BLACK BEAR
POPULATION MANAGEMENT PLAN

DAU B-11

Roaring Fork and Eagle Valleys

GAME MANAGEMENT UNITS

35, 36, 43, 44, 45, 47, 361, 444, and 471

NW Region

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BLACK BEAR POPULATION MANAGEMENT PLAN FOR DATA ANALYSIS UNIT B-11

EXECUTIVE SUMMARY

GMUs: 35, 36, 43, 44, 45, 47, 361, 444, and 471 (Pitkin, Eagle, Garfield, Gunnison, and Grand counties)
Land Ownership: 63% USFS, 22% Private, 14% BLM, 1% State, <1% Local municipalities/Land trust/Non-governmental organization
Current Population Objective: Provisional since 2010: Decrease the bear population.
Current Mortality Objectives: Provisional since 2010: 80 harvested bears; 110 total bear mortalities.
Preferred New Strategic Goal: Stable bear population trend and no increase in human-bear conflicts: CPW will manage the B-11 bear population within the stable ranges of the age-sex harvest composition indices and total mortality rates. Continuing efforts will be made to engage communities in Bear Aware education and to encourage local governments to implement and strictly enforce ordinances aimed at minimizing bear attractants. To allow a few years for communities to work on education and enforcement strategies, starting in the 5th year of implementation of this management plan, we will examine whether these strategies are effective based on the number of human-bear conflicts. If human-bear conflicts have increased beyond a 3-year average of 450 conflict incidents per year, then the management strategy will transition to bear population reduction through increased harvest. Under the current estimated population size of 1,040 bears, a stable population strategy can be achieved through annual total mortality of 104-156, which includes hunter harvest of 70-122 bears. License quotas are expected to remain similar to current levels.

BACKGROUND

Black bear Data Analysis Unit (DAU) B-11 is located in the Roaring Fork and Eagle River valleys, including the Frying Pan River, Crystal River, Homestake, Brush, Gypsum, and Gore Creeks, and also includes part of the Colorado River watershed. The DAU includes Pitkin County, most of Eagle County, and portions of Garfield, Gunnison, and Grand Counties. The Game Management Units (GMUs) in B-11 are 35, 36, 43, 44, 45, 47, 361, 444, and 471. Major towns in the DAU include Aspen, Snowmass Village, Basalt, Carbondale, Glenwood Springs, Gypsum, Eagle, Edwards, Avon, and Vail. B-11 covers approximately 7,400 square kilometers (1.83 million acres) of land, managed by various government agencies and private landowners. Nearly four-fifths of the DAU is public land.

Annual bear mortality in B-11 has been increasing over the past 2 decades. The 10-year average of annual bear mortality is 118 bears/year, and the 3-year average is 135 bears/year. Conflicts between bears and humans are frequent, especially when natural foods are scarce and when garbage and other human-related attractants are readily available. These conflicts are the combined result of increases in both bear and human populations over the past several decades, increased availability of human-related food sources, and more frequent poor natural food years. In B-11, bear conflict years are now the “new normal.”

Harvest has also increased since 2010 when license quotas were increased. The current 10-year average annual harvest mortality is 80 bears, and the current 3-year average is 100 harvested bears. Among methods of take, the September rifle season contributes the most (76%) toward total annual harvest.

CPW uses the age and sex composition of harvested bears as an indicator of population trajectory. Over the most recent 3 years (2017-2019) of available data, the age and sex composition of the harvest has averaged: (a) 20% adult male in the total harvest, (b) 40% female in the total harvest, and (c) 49% adult female in the female portion of harvest. Overall, the trend since 2010 in these age-sex composition indices considered altogether points toward a population trajectory that is relatively stable.

A suite of 4 habitat and population models was developed to estimate the bear population size in the unit. Because the population size of black bears is challenging to accurately measure, the model estimates of population vary widely, from ~600 to ~1,400 bears, depending on the assumptions within each model. For the

purposes of establishing management guidelines and objectives, we averaged the 4 models, yielding an estimate of 1,040 adult and subadult bears as the current presumed population size.

SIGNIFICANT ISSUES

The most significant issue regarding bear management in B-11 is managing conflicts between bears and people. These conflicts generally involve bears feeding on trash, entering and damaging houses and vehicles, or killing livestock. On rare occasions, direct contact between bears and humans has resulted in human injuries. Conflicts are common in most towns within the DAU, especially during poor natural food years. Trash ordinances have been adopted by many towns and counties in B-11 and have had varied success at reducing available anthropogenic foods. In reality, however, trash continues to be a problem in many communities due to poor compliance with trash ordinances. In 8 of the last 15 years, B-11 has had unprecedentedly high human-bear conflicts, which have exceeded CPW field staff's time and resources to reasonably handle.

The cost of bear-related game damage claims in B-11 between 2002-2017 averaged $26,633 per year. Domestic sheep kills were the overwhelming majority of claims. Landowner-caused bear mortalities account for 15-20% of total non-harvest bear mortalities, but there is no clear correlation between fall forage quality and the number of landowner-caused mortalities.

