Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

CHAPTER 5: BLACK BEAR MANAGEMENT REPORT

From: 1 July 2010
To: 30 June 2013

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 abundant productive salmon streams, many large estuaries, and subalpine and alpine areas at lower, more hospitable elevations compared to mainland locations capable of supporting a large number of bears. The large average skull sizes of Unit 2 bears compared to other Southeast Alaska bears also suggest that Unit 2 is extremely productive black bear habitat.

Small openings and disturbed areas, such as wetlands, avalanche chutes, clearcuts, and subalpine meadows are important areas for foraging. 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 and 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*.). Later in spring, some bears are efficient predators of Sitka black-tailed deer fawns during a short vulnerable period in late May and June. 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). Fecundity may also be impacted if food supplies have been poor during the previous summer and the female has not accumulated adequate energy reserves. 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 to 7 years of age, depending on their nutritional plane, a measure of habitat quality (Kolenosky and Strathearn 1987). Age of first reproduction for females on Prince of Wales tends to be skewed toward older bears ages 5-7 (Porter and Bethune unpublished data).

Although there are abundant healthy and productive habitats, more clearcut logging has occurred in Unit 2 than in other Southeast Alaska (Southeast) black bear area. Counting national forest

and private lands, the Alaska Department of Fish and Game (ADF&G) estimates about 475 mi^2 of forested black bear habitat in Unit 2 has been cut during the past 65 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 more than 2,500 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 finish, as required by the 1997 Tongass Land Management Plan (TLMP, USFS 1997). The recently enacted Access Travel Management Plan (ATM) by the USFS will close 150 miles of road to highway vehicles and convert an additional 222 miles from highway vehicle use to off highway vehicle (OHV) use only (USDA 2009). As a result of more than 40 years of large-scale clearcut logging, habitat changes continue to occur. Although early seral stages (3–20 years postlogging) provide black bears with abundant 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 lead to the decline of 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 in Unit 2 (Suring et al. 1988).

Logging activity peaked in the 1980's and early 1990's before declining to lower levels, but has seen a resurgence recently. The 2009 Logjam Timber sale produced 73 million board feet of lumber from clear-cutting 3,400 acres of old-growth habitat. The US Forest Service released a Record of Decision for another large-scale sale called the Big Thorne Timber sale in summer 2013. This sale, which is currently delayed, will allow for an additional 120 million board feet of lumber from approximately 6,000 acres of old growth forest. In addition, the Sealaska lands act recently passed by Congress transfers 70,000 acres of Tongass National forest to Sealaska Corporation. Of this, 68,400 acres, or 107 mi^2 of additional old-growth habitat is available for clear-cut logging.

HUMAN USE HISTORY

Black bears are indigenous to Unit 2 and have traditionally been hunted for food and trophies. Information about black bear abundance and distribution in the unit is limited to sealing records, anecdotal public reports, and observations by our staff. In addition, ADF&G staff has conducted an extensive black bear life history research project on POW Island. Results from this project are currently being analyzed.

Regulatory history

Statewide sealing of black bears began in 1973. Since then we have been able to get data on hunter effort during the sealing process, but only for those hunters who were successful. However, a proposal passed at the 2008 Board of Game (BOG) meeting now requires all black bear hunters to obtain a harvest ticket/report prior to hunting allowing us to obtain catch per unit effort data from "all" hunters for specific locations they have hunted. The contact information we receive from these harvest tickets will also allow us to survey hunters for additional hunter effort information. As expected, the first few years of this new regulation have presented hunters with a huge learning curve. Compliance during this reporting period (2010-2012) has been spotty and harvest ticket data has not always aligned with bear sealing data. As hunters and license vendors get used to this new regulation, compliance will improve and we should begin collecting meaningful data during the next reporting period.

Seasons and bag limits

Since statehood, the bear hunting season has extended from 1 September through 30 June, and the annual bag limit for residents has been 2 bears, only 1 of which can be a blue or glacier bear. Nonresident and resident bag limits were the same until 1990, when the nonresident limit was reduced to 1 bear per year. There has been a major change in the bear hunting regulations in Southeast Alaska (Units 1–3) during this reporting period. Beginning with RY2012, all unguided nonresidents are required to draw a tag. Unit 2 has been split into 2 seasons. The fall season (DL027) runs 1 September through 31 December. The spring season (DL028) is 1 January through 30 June. This reduced opportunity for unguided nonresidents is reflected in the harvest totals (Table 1). Seasons and bag limits remain unchanged for residents and nonresidents hunting with a registered guide.

Baiting

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 fall 1996, hunters were required to salvage the edible meat of all spring black bears killed in Southeast Alaska during 1 January–31 May. This was a compromise for hunters at a time when baiting was under great public scrutiny. The salvage rule and bear baiting in general continue to be contentious issues, with proposals for and against these regulations coming before the BOG each cycle.

Hunting with dogs

POW is the only place in Southeast Alaska with a history of hunting bears with dogs, and unlike other areas of the state most hunters interested in this method have been 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 disturbance 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. During the last 2 reporting periods, only 1 local resident has applied for a permit. Approximately 1–4 bears are harvested with dogs each year, which is a small portion of the overall bear harvest. Most hunters find spot-and-stalk methods very effective, and they consequently rely less on other methods.

Historical harvest patterns

After averaging 123 bears per year during 1980–1988 and 221 bears annually from 1989 to 1995, the Unit 2 black bear harvest increased to a yearly average of 353 bears during 1994–2002 (Bethune 2011). During 2003–2007 the average increased to 431 bears annually. Harvest peaked in 2005 at nearly 500 bears (Table 1) and has declined alarmingly since. Black bear harvest by nonresidents in Unit 2 steadily increased during the past 25 years and topped out at 89% during

2006 and 2007. During the past 10-year period, Alaska residents living in Unit 2 accounted for 6% and nonlocal residents another 9% of the harvest, with the remaining 85% going to nonresidents (Table 2). A draw hunt for unguided nonresidents instituted in RY2012 will likely reduce this percentage; in RY2012 nonresidents accounted for 65% of the harvest. Most nonresidents do not use a registered guide when black bear hunting in this unit, but guided hunts are increasing. Nonresident hunters must purchase a locking tag ($225–$300) to affix to each bear harvested. During the past 10 years, males have accounted for about 73% of the harvest and 74% of the total harvest has occurred during spring (Tables 1 and 3).

With the extensive road system, numerous lodges and bed and breakfasts, vehicle and skiff rentals available, POW is a very popular and economical hunt for the do-it-yourself hunter wanting to experience Alaska. Although we do not have comparable hunter effort data, field observations from staff, harvests and anecdotal reports of lower bookings from lodges indicate fewer hunters came to POW during the previous reporting period. Economic recession, fuel prices or lower bear populations are all potential reasons for this apparent decline. However, it appears that hunter participation increased during this reporting period leading up to the implementation of the limited draw hunt in RY 2012. It is likely that hunters came to POW in RY 2010 and 2011 knowing their chances to hunt POW in the future would be limited.

