M	(%)	F	(%)	Unk.	Total
Fall 99	29	31	52	0	60	NA	0	4	3	29	45	35	55	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	77	67	23	3	294
Fall 00	47	24	34	0	71	NA	1	2	2	48	65	26	35	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	20	2	314
Fall 01	28	20	42	0	48	NA	0	0	0	28	58	20	42	0	48
Spring 02	201	37	16	0	238	1	0	0	1	201	84	37	16	1	239
Total	229	57	20	0	286	1	0	0	1	229	80	57	20	1	287
Fall 02	24	19	44	0	43	NA	0	0	2	24	56	19	44	2	45
Spring 03	147	38	21	0	185	2	0	0	0	147	79	38	21	0	185
Total	171	57	25	0	228	2	0	0	2	171	75	57	25	2	230
Fall 03	25	13	34	0	38	NA	1	0	0	26	67	13	33	0	39
Spring 04	135	34	20	0	169	5	0	0	0	135	80	34	20	0	169
Total	160	47	23	0	207	5	1	0	0	161	77	47	23	0	208
Fall 04	34	17	33	0	51	NA	0	0	0	34	67	17	33	0	51
Spring 05	115	32	22	0	147	4	0	0	0	115	78	32	22	0	147
Total	149	49	25	0	198	4	0	0	0	149	75	49	25	0	198
Fall 05	34	28	45	0	62	NA	0	0	0	34	55	28	45	0	62
Spring 06	137	29	17	0	166	0	0	0	0	137	83	29	17	0	166
Total	171	57	25	0	228	0	0	0	0	171	75	57	25	0	228

	Hunter kill						Nonhunting kill ^a			Total estimated kill					
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	M	(%)	F	(%)	Unk.	Total
Spring 07	153	27	15	0	180	2	0	0	0	153	85	27	15	0	180
Total	188	44	19	0	232	2	0	0	0	188	81	44	19	0	232
Fall 07	18	15	45	0	33	0	0	0	0	18	56	15	45	0	33
Spring 08	161	31	16	0	192	1	0	0	0	161	84	31	16	0	192
Total	179	46	20	0	225	1	0	0	0	179	80	46	20	0	225
Fall 08	24	18	43	0	42	0	0	0	0	24	57	18	43	0	42
Spring 09	141	24	15	0	165	2	0	0	0	141	85	24	15	0	165
Total	165	42	20	0	207	2	0	0	0	165	80	42	20	0	207
Fall 09	21	14	40	0	35	0	0	0	0	21	60	14	40	0	35
Spring 10	113	21	16	0	134	2	0	0	0	113	84	21	16	0	134
Total	134	35	21	0	169	2	0	0	0	134	79	35	21	0	169
Fall 10	17	11	(39)	0	28	0	1	0	0	18	(62)	11	(38)	0	29
Spring 11	123	26	(17)	0	149	3	0	0	0	123	(83)	26	(17)	0	149
Total	140	37	(21)	0	177	3	1	0	0	141	(79)	37	(21)	0	178
Fall 11	17	12	(41)	1	30	0	1	0	1	18	(60)	12	(40)	2	32
Spring 12	127	28	(18)	0	155	2	0	0	0	127	(82)	28	(18)	0	155
Total	144	40	(22)	1	185	2	1	0	1	145	(78)	40	(22)	2	187
Fall 12	21	9	(30)	0	30	0	0	0	0	21	(70)	9	(30)	0	30
Spring 13	132	20	(13)	0	152	0	0	0	0	132	(87)	20	(13)	0	152
Total	153	29	(16)	0	182	0	0	0	0	153	(84)	29	(16)	0	182

^a Includes DLP kills, research mortalities, and other known human-caused accidental mortality.

Table 2. Unit 3 black bear harvest data by nonresident drawing hunt number, 2012.