These bear management issues and the approaches needed to address them are complex and multifaceted. The structure of a Bear Population Management Plan focuses primarily on one specific tool, hunting, out of a suite of tools, including education, enforcement, and habitat modification, that can also be used to manage conflicts. This plan provides harvest-related monitoring structures along with strategic goal alternatives to manage the bear population size and human-bear conflicts in B-11. However, the types of conflicts that occur between people and bears often require more than simple changes in licensing or hunting structure in order to completely resolve the problem. Preventing human-bear conflicts by removing attractants for bears is critical to addressing the source of the conflicts, rather than only dealing with the later consequences through lethal removal of bears. Active and consistent involvement by residents and businesses in the communities, trash companies, HOAs, local governments, and federal land management agencies to substantially reduce and ideally eliminate the availability of human food sources for bears is needed to truly and effectively resolve these bear management issues.

PREFERRED MANAGEMENT STRATEGY

The top management priority in DAU B-11 is to reduce conflicts between humans and bears. In addition, the quality of bear hunting experience and the persistence of a sustainable bear population are additional priorities after human-bear conflict management. **Importantly, without significantly reducing trash and other human-associated attractants, human-bear conflicts will likely continue. CPW's management authority (and therefore this bear management plan) only directly covers management of wildlife, so it is incumbent upon municipalities, residents and other stakeholders to collaboratively address the human behaviors and activities which in turn affect bears' foraging patterns.**

We considered two alternatives for future strategic goals for B-11's bear population: Alternative 1 would manage for a stable bear population and no increase in human-bear conflicts, and Alternative 2 would prescribe a reduction in the bear population through increased harvest until a 50% decrease in human-bear conflicts is achieved. The preferred management strategy that CPW staff is recommending blends the two alternatives, starting with the approaches outlined in Alternative 1 to maintain the current bear population size and to avoid an increase in conflicts. If human-bear conflicts increase, however, the management strategy would shift to Alternative 2.

Alternative 1: Stable population trend with social metric threshold

Under Alternative 1, B-11 would be managed for a stable bear population trajectory and for no increase in human-bear conflicts. A decrease in human-bear conflicts is desired and CPW will continue to work with communities to educate residents and visitors on Bear Aware practices, and encourage municipal and county authorities to strictly enforce trash ordinances. To allow a few years for communities to work on

education and enforcement strategies, starting in the 5th year of implementation of this management plan, we will examine whether these strategies are effective based on the number of human-bear conflicts. If human-bear conflicts have increased beyond a 3-year average of 450 conflicts per year, then the management strategy for B-11 would be changed to a bear population reduction strategy by increasing harvest, as described in Alternative 2.

The trend in 3-year averages of age/sex composition of the harvest should be consistent with that of a stable population:

(a) proportion of adult males in the harvest within 25-35%,

(b) total females at 30-40% of total harvest,

(c) adult females at 45-55% of the female harvest.

The total mortality rate as a proportion of the population should fall in the 10-15% range. Based on the current population estimate in B-11 of 1,040 bears, total mortality needed to maintain a stable population is 104-156 total bear mortalities per year. Deducting the current 3-year average non-harvest human-caused mortality of 34 mortalities from the total mortality objective, the harvest objective should be 70-122 harvested bears per year.

CPW will continue to work with local municipalities, communities, and trash companies to emphasize both Bear Aware information and education, as well as enforcement of trash ordinances and other regulations aimed at reducing or prohibiting artificial food sources available to bears. Funding for efforts to reduce human-bear conflicts will be instrumental. Internal CPW funds have been allocated to address human-bear conflicts in B-11, but additional matching funds from local governments and organizations will also be necessary to affect change on a scale significant enough to positively influence outcomes.

In the 5th year of this plan, if the number of human-bear incidents (based on incidents logged in CPW's Wildlife Incidents App that are classified as conflicts) exceeds a 3-year average of 450 conflicts/year, then the management strategy would shift to a bear population reduction objective through increased harvest (as described in Alternative 2).

Under Alternative 1, opportunities to obtain a bear license would remain under a limited license structure and license quotas would remain similar to those of recent years. Unless communities are successful at securing trash and other human food sources, human-bear conflicts would likely continue to be high in years of poor natural foods. Vehicle collisions with bears and game damage would also remain similar to current levels, assuming a stable bear population.

Alternative 2: Decreasing population trend with social metric thresholds

B-11 would be managed for a decreasing population trend until social metrics show a reduction in human-bear conflicts of at least 50% over a running 3-year average, or until harvest composition indices indicate 3 consecutive years of declining population, at which time CPW would conduct a survey of B-11 bear hunters to assess hunter satisfaction. (See main text for further details.)

CPW's primary tool to manage the overall bear population size is through regulating the amount of harvest, but the agency does not have authority over enforcing people to secure their garbage. **As observed in other communities in the U.S. and Canada dealing with human-bear conflicts, a meaningful reduction in conflicts only occurs when human-source foods are made unavailable to bears. CPW strongly encourages people to follow bear-proofing guidelines and supports strict enforcement by local law enforcement authorities of ordinances to secure garbage and other attractants.**

BEAR DATA ANALYSIS UNIT (DAU) B-11
GAME MANAGEMENT UNITS
35, 36, 43, 44, 45, 47, 361, 444, and 471

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INTRODUCTION

Colorado Parks and Wildlife (CPW) manages wildlife for the use, benefit, and enjoyment of the people of the state in accordance with the CPW's Strategic Plan and mandates from the Colorado Parks and Wildlife Commission and the Colorado Legislature. Colorado's wildlife resources require careful and increasingly intensive management to accommodate the many and varied public demands and growing impacts from people. CPW is responsible for the maintenance of Colorado's big game at population levels that are established through a public review process and approved by the Colorado Parks and Wildlife Commission.

BEAR