Until 1985 Unit 2 bear hunters used airplane, boat, and highway transportation in relatively equal amounts (Bethune 2011). However, logging-associated road construction peaked in the 1980s, and beginning in 1986, most hunters used the road system to access hunting areas. During the past 10 years, highway vehicles accounted for 43% of the transportation used by successful Unit 2 hunters while boats accounted for 53% (Table 4). Even boat-based hunters are using the extensive road system to access multiple waterways on a typical hunt. New highway improvement and paving projects continue to improve access on Prince of Wales. Paving was completed along the main 30 Road from the Naukati Junction to Coffman Cove during the summer of 2009. The pavement from Hollis to Klawock is currently being improved and road improvements and paving from the Coffman Cove Junction north toward Whale Pass commenced in 2013 and continue. These projects have improved hunter access to the island but will be countered somewhat by diminishing road access due to road closures associated with the Forest Service's Access Travel Management Plan.

Historical harvest locations

Historically, Wildlife Analysis Areas (WAAs) 1214, 1317 and 1422 account for approximately one-third of the annual harvest (Table 5). WAA 1422, which includes Tuxekan and El Capitan passages on west POW, offers easy road access. WAA 1317 (the area south and west of Hollis) provides easy boat access into the 12-mile Arm area. WAA 1214 includes the popular Polk and McKenzie Inlet regions. Additional WAAs that have received notable hunting pressure more recently include 1420 (Ratz Harbor to Coffman Cove on the east side of POW), WAA 1318 which encompasses the area around the communities of Craig and Klawock, POW's primary population center and which affords hunters easy road access, and 1530 (Whale Pass and Exchange Cove on the northeast corner of the island) (Figure 1). Many of these areas also offer good boat access from saltwater along protected bays and passages.

Several popular WAA's experienced significant declines in harvest beginning in approximately 2008–2009, most notably WAA 1107 (Hydaburg area), 1210 (Moira Sound), 1211

(Cholmondeley Sound), 1317 (12-Mile Arm), 1319 (North Thorne), and 1422 (Tuxekan/El Cap) (Table 5).

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain an average skull size of at least 19.1 inches for male bears harvested each spring (January–June) or 18.0 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.

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 average skull size as a possible indication of changes in the population's age structure.

Skull size has been used in the past as a management tool. It was assumed that average skull size trends may indicate changes in population size and composition, and provide some measure of the sustainability of the harvest. It was postulated that 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. An increasing average skull size could also indicate a reduction in the proportion of younger bears in the population. However, Person (Wildlife Biologist, ADF&G, Ketchikan, personal communication) conducted a rigorous analysis of the Unit 2 black bear harvest data from 1999-2007 and concluded that none of the biological parameters we measure such as harvest numbers, proportion of females in the harvest, skull size or age were sensitive enough indicators to predict impacts to the population. He did note that high numbers of bears killed in Major Harvest Units (MHU) 13–15 (Fig. 1) may have reduced the median age of bears in that segment of the harvested population and that it appeared there were fewer large bears proportionally in the harvested male population in those MHU's. Intense harvest may reduce the number of big bears and increase the proportion of younger animals in a population. Nonetheless, Person concluded that it was unclear from the data analyzed that any of the indicators used, pointed to an actual population decline. Person noted that skull size, age and proportion of females in the population has at least as much to do with hunter selectivity as any characteristic of 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.

Sex ratio is a parameter commonly used when monitoring black bear harvests. It is relied on as a primary means of assessing population status in 19 states and provinces and as supporting information for population assessment in other 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 (Porter 2008).

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 Alaska Wildlife Troopers (AWT) 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 licensed big game guides. A premolar is also collected at the time of sealing and sent to Matson's Laboratory in Montana for age determination. During this report period, tissue and/or hair samples were also collected from harvested bears for genetic work and stable isotope diet analysis.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Precise population estimates are not available for black bears in Unit 2, though estimates can be made using known densities from other studies. We use information obtained during sealing to try to measure population trends. 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, but in the absence of accompanying demographic data, correlations between these measures and harvest sustainability are difficult to discern. Recently conducted research on POW will provide the department with a better understanding of black bears. Some of the results such as adult survival rates, fecundity, harvest rate and habitat use will help us better model bear populations in Unit 2.

Population Size

No black bear population studies have been completed in Unit 2. Density estimates of North American black bears vary between 0.3 and 3.4 bears/mi^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 produced the 3.4 bears/mi^2 estimate (Lindzey and Meslow 1977).

Elsewhere, Modafferi (1982) estimated 1 bear/mi^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/mi^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/mi^2 (Carney 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 America 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, Larsen (1995) derived a population estimate of 5,400 bears for the unit. In calculating this estimate, Larsen assumed bear densities were not homogenous across the landscape.

In 2000, ADF&G supported a study on a 400-mi^2 northern portion of Kuiu Island located in Unit 3 that used tetracycline biomarker mark-recapture technique to estimate black bear density. This study area was comprised of the most productive forest habitat on the island and included several major salmon producing streams and rivers. The research came up with a calculated density estimate of 3.9 bears/mi^2 (95% CI 1.8–5.6 bears/mi^2) (Peacock 2004). This high density estimate is comparable with Lindzey and Meslow's (1977) peak estimate of black bears on Long Island, Washington. Because the Kuiu effort was focused on an island adjacent to Unit 2 with similar logging and habitat types, the results may be more applicable to Unit 2 bear populations than studies done elsewhere. Using Peacock's estimate of 3.9 bears/mi^2 gives a population estimate of 14,040 bears in Unit 2. We know this estimate is likely too high, as it assumes that the entire Unit is comprised of the highest quality black bear habitat available. Indeed some areas in Unit 2, such as the southern MHUs are mostly muskeg scrub and low volume forest with few major salmon streams. We also know some areas such as Heceta and other western islands likely have few if any bears. Therefore a better, more conservative approach is to use the lower end of Peacock's 95% Confidence interval (1.8 bears/mi^2), which gives an estimate of 6,480 bears. We currently estimate the Unit 2 black bear population to be lower than that as the population appears to be depressed from highs seen in the 1990's and early 2000's. Plausible reasons for this decline include overharvest coupled with loss of habitat due to extensive logging in the unit over the past 50 years.

Current Research

During this and the previous reporting periods the department conducted 2 projects to help answer some of the questions surrounding the recent black bear population declines on POW. In 2008 we initiated a DNA mark-recapture pilot study in the central portion of Prince of Wales Island in an attempt to calculate harvest rate. We intensified efforts during the summer of 2009 and completed the project in 2010. This project used noninvasive breakaway single-capture noose snares equipped with barbed wire (Beier et al. 2005), and also short barbed wire fences to capture hair from live bears. Bears were considered marked if we obtained a genetic signature from hair samples. Recaptures were obtained from harvested bears during subsequent hunting seasons using tissue collected during the sealing process. This method gave a harvest rate of 9.2% (95% CI 0.034-0.188). Unfortunately, large number of tissue samples from harvested bears from 2008–2010 may have been compromised or lost. New techniques for collecting wolf DNA using scented hair boards is showing promise for use in future black bear density studies (Person and Larsen 2013).