Hunt Nr	Regulatory Year	Permits issued	Did not hunt	Percent successful hunters	Number failing to report	Males	(%)	Females	(%)	Unk	Total harvest
DL029 Kuiu Island Drawing	2012	40	9	54	3	14	(93)	1	(7)	0	15
DL030 Kupreanof Island Drawing	2012	83 ^a	18	51	6	27	(90)	3	(10)	0	30
DL031 Unit 3 Remainder Drawing	2012	21 ^b	4	29	0	5	(100)	0	(0)	0	5
Total all hunts	2012	144	31	48	9	46	(92)	4	(8)	0	50

^a Excludes 1 unguided nonresident that hunted Kupreanof Island unsuccessfully with the wrong permit (GL000)

^b Excludes 1 unguided nonresident that hunted Mitkof Island unsuccessfully with the wrong permit (GL000)

Table 3. Unit 3 harvested black bear mean skull size^a, 1998–2012.

Regulatory year	Males	<i>n</i>	Females	<i>n</i>
1998–1999	18.6	232	16.6	48
1999–2000	18.5	216	16.7	60
2000–2001	18.5	249	16.9	58
2001–2002	18.5	222	16.8	57
2002–2003	18.3	167	16.8	56
2003–2004	18.5	157	16.6	45
2004–2005	18.3	148	16.7	49
2005–2006	18.6	168	16.7	56
2006–2007	18.6	184	16.4	43
2007–2008	18.6	177	16.7	44
2008–2009	18.3	162	17.0	42
2009–2010	18.3	130	16.7	35
2010–2011	18.1	139	16.7	35
2011–2012	17.8	141	16.5	39
2012–2013	18.0	146	16.7	29

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

Table 4. Unit 3 harvested black bear mean age, 1998–2012.

Regulatory year	Males	<i>n</i>	Females	<i>n</i>
1998–1999	7.3	222	8.5	46
1999–2000	7.4	217	9.4	59
2000–2001	7.2	245	9.3	58
2001–2002	7.3	228	9.3	57
2002–2003	7.4	171	9.1	57
2003–2004	N/A		N/A	
2004–2005	7.4	148	9.3	49
2005–2006	8.0	166	10.1	53
2006–2007	8.2	180	9.3	41
2007–2008	8.3	172	9.2	44
2008–2009	7.6	163	11.0	42
2009–2010	7.6	127	10.0	33
2010–2011	7.3	136	10.3	34
2011–2012	6.5	132	10.4	39
2012–2013	7.4	147	12.4	25

Table 5. Unit 3 harvested black bear mean days hunted per successful hunter, 1998–2012^a.

Regulatory year	Total days	Total hunters	Total harvest	Average days hunted
1998–1999	892	292	292	3.1
1999–2000	871	282	287	3.1
2000–2001	930	309	309	3.0
2001–2002	964	286	286	3.4
2002–2003	775	228	228	3.4
2003–2004	682	207	207	3.3
2004–2005	651	195	198	3.3
2005–2006	696	223	228	3.1
2006–2007	751	227	232	3.2
2007–2008	728	221	225	3.2
2008–2009	671	201	207	3.2
2009–2010	610	164	169	3.6
2010–2011	566	174	177	3.2
2011–2012	681	182	185	3.7
2012–2013	592	177	182	3.3

^a Totals do not include DLP.

Table 6. Unit 3 black bear hunter harvest by island and density, 1998–2012.

Regulatory year	Kupreanof 1090 mi ²				Kuiu 746 mi ²				Mitkof 211 mi ²			
	Kill	Percent of Unit 3	Average mi ² / bear kill		Kill	Percent of Unit 3	Average mi ² / bear kill		Kill	Percent of Unit 3	Average mi ² / bear kill	
			Male	Female			Male	Female			Male	Female
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	165	53	6	25	10	3	26	106
2001	161	56	9	29	106	37	8	41	14	5	18	106
2002	97	43	15	42	111	49	9	26	11	5	19	No females
2003	69	33	21	64	121	58	8	31	13	6	26	42
2004	77	39	19	55	114	58	9	27	2	1	106	No females
2005	108	47	15	33	107	47	9	36	8	4	35	106
2006	104	45	14	39	110	47	8	57	11	5	26	70
2007	84	37	17	55	130	58	7	31	4	2	53	No females
2008	88	43	15	68	96	46	9	44	15	7	30	26
2009	73	43	20	57	76	45	12	57	13	8	19	106
2010	66	37	22	68	87	49	10	57	5	3	53	211
2011	88	48	16	57	75	41	13	47	10	5	23	211
2012	74	41	18	91	81	45	11	68	4	2	70	211