In 2009 we began a comprehensive demographics, life history and movement patterns research project. Its objectives were to describe home range and movement patterns, and evaluate bear vulnerability to harvest along streams and roads. Bears were captured with modified Aldrich foot snares in elevated M-15 bucket sets and then were equipped with Gen IV GPS or VHF radio collars. Blood, tissue samples and morphometric data were collected at time of capture. Final reports will describe home range by gender, and will describe den sites and habitat selection using resource selection functions. This study is now complete and in the analysis and writing phase. We hope this project will help corroborate our hair snare work and previous bear research in Southeast. In addition, bear GPS collar locations data are being overlain with fawn mortality locations to derive better estimates of fawn predation by bears. (unpublished, Sophie Gilbert, Graduate Student, University of Alaska Fairbanks).

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 provides a better indicator of harvest sustainability and population well-being than it does of the ratio of males to females in the population. This is because many hunters select the largest bear they can find, and tend to harvest males at a rate higher than they occur in the population. We suspect the harvest of female bears increased over time as hunters had a harder time finding large male bears, thus they would take a large female bear. A decreasing trend in the male-to-female harvest ratio could signal a decline in the segment of the population made up of older, larger males.

Distribution and Movements

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 Kermode (white) bears, which occur infrequently in nearby British Columbia and occasionally along the mainland of Southeast Alaska.

MORTALITY

Harvest

Season	Bag limit
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 using registered guides: 1 bear
1 September–31 December (DL027)	Nonresident hunters not using registered guides: 1 bear by drawing permit only.
1 January–30 June (DL028)	Nonresident hunters not using registered guides: 1 bear by drawing permit only.

Board of Game Action and Emergency Orders. At its 2010 meeting the BOG extended the Southern Southeast Controlled Use Area effective dates from 1 September–30 September to 1 September–31 October. This was in response to hunters switching effort from September to October. The CUA sunset on 31 October 2012 and was not reauthorized by the BOG.

At the 2010 meeting, in response to unsustainable black bear harvests in some parts of Southeast Alaska, the BOG established draw hunts for all nonresident black bear hunters not using registered guides. The justification for these hunts can be found in Board of Game Direction on Black Bear Guide Allocations and Harvests in Southeast Alaska (ADFG 2011).

We issued no emergency orders affecting black bears in Unit 2 during this report period.

Hunter Harvest. The 2010–2012 average harvest was 242 bears/year. The harvest has been trending downward since the peak harvest of 486 bears in 2005 (Table 1). Harvest numbers during this reporting period need to be viewed with the understanding that 2 different management approaches were employed during this reporting period. During RY2010 and RY2011 the hunt was a general open hunt, but changed to a draw hunt for unguided nonresidents

for the RY2012 season. The average of 242 bears/year during this report period includes harvests of 256 and 319 during 2010 and 2011 respectively, and 152 under newly established drawing hunt regulations in 2012. Bunnell and Tait (1985) developed a deterministic simulation model showing that maximum allowable annual hunting mortality on black bears over 1 year old is 14.2% of the estimated population. Using Larsen's population estimate of 5,400 bears (Larsen 1995), this percentage would result in a maximum sustainable annual harvest of 767 bears. To date, the high 2005 harvest of 486 bears constituted only 9% of this population estimate. We believe the recent high harvests have not been sustainable and that the bear population has been reduced markedly the last several years. Therefore, the simulation model of 14.2% harvest being sustainable on POW may be too high, or we may be over-estimating bear density.

We are likely also beginning to see the effects of reduced carrying capacity for bears in the Unit as extensive tracts of clearcuts grow into sterile, stem-excluded second growth forests. Other factors that managers must consider are wounding loss and illegal kills. Fifty percent additional mortality in 2005 (which the department suspects may be reasonable on POW based on radio collared bears) would bring the harvest to nearly 750 bears, which is very close to the simulation model's number of 767 bears as the maximum sustainable harvest for that year.

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 1989). The mean age of harvested Unit 2 bears has remained fairly constant during the past 10 years (2003–2012), with males averaging 6.5 years (range 6.0–7.3) and females 9.3 years (range 8.6–10.1) (Table 6). Males harvested in the fall are always younger on average than bears harvested in the spring. For example, the average age for males in fall 2007 was the lowest on record at 3.8 years (Table 6). The pattern is similar for female harvest in spring versus fall. We will continue to evaluate the age trends of harvested male bears and the age structure of all harvested bears on a smaller landscape scale to look for trends. The average age of male bears taken during this report period was 6.5 years (data based only on RY2010 and RY2011 as RY2012 data is not yet available).

We have failed to meet our management objective of 19.1 inch mean spring male skull size during all 3 years of this reporting period; 2010 ($\bar{x}$ =18.6), 2011 ($\bar{x}$ = 18.4) and 2012 ($\bar{x}$ = 18.8). However, the overall annual mean male skull size did exceed the management goal of 18.0 inches every year during this reporting period. We will continue to monitor the harvest for trends in age and skull size in the data. During the previous reporting period (RY2007–2009) hunters took 63, 27 and 7 bears with skull sizes ≥20 inches (average 32). During this reporting period hunters took 29, 44 and 26 ≥20 inch bears (average 33). Occasionally Unit 2 male bears also exceed the total 21-inch skull measurement, qualifying them for the Boone and Crocket record book. During this report period, 14 bears reached ≥21 inches. This is nearly identical to the 13 bears from 2007–2009 that met this criteria, but is markedly contrasted to the peak years of 2004–2006 when 24, 26 and 28 bears respectively reached this mark. Although managing Unit 2 for trophy black bears is not necessarily a specific management objective, we hope that the limited draw hunt will create a high quality hunt where hunters, if they choose to be selective, have a reasonable chance at a 20+ inch bear.

A sex ratio of 3 males to 1 female bear in the harvest (or 75% male harvest) is thought to be sustainable over the long term. This objective was met during RY2011 and RY2102, but not in RY2010. The overall average was 2.9:1 ratio for this reporting period or 74% male harvest. The average sex ratio of the harvest during the past 10 years (2003–2012) has been just below management objectives at 2.7:1 (range 2.3:1–3.7:1) and has been above 3:1 during 3 of those 10 years. The 3.7:1 (79% male) ratio observed during RY 2012 is one of the highest we have on record for Unit 2. Managers are optimistic that the implementation of a draw hunt for nonguided nonresidents is making hunters more selective.

We believe it is important to consider harvest by watershed and other site-specific locations in order to track potential localized overharvest and to evaluate our population estimate, which is currently based on available habitat in Unit 2 as a whole. Consequently, we looked at the Unit 2 harvest at smaller scale areas as well as unit wide. The unit is divided into major harvest units (MHUs), which in turn are composed of Wildlife Analysis Areas (WAAs). During this reporting period (RY2010–2012) MHU 1200 showed a sharp rising trend in percentage of females harvested. In MHU 15 the percentage was trending down slightly and in MHU's 1100, 1300, and 1400 the trend was sharply down. Compared to the last decade (2003–2012) the percent female harvest has been stable in MHU 1100 and 1500 and trending down in MHU's 1200, 1300 and 1400. When looking at total harvest of females during this reporting period, MHU 1200 is trending up but MHU's 1100, 1300, 1400 and 1500 are trending down sharply. Over the past decade (2003–2012) the total female harvest is trending down in all 5 MHU's. All trends were calculated using linear regression (Table 7 and Figure 1).

During this report period only 1 hound hunter registered to hunt with dogs. One bear was taken using hounds during this reporting period. This houndsman has assisted Fish and Game staff with bear captures using his tracking dogs and has also assisted several hunters to find and dispatch wounded and hard to locate bears.

Hunter Residency and Success. Nonresident hunters continue to harvest more bears in Unit 2 than local and nonlocal Alaska residents combined. Prior to the 1990's, nonresidents represented less than 50% of the Unit 2 bear harvest. During this report period, nonresidents took 80% of the reported harvest, while Unit 2 residents and nonlocal Alaska residents took 7% and 13% of the remaining harvest, respectively (Table 2). The discrepancy is even more pronounced looking at the 10-year average (2003–2012) with nonresidents taking 85% of the bears. The residency of successful hunters has shifted dramatically over the past 20 years. During the 1990's Alaska residents accounted for 37% of the harvest, compared to just 15% over the past decade (Table 2).

Reasons for this shift are most likely due to an increasing interest by non-Alaskans to hunt bears in Unit 2, and a change in demographics of Alaskans living in Unit 2. Most strikingly, the Unit 2 human population has changed in the past 20 years with the closure of many logging camps and overall reductions in timber-related activities. During the past 50 years, the logging industry provided a steady flow of new hunters into the area. These were often new residents to Alaska, and a high proportion of them were avid hunters. The remote locations of the many operations allowed workers easy access to game populations, including bears. Since the decline of the timber industry, newer Unit 2 residents are more involved in tourism and charter fishing. This may explain some of the reduced resident harvest.

Hunter effort has varied widely during this reporting period. Hunters logged 960 days afield during 2010, well below the peak of 1,677 days in 2005. Effort spiked in 2011 to 1,409 hunter days, most likely a function of a last push by hunters to hunt Unit 2 before the draw hunt was instituted. As a result of the first draw hunts in 2012, hunter days dropped to 504, the lowest managers have seen since the mid 1980's. The days-per-bear has remained constant at approximately 3.6 hunter days of effort per harvested bear over the past decade (range 3.3-4.4) (Table 6).

Harvest Chronology. Most Unit 2 bears are taken in the spring with May consistently ranking as the peak harvest month. The May bear harvest averaged 53% of the annual harvest during this reporting period, consistent with the previous 7-year average of 55%. Historically, the month of September was consistently the second highest harvest month, but with the implementation of the Southern Southeast Islands Controlled Use Area in RY2009 and draw hunt in RY2012, it has dropped off considerably. Currently June is the second highest-ranking bear harvest month (Table 3).

Harvest in particular Major Harvest Areas (MHU). Major Harvest Unit (MHU) 1300 accounted for the largest portion of the total harvest in Unit 2 for this reporting period with 31%. MHU's 1200, 1400 and 1500 were similar for this reporting period at 19%, 19% and 20%, respectively. This reflects the pattern of the previous 7 years (2003–2009) of MHU 1300 accounting for 30% of the harvest while MHU's 1200, 1400 and 1500 ranking 2nd through 4th with 23%, 20% and 18% respectively. MHU 1300 is the most road accessible area of Prince of Wales Island, which leads to intense harvest pressure.

Bait permits are issued by registration permit, and each permit allows the hunter to establish 2 bait sites. Baiting is allowed only during the spring hunting season (April 15–June 30). During the past 10 years, we have issued permits for an average of 101 bait site locations each year (range 54–157). During the 2005 season we issued permits for 157 sites, the most on record for a single year in Unit 2. However, even with the overall number of bait registration permits issued in the unit, the reported harvest over bait has historically accounted for only a small percentage of the total Unit 2 bear harvest. During this report period 2010–2012, hunters reported taking 20, 26 and 11 bears over bait respectively (Table 1). With many other bear hunting options in this area, hunters who obtain Unit 2 bait permits often report taking bears using spot and stalk methods during their hunt rather than over the established bait site.

Because additional hunters may hunt over the same site with permission of the permit holder we do not have good estimates of actual numbers of hunters using bait sites. In an attempt to gather some of that important harvest information we have asked hunters to mail their posted site permit back to the department at the end of the hunting season. This printed bait site permit includes hunting license numbers from other visitors if they used another hunter's registered bait site. Hunters harvesting bears over bait each season in Unit 2 are traditionally nonresidents and typically use archery equipment to harvest a bear. Beginning spring 2010, hunters have been required by state regulation to provide exact GPS coordinates of their bait station prior to registration. This proposal was submitted by the Alaska Wildlife Troopers (AWT) to address the need for troopers to be able to locate bear baiting sites. Bear baiting permits come with a number of conditions associated with them, including requirements that they be placed away from roads and residences for public safety, and that the sites be cleaned up after the season ends. In order

for AWT to check bait sites for permit compliance, troopers need to be able to locate the sites in a safe and efficient manner. Prior to this regulation, troopers often spent hours looking for a single site. By requiring GPS locations, AWT has been able to use the waypoints to quickly and efficiently check sites for compliance and helping ensure bear baiting is conducted in a safe and responsible manner. This in turn should reduce threats of bear baiting opportunities being eliminated by voter initiatives.

Guided Hunter Harvest. Nonresidents accompanied by a licensed big game guide are allowed to harvest 1 bear. During this report period 8 guides were registered to hunt in Unit 2. Guides must first be licensed by the state for specific guide use areas and then be permitted by the U.S. Forest Service (USFS) under a special use permit to use Federal Lands. Guided hunters are not guaranteed success, although personal contact with several Southeast guides suggests 95–100% of guide-assisted hunters take bears. Successful guided hunts mirrored the harvest pattern seen in recent years, peaking in 2005 when 75 guided hunters harvested bears. During this reporting period, guided hunters took 49, 40 and 61 black bears respectively. This represents 19%, 12% and 39% of the harvest. The 39% guided harvest in RY2012 is a direct result of the black bear hunt going to a draw hunt. Except for RY2012, the average going back to RY2003 has been 14% guided harvest. Historically, 2–4 licensed big game guides have operated in Unit 2 annually. From 1990-1997 only 2 bears a year on average were taken by guided hunters, but in 1998 Unit 2 saw significant guided activity. Fifteen bears were taken on guided hunts that year and guided kills steadily increased to the peak in 2005.

The use of transporters to access hunting areas, especially by nonresidents, has been an issue of concern during this and previous report periods. Transporters are not limited by the State of Alaska or USFS to a set number of transported bear hunts (unlike registered guides who are permitted for a set number of bear hunts), so they can take as many clients on as they can handle, and that can equate to a high number of dead bears. The unregulated transporter issue is partly responsible for the large increase in bear harvest since the mid 1990s and the associated concerns we now have with bear conservation in Unit 2. Transporters are not legally allowed to influence where hunters go to hunt, nor can they assist hunters in locating or stalking game, or help clients care for trophies. There is concern that these regulations are frequently abused; that many transporters are operating similar to big game guides. The USFS is currently evaluating these activities and may eventually change its special use permit system to provide better transporter records across the Tongass National Forest. The Alaska Big Game Commercial Services Board is also clarifying existing guide language in state regulation and establishing new guidelines to reduce abuse of this system. The Forest Service is also looking at ways to bring transporters under the permit umbrella similar to guides and other permitted users. Although the Forest Service permit system is focused on addressing crowding issues, this mandatory reporting would also provide a way to monitor changes across all of the Tongass National Forest.