Table 7. Unit 3 black bear mean male skull size^a and percent of harvest by major island and season, 2001–2012.

Island	Season	2001				2002				2003			
		Nr males	(%)	Average	<i>n</i>	Nr males	(%)	Average	<i>n</i>	Nr males	(%)	Average	<i>n</i>
Kupreanof	Fall	22	55	17.8	22	10	59	18.8	10	3	60	18.7	2
	Spring	102	84	18.4	97	61	76	18.2	58	49	77	18.5	49
	Total	124	77	18.3	119	71	73	18.3	68	52	75	18.5	51
Kuiu	Fall	3	60	18.0	3	8	42	17.0	8	21	72	17.9	20
	Spring	85	84	18.8	84	74	80	18.5	74	76	83	18.6	75
	Total	88	83	18.8	87	82	74	18.4	82	97	80	18.5	95
Mitkof	Fall	2	100	19.0	2	5	100	16.8	5	1	33	15.5	1
	Spring	10	83	17.2	9	6	100	17.5	5	7	70	17.5	7
	Total	12	86	17.5	11	11	100	17.1	10	8	62	17.2	8

^a Skull size = total length + zygomatic width.

Table 7. continued.

Island	Season	2004				2005				2006			
		Nr males	(%)	Average	<i>n</i>	Nr males	(%)	Average	<i>n</i>	Nr males	(%)	Average	<i>n</i>
Kupreanof	Fall	11	61	17.6	11	17	50	18.0	17	11	50	17.4	11
	Spring	37	67	18.2	37	58	78	18.8	58	65	79	19.0	62
	Total	48	71	18.1	48	75	69	18.6	75	76	73	18.7	73
Kuiu	Fall	21	58	18.3	21	12	57	17.8	11	21	84	18.2	21
	Spring	64	83	18.7	64	74	86	18.8	73	76	89	18.8	75
	Total	85	75	18.6	85	86	81	18.7	84	97	88	18.7	96
Mitkof	Fall	0	0	0	0	3	60	17.4	3	3	60	16.3	3
	Spring	2	100	17.0	1	3	100	18.9	3	5	83	18.7	5
	Total	2	100	17.0	1	6	75	18.2	6	8	73	17.8	8

^a Skull size = total length + zygomatic width.

Table 7. continued.

Island	Season	2007				2008				2009			
		Nr males	(%)	Average	<i>n</i>	Nr males	(%)	Average	<i>n</i>	Nr males	(%)	Average	<i>n</i>
Kupreanof	Fall	6	67	18.4	6	10	53	16.2	10	6	40	17.4	6
	Spring	58	77	18.5	58	62	90	18.2	60	48	83	18.1	46
	Total	64	76	18.5	64	72	82	17.9	70	54	74	18.0	52
Kuiu	Fall	11	48	18.2	11	12	63	18.6	11	8	73	18.1	8
	Spring	95	89	18.9	93	67	87	18.6	67	55	85	18.8	55
	Total	106	82	18.8	104	79	82	18.6	78	63	83	18.7	63
Mitkof	Fall	1	100	NA	1	1	33	NA	1	5	83	17.2	4
	Spring	3	100	17.1	3	6	50	17.7	6	6	86	17.0	6
	Total	4	100	16.0	4	7	47	17.7	7	11	85	17.1	10

^a Skull size = total length + zygomatic width.

Table 7. continued.