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 additional bears while hunting. Nonresident hunters probably wound more animals than residents because of unfamiliarity with local habitat conditions and vegetation, shot distance and placement, and basic bear behavior after the shot is

fired. Information from radio collared bears indicates a wounding rate near 25%. Although there is little other supportive data, managers believe the wounding loss on POW may actually be much higher, perhaps even as high as 50% of the annual harvest.

In the past few years we have documented a few defense of life or property (DLP) kills, but prior to that, few cases were ever reported. We suspect that bears killed at logging camps and in the many small Unit 2 communities have historically gone unreported due to the nature of DLP kills and the necessity of filling out paperwork and turning the bear over to the state. ADF&G is making a greater effort to build relationships with enforcement officials to foster better documentation and data collection in the future. Several bears are also killed in vehicle collisions each year along new stretches of paved highway. We expect vehicle collisions to increase with more miles of road being paved each year in the unit, grasses planted to stabilize hillsides will attract bears, and more drivers will spend additional time on the road at higher speeds.

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* spp., may contribute to short-term bear population growth. This new forage source will be lost as the canopy closes, as will habitat diversity associated with old-growth forests. We are also concerned with the loss of denning structures associated with the loss of trees. Logging removes valuable den trees. Bears do continue to use dens in stumps, but these structures will decay over time. Roads associated with logging increase 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. Traditionally used as a silviculture practice, precommercial thinning and pruning has been performed in some young second-growth stands in Unit 2. Recently there have been some attempts to add a wildlife component to the thinning prescriptions. The problem with most thinning prescriptions meant to benefit wildlife is the remaining slash. Because of additional cost to remove or reduce this material it is seldom treated and creates an barrier to most animals for approximately 20–25 years, after which canopy closure again results in loss of understory plants. The long-term effects of extensive clearcut logging will be detrimental to black bear populations in this unit. We may very well have reached the peak of bear suitability in Unit 2 as most of the areas previously clearcut are now reaching the closed canopy stage of forest succession. Several proposed large federal timber sales along with some state timber sale offerings will further reduce long term bear carrying capacity in Unit 2.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Nuisance Bear Problems. Historical records are inaccurate regarding the number of bears killed while getting into garbage or other human attractants in Unit 2. We receive only 1–2 DLP reports from POW each year. Since most of these Unit 2 areas are not restricted by city ordinances, landowners are more likely to shoot and tag a nuisance bear under hunting regulations rather than surrender it to authorities.

Until recently open landfills near many communities lured bears near people, and consequently, created generations of food-conditioned bears. A recent effort by the Alaska Department of Environmental Conservation to bring landfill managers into compliance with state regulations has resulted in fewer refuse attractions for Unit 2 bears. The city of Thorne Bay closed its landfill. The city of Hydaburg was found to be out of compliance and is now shipping to the Craig/Klawock landfill. The shared Craig/Klawock barge transfer site is now operating and has removed the food attraction for bears.

CONCLUSIONS AND RECOMMENDATIONS

The Unit 2 black bear harvest steadily increased to record levels in 2005. Now that Unit 2 is under a draw permit for nonguided nonresidents, managers should be able to stabilize the annual bear harvest and bring it down to more sustainable levels. The data that has been collected to estimate the harvest rate of bears in the central WAAs on POW, as well as present research efforts aimed at providing some basic demographics, life history and movement pattern information about POW bears will greatly enhance our understanding of this important animal on POW to better address future management needs.

The general age trend of male and female bears in the harvest appears to be stable, but we have failed to meet our management objective of 19.1 inches mean spring male skull size during all 3 years of this reporting period

Unit 2 hunters would benefit from an educational video with information on identifying mature male bears in the field and that at the same time outlines our concerns about wounding loss. Such a video would help hunters and managers by promoting more male-specific selective hunting and would help educate hunters about shot placement and shot distance.

We will continue to monitor specific harvest locations in order to track harvest and adjust future population estimates. This is especially important because harvests along the road system make up a large portion of the total bear harvest in the unit. Based on available literature, data collected, and crude density estimates, we believe the harvests during the mid 2000's exceeded sustainable levels. Regulatory changes such as the Southern Southeast Islands Controlled Use Area and a draw hunt for nonguided nonresidents have been implemented to address these concerns and appear to be effectively bringing harvests back within sustainable levels. Anecdotally, hunters and guides have reported a higher quality hunt post draw implementation, with less crowded hunting conditions and more bears available.

As logging continues, and large tracts of previously logged habitat rapidly convert to second-growth forest, we anticipate reductions in the carrying capacity for Unit 2 bears.

REFERENCES CITED

ADF&G. 2011. Board of Game Direction on Black bear Guide Allocations and Harvests in Southeast Alaska (Based on Decisions made at the November 2010 Region I Board of Game Meeting).

Beier L. R., S. B. Lewis, R. W. Flynn, G. Pendelton, T. V. Schumacher. 2005. A single-catch snare to collect brown bear hair for genetic mark-recapture studies. Wild. Soc. Bull. Vol. 33, (2) pp. 766–773.

Bethune, S.W. 2011. Unit 2 black bear management report. Pages 67–95 in P. Harper, editor. Black bear management report of survey and inventory activities 1 July 2007–30 June 2009. Alaska department of Fish and Game. Project 17.0. Juneau.

Bunnell F.L. and D. Tait. 1985. Mortality rates of North American bears. Arctic 38:316–323.

Carney D.W. 1985. Population dynamics and denning ecology of black bears in Shenandoah National Park, Virginia. M.S. Thesis. Virginia Polytechnic Institute and State University, Blacksburg, VA.

Garshelis D.L. 1989. Bear Management and Research in the Great Lakes States. North Country Bear Hunter 2(2):8–9.

Garshelis D.L. 1990. Monitoring effects of harvest on black bear populations in North America: a review and evaluations of techniques. Pages 120–144 *in* Clark, J.D., and K.G. Smith, editors. Proceedings of the Tenth Eastern Workshop on Black Bear Research and Management.

Jonkel C.J. and I.M. Cowan. 1971. The black bear in the spruce-fir forest. Wildlife Monographs 27.

Kolenosky G.B. and Strathearn S.M. 1987. Black Bear. Pages 442–454 *in* M. Novak et al., editors. Wild Furbearer Management and Conservation in North America.

Modafferi R. 1982. Black bear movements and home range study. Alaska Department of Fish and Game Final Report. Federal Aid in Wildlife Restoration Project. W-17-10, W-17-11, W-21-1, and W-21-2. Job 17.2R.

Larsen D.N. 1995. Black bear harvests and management, Prince of Wales and adjacent islands. Unpublished report, Ketchikan.

Lindzey F.G. and E.C. Meslow. 1977. Population Characteristics of black bears on an island in Washington. Journal of Wildlife Management 41(3):408–412.

Peacock L. 2004. Population, genetic and behavioral studies of black bears in southeast, Alaska. Ph D Dissertation, University of Nevada Reno.

Person, D.K. and K. Larson. 2013. Developing a method to estimate abundance of wolves in southeast Alaska, Progress Report: 1 January 2013–31 May 2013.

Poelker R.J. and H.D. Hartwell. 1973. Black bear of Washington. Biological Bulletin. No. 14. Federal Aid Project W-71-R. Olympia, Washington.

Porter, B. 2008. Unit 2 black bear management report. Pages 66–91 *in* P. Harper, editor. Black bear management report of survey and inventory activities 1 July 2004–30 June 2007. Alaska Department of Fish and Game. Project 17.0. Juneau.

Suring L.H., E.J. Degayner, R.W. Flynn, T. McCarthy, M.L. Orme, R.E. Wood and E.L. Young. 1988. Habitat capability model for black bear in southeast Alaska. U.S. Forest Service, Tongass National Forest.

USDA (United States Department of Agriculture) Forest Service. 2009. Access travel management plan environmental assessment Prince of Wales and surrounding islands. Craig and Thorne Bay ranger districts. Tongass National Forest, Alaska.

U.S. Forest Service. 1997. Tongass Land Management Plan Revision. U.S. Forest Service R10-MB-338b.

Wood R.E. 1990. Black bear survey-inventory progress report. Pages 1–6 *in* S.O. Morgan, editor. Annual report of survey-inventory activities. Part IV. Black bear. Vol. XX. Alaska Department of Fish and Game Federal Aid in Wildlife Restoration Progress Report. Project W-23-2, Study 17.0. Juneau.

PREPARED BY:

Stephen Bethune
Wildlife Biologist II

APPROVED BY:

Ryan Scott
Acting Regional Management Coordinator

Please cite any information taken from this section, and reference as:

Bethune, S. 2014. Unit 2 black bear management report. Chapter 5: pages 5-1 through 5-26 [*In*] P. Harper and Laura A. McCarthy, editors. Black bear management report of survey and inventory activities 1 July 2010–30 June 2012. Alaska Department of Fish and Game, Species Management Report, ADF&G/DWC/SMR-2014-5, Juneau.

Table 1. Unit 2 black bear harvest, RY 2003-2012.

Regulatory year	Reported													
	Hunter kill					Nonhunting kill[a]				Total estimated kill[c]				
	M	F	Unk	Total	Baited[b]	M	F	Unk	Total	M	(%)	F	(%)	Unk	Total
2003															
Fall 2003	65	49	0	114	0	0	2	0	2	65	(56)	51	(44)	0	116
Spring 2004	275	46	0	321	35	3	0	0	3	278	(86)	46	(14)	0	324
Total	340	95	0	435	35	3	2	0	5	343	(80)	97	(20)	0	440
2004															
Fall 2004	48	66	0	114	0	0	0	0	0	48	(42)	66	(58)	0	114
Spring 2005	296	61	0	357	30	0	0	0	0	296	(83)	61	(17)	0	357
Total	344	127	0	471	30	0	0	0	0	344	(73)	127	(27)	0	471
2005															
Fall 2005	71	53	0	124	0	0	0	0	0	71	(57)	53	(43)	0	124
Spring 2006	268	94	0	362	46	0	0	0	0	268	(74)	94	(26)	0	362
Total	339	147	0	486	46	0	0	0	0	339	(70)	147	(30)	0	486
2006															
Fall 2006	44	37	0	81	0	0	0	0	0	44	(54)	37	(46)	0	81
Spring 2007	240	72	0	312	37	0	0	0	0	240	(74)	72	(23)	0	312
Total	284	109	0	393	37	0	0	0	0	284	(70)	109	(28)	0	393
2007															
Fall 2007	47	58	0	105	3	0	0	0	0	47	(45)	58	(55)	0	105
Spring 2008	205	53	0	258	31	0	0	0	0	205	(79)	53	(21)	0	258
Total	252	111	0	363	31	0	0	0	0	252	(69)	111	(31)	0	363
2008															
Fall 2008	64	59	0	123	0	1	0	0	1	65	(52)	59	(48)	0	124
Spring 2009	176	27	0	203	24	0	0	0	0	176	(87)	27	(13)	0	203
Total	240	86	0	326	24	1	0	0	1	241	(74)	86	(26)	0	327

Table continues next page

Table 1. continued.

Regulatory year	Reported													
	Hunter kill					Nonhunting kill[a]				Total estimated kill[c]				
	M	F	Unk	Total	Baited[b]	M	F	Unk	Total	M	(%)	F	(%)	Unk	Total
2009															
Fall 2009	26	32	3	61	0	2	0	0	2	28	(46)	32	(53)	3	63
Spring 2010	145	36	0	181	8	1	0	0	1	146	(80)	36	(20)	0	182
Total	171	68	3	242	8	3	0	0	3	174	(72)	68	(28)	3	245
2010															
Fall 2010	27	24	0	51	0	3	0	0	3	30	(56)	24	(44)	0	54
Spring 2011	151	54	0	205	20	0	1	1	2	151	(73)	55	(27)	0	206
Total	178	78	0	256	20	3	1	1	5	181	(70)	79	(30)	0	260
2011															
Fall 2011	25	21	0	46	0	1	0	0	1	26	(55)	21	(45)	0	47
Spring 2012	219	54	0	273	26	0	0	2	2	219	(80)	54	(20)	2	275
Total	244	75	0	319	26	1	0	2	3	245	(77)	75	(23)	2	322
2012															
Fall 2012	19	14	0	33	0	5	0	0	5	24	(63)	14	(37)	0	38
Spring 2013	100	19	0	119	11	0	0	0	0	100	(84)	19	(16)	0	119
Total	119	33	0	152	11	5	0	0	5	124	(79)	33	(21)	0	157

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

[b] Bears reported harvested over bait.

[c] Percent by sex based only on known harvest total

Table 2. Unit 2 residency of successful black bear hunters, RY 2003-2012.

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total
2003	28	(7)	24	(5)	383	(88)	435
2004	28	(6)	42	(9)	401	(85)	471
2005	20	(4)	41	(8)	425	(87)	486
2006	18	(5)	26	(7)	349	(89)	393
2007	17	(5)	22	(6)	324	(89)	363
2008	22	(7)	24	(7)	280	(86)	326
2009	22	(9)	25	(10)	195	(81)	242
2010	14	(5)	28	(11)	214	(84)	256
2011	19	(6)	33	(10)	267	(84)	319
2012	19	(13)	34	(22)	99	(65)	152
Average	21	(6)	30	(9)	294	(85)	344

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

Table 3. Unit 2 black bear hunter harvest chronology by month[a], RY 2003-2012

Regulatory	Harvest periods												
year	Sep	(%)	Oct	(%)	Nov	(%)	Apr	(%)	May	(%)	Jun	(%)	*n*
2003	99	(24)	13	(3)	2	(<1)	21	(5)	265	(60)	35	(8)	435
2004	99	(21)	11	(2)	4	(1)	37	(8)	278	(59)	42	(9)	471
2005	110	(23)	12	(2)	2	(<1)	18	(4)	276	(57)	68	(14)	486
2006	95	(24)	11	(3)	4	(1)	3	(1)	223	(57)	57	(15)	393
2007	94	(26)	9	(2)	2	(<1)	10	(3)	184	(51)	64	(18)	363
2008	104	(32)	13	(4)	6	(2)	7	(2)	133	(41)	63	(19)	326
2009	30	(13)	25	(10)	3	(1)	5	(2)	139	(58)	37	(15)	242
2010	31	(12)	16	(6)	4	(2)	6	(2)	132	(52)	67	(26)	256
2011	35	(11)	8	(3)	3	(1)	2	(<1)	168	(53)	103	(32)	319
2012	17	(11)	11	(7)	5	(3)	5	(3)	82	(54)	32	(21)	152
Average	71	(20)	13	(4)	4	(1)	11	(3)	188	(55)	57	(17)	344

[a] Does not include bears killed during closed season.