Island	Season	2010				2011				2012			
		Nr males	(%)	Average	<i>n</i>	Nr males	(%)	Average	<i>n</i>	Nr males	(%)	Average	<i>n</i>
Kupreanof	Fall	5	(42)	18.5	5	7	(50)	15.2	7	8	(89)	18.0	7
	Spring	45	(83)	17.8	44	61	(84)	17.8	60	54	(83)	17.9	52
	Total	50	(76)	17.8	49	68	(77)	17.6	66	62	(83)	17.9	59
Kuiu	Fall	11	(85)	18.9	11	6	(60)	16.8	6	12	(71)	17.9	11
	Spring	62	(85)	18.4	62	52	(81)	18.3	52	58	(90)	18.5	55
	Total	73	(85)	18.5	73	59	(80)	18.2	58	70	(86)	18.4	66
Mitkof	Fall	1	(100)	NA	1	3	(75)	18.8	2	1	33	NA	1
	Spring	3	(75)	17.7	3	6	(100)	18.1	6	4	(80)	17.3	4
	Total	4	(80)	17.9	4	9	(90)	18.2	8	5	(63)	17.4	5

^a Skull size = total length + zygomatic width

Table 8. Unit 3 black bear successful hunter residency, 1998–2012.

Regulatory year	Local resident ^a	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
1998–1999	45	15	41	14	206	71	292
1999–2000	25	9	31	11	231	80	287
2000–2001	27	9	36	12	246	80	309
2001–2002	28	10	44	15	214	75	286
2002–2003	24	11	29	13	175	77	228
2003–2004	12	6	16	8	179	86	207
2004–2005	8	4	19	10	168	86	195
2005–2006	15	7	11	5	197	88	223
2006–2007	10	4	34	15	183	81	227
2007–2008	17	8	28	13	177	80	222
2008–2009	19	9	23	11	159	79	201
2009–2010	14	9	23	14	127	77	164
2010–2011	11	6	22	12	144	81	174
2011–2012	18	10	22	12	142	78	182
2012–2013	30	17	24	13	125	70	179

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

Table 9. Unit 3 black bear harvest chronology by percent, 1998–2012.

Regulatory year	Month									<i>n</i>
	September	October	November	December	March	April	May	June	July	
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
2001–2002	15	1	0	0	0	8	56	20	0	286
2002–2003	16	1	0	0	0	11	51	21	0	228
2003–2004	18	0	0	0	0	12	56	14	0	207
2004–2005	24	2	1	0	0	14	42	18	0	198
2005–2006	25	2	0	0	0	10	43	21	0	228
2006–2007	20	2	0	0	0	3	49	25	0	232
2007–2008	13	1	0	0	0	10	60	16	0	225
2008–2009	18	2	0	0	0	8	59	13	0	207
2009–2010	15	6	0	0	0	11	55	14	0	169
2010–2011	12	3	0	0	0	10	57	18	0	177
2011–2012	15	2	0	0	0	4	54	25	0	185
2012–2013	14	2	0	0	0	10	59	15	0	182

Table 10. Unit 3 black bear harvest, in percent by transport method, 1998–2012

Regulatory year	Airplane	Boat	3-4 wheeler	Snowmachine	Off-road vehicle	Highway vehicle	Foot	Unknown	<i>n</i>
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
2001–2002	1	78	0	0	0	21	0	0	285
2002–2003	1	79	0	0	0	19	1	0	228
2003–2004	7	77	0	0	0	16	0	0	207
2004–2005	8	74	<1	0	<1	17	0	0	198
2005–2006	7	77	0	0	0	14	1	0	228
2006–2007	7	70	1	0	2	19	1	0	232
2007–2008	4	87	0	0	0	8	0	0	225
2008–2009	4	91	0	0	0	3	1	0	207
2009–2010	2	79	2	0	0	14	1	2	169
2010–2011	5	76	4	0	1	14	1	0	177
2011–2012	4	79	0	0	0	15	2	0	185
2012–2013	3	82	0	0	3	11	1	0	182