Table 4. Unit 2 transportation methods use in harvesting black bears, RY 2003-2012.

	Transport												
Regulatory year	Air	(%)	Boat	(%)	Highway vehicle	(%)	Walk	(%)	ORV	(%)	Unk	(%)	*n*
2003	11	(1)	231	(54)	185	(43)	7	(0)	1	(0)	0	(0)	435
2004	6	(1)	235	(50)	228	(48)	0	(0)	0	(0)	3	(<1)	471
2005	5	(1)	258	(53)	219	(45)	4	(1)	0	(0)	0	(0)	486
2006	12	(3)	181	(46)	200	(51)	0	(0)	0	(0)	0	(0)	393
2007	3	<1	186	(51)	163	(45)	10	(3)	1	<1	0	(0)	363
2008	7	(2)	140	(43)	165	(51)	11	(3)	3	<1	0	(0)	326
2009	1	<1	129	(53)	90	(37)	8	(3)	1	<1	13	(5)	242
2010	13	(5)	141	(55)	88	(34)	10	(4)	3	(1)	1	(<1)	256
2011	4	(1)	197	(62)	108	(34)	10	(3)	0	(0)	0	(0)	319
2012	4	(2)	109	(72)	33	(22)	6	(4)	0	(0)	0	(0)	152
Average	7	(2)	181	(53)	148	(43)	7	(2)	1	(<1)	2	(<1)	344

Table 5. Unit 2 black bear harvest from the most heavily harvested wildlife analysis areas (WAA), RY 2003-2012.

WAA	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	$\bar{x}$
1107	16	37	35	23	28	14	5	10	17	7	**19**
1210	26	10	24	12	12	6	3	8	11	8	**12**
1211	20	35	32	28	18	8	3	6	4	5	**16**
1213	9	16	21	7	8	11	6	1	2	4	**9**
1214	37	38	55	21	27	37	31	28	35	19	**33**
1315	24	13	12	16	18	13	15	14	18	9	**15**
1316	3	3	1	3	4	8	2	2	2	1	**3**
1317	34	37	32	36	28	26	14	14	30	1	**25**
1318	25	11	13	16	19	16	13	17	25	3	**16**
1319	21	24	36	22	27	22	10	8	11	5	**19**
1332	0	15	14	19	18	12	15	13	14	5	**13**
1420	16	24	29	23	11	18	14	26	15	14	**19**
1421	11	10	8	11	8	9	8	5	7	3	**8**
1422	50	62	60	46	49	43	23	22	28	16	**40**
1526	26	22	12	19	10	9	9	12	17	15	**15**
1527	16	5	10	12	12	5	6	12	14	1	**9**
1529	10	19	19	21	13	10	9	12	14	3	**13**
1530	17	16	13	13	8	17	10	3	10	4	**11**
1531	4	9	6	4	8	4	0	4	0	0	**4**

Table 6. Unit 2 successful black bear hunter effort, mean skull size, and mean age, RY 2003-2012.

Regulatory year	Hunter effort: Total days	Hunter effort: Nr hunters	Hunter effort: Mean days per hunter	Mean skull size[a] (inches): Male	Mean skull size[a] (inches): n[d]	Mean skull size[a] (inches): Female	Mean skull size[a] (inches): n	Average age (years)[bc]: Male	Average age (years)[bc]: n	Average age (years)[bc]: Female	Average age (years)[bc]: n
2003											
Fall 2003	355	114	3.1	17.5	65	16.6	46	4.8	64	9.0	49
Spring 2004	1142	320	3.6	19.4	272	17.2	44	7.9	271	10.2	43
Total/Average	1497	435	$\bar{x}$ =3.4	$\bar{x}$ =19.0	337	$\bar{x}$ =16.9	90	$\bar{x}$ =7.3	335	$\bar{x}$ =9.5	92
2004											
Fall 2004	375	112	3.3	17.6	46	16.8	65	4.5	47	9.3	64
Spring 2005	1251	354	3.5	19.3	286	16.9	57	7.8	288	9.6	60
Total/Average	1626	466	$\bar{x}$ =3.5	$\bar{x}$ =18.5	332	$\bar{x}$ =16.9	122	$\bar{x}$ =6.2	335	$\bar{x}$ =9.5	124
2005											
Fall 2005	371	124	3.0	17.2	67	16.5	51	4.6	70	7.5	51
Spring 2006	1306	360	3.6	18.8	258	17.2	87	7.4	260	9.6	90
Total/Average	1677	484	$\bar{x}$ =3.5	$\bar{x}$ =18.0	325	$\bar{x}$ =16.9	138	$\bar{x}$ =6.0	330	$\bar{x}$ =8.6	141
2006											
Fall 2006	267	81	3.3	16.9	43	16.7	37	4.9	44	9.6	37
Spring 2007	1165	312	3.7	19.0	240	16.7	72	7.8	228	8.1	67
Total/Average	1432	393	$\bar{x}$ =3.6	$\bar{x}$ =18.0	283	$\bar{x}$ =16.7	109	$\bar{x}$ =6.4	272	$\bar{x}$ =8.9	104
2007											
Fall 2007	323	104	3.1	16.7	46	16.8	57	3.8	46	8.7	55
Spring 2008	967	255	3.8	18.9	201	17.2	52	7.3	191	10.8	50
Total/Average	1,290	359	$\bar{x}$ =3.6	$\bar{x}$ =18.5	247	$\bar{x}$ =17.0	109	$\bar{x}$ =6.6	237	$\bar{x}$ =9.7	105
2008											
Fall 2008	331	120	2.8	17.3	56	16.8	53	5.0	54	9.5	50
Spring 2009	767	203	3.8	18.9	166	17.3	26	7.0	151	11.3	22
Total/Average	1,098	323	$\bar{x}$ =3.4	$\bar{x}$ =18.5	222	$\bar{x}$ =17.0	79	$\bar{x}$ =6.5	205	$\bar{x}$ =10.0	72

Table continued next page

Table 6. continued.

Regulatory year	Hunter effort: Total days	Hunter effort: Nr hunters	Hunter effort: Mean days per hunter	Mean skull size[a] (inches): Male	*n*[c]	Mean skull size[a] (inches): Female	*n*	Average age (years)[b]: Male	*n*	Average age (years)[b]: Female	*n*
2009											
Fall 2009	160	53	3.0	17.6	25	16.6	28	5.2	19	8.5	25
Spring 2009	630	177	3.6	18.9	146	16.8	34	7.0	120	11.1	29
Total/Average	790	230	$\bar{x}$ =3.4	$\bar{x}$ =18.7	171	$\bar{x}$ =16.7	62	$\bar{x}$ =6.8	139	$\bar{x}$ =9.9	54
2010											
Fall 2010	168	51	3.3	17.2	27	16.5	23	5.9	20	8.8	18
Spring 2011	792	205	3.9	18.6	150	17.0	52	6.4	146	10.5	49
Total/Average	960	256	$\bar{x}$ =3.8	$\bar{x}$ =18.4	177	$\bar{x}$ =16.8	75	$\bar{x}$ =6.3	166	$\bar{x}$ =10.1	67
2011											
Fall 2011	126	46	2.7	16.9	25	16.5	19	4.1	24	9.1	21
Spring 2012	1283	273	4.7	18.4	215	17.0	53	6.0	207	8.3	51
Total/Average	1409	319	$\bar{x}$ =4.4	$\bar{x}$ =18.2	240	$\bar{x}$ =16.8	72	$\bar{x}$ =6.6	231	$\bar{x}$ =8.6	72
2012											
Fall 2012	78	33	2.4	17.8	19	16.3	14	--	--	--	--
Spring 2013	426	119	3.6	18.8	100	16.7	19	--	--	--	--
Total/Average	504	152	$\bar{x}$ =3.3	$\bar{x}$ =18.6	119	$\bar{x}$ =16.5	33	--	--	--	--

[a] Skull sizes equal length plus zygomatic width.

[b] Bear ages for 2012 not available, results still returning from lab at time of printing.

[c] *n* represents sample size. Totals may not equal other tables due to some bears not being aged and/or damaged skulls at sealing.

Table 7. Unit 2 black bear harvest by major harvest unit (MHU), RY 2003-2012.

	MHU 1100			MHU 1200			MHU 1300			MHU 1400			MHU 1500		
Year	Female	Total	% Fem.	Female	Total	% Fem.	Female	Total	% Fem.	Female	Total	% Fem.	Female	Total	% Fem.
2003	4	48	8	17	102	17	31	122	25	21	77	27	22	83	27
2004	7	51	14	24	109	22	31	124	25	34	96	35	30	85	35
2005	13	47	28	45	136	33	39	128	30	28	95	29	22	72	31
2006	7	32	22	16	81	20	44	119	37	19	80	24	22	78	28
2007	10	39	26	21	65	32	36	122	30	22	68	32	22	61	36
2008	4	26	15	19	67	28	26	100	26	20	70	29	17	51	33
2009	2	18	11	4	47	9	27	79	34	14	44	32	17	39	44
2010	8	25	32	4	46	9	20	76	26	24	55	44	19	55	35
2011	7	33	21	11	56	20	28	110	25	10	50	20	17	62	27
2012	1	19	5	10	38	26	3	36	8	10	33	30	9	31	29
Ave.	6	34	18	17	75	23	29	102	28	20	67	30	20	62	32

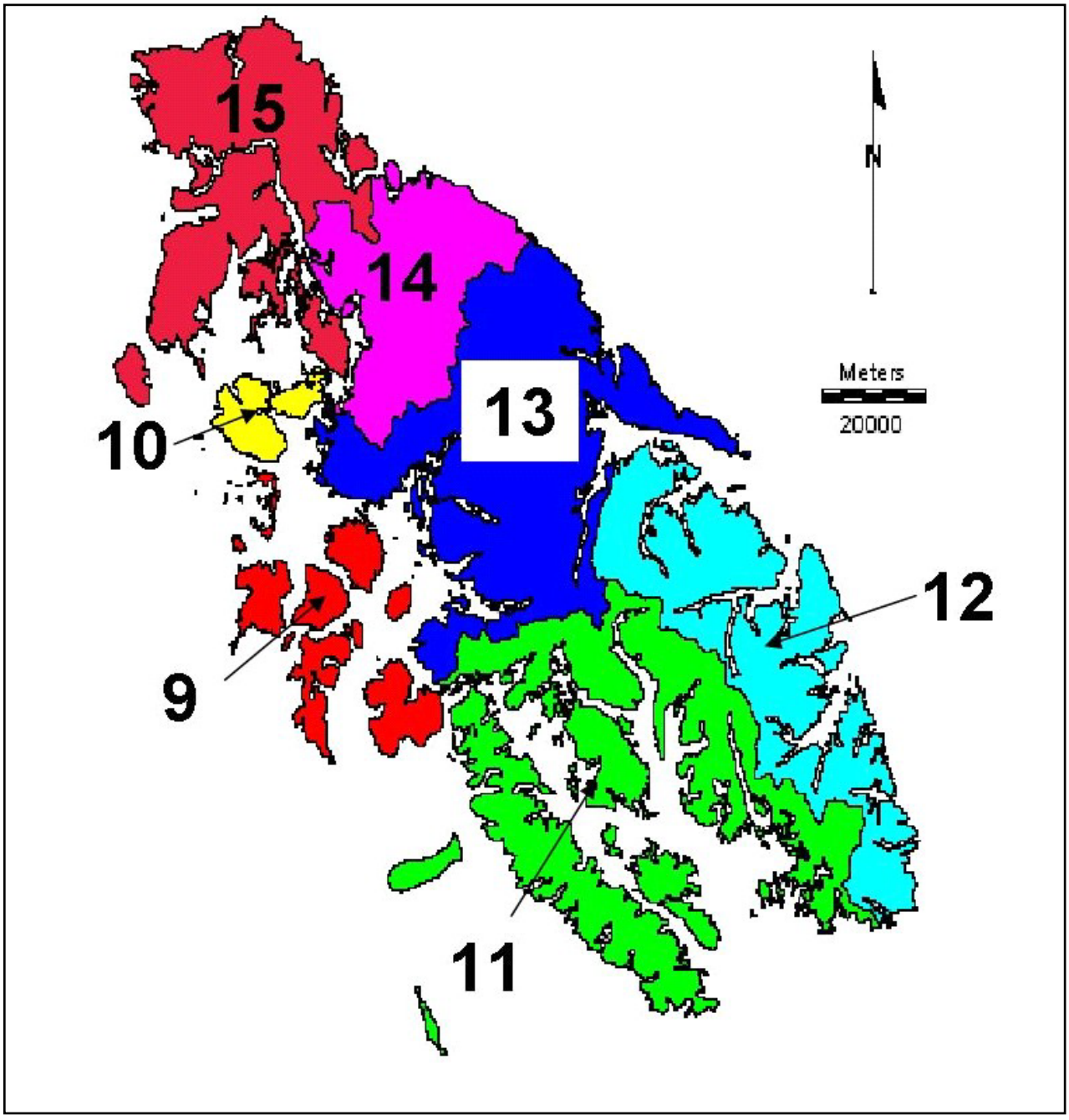

Figure 1. Unit 2 Major Harvest Units (MHUs, XX00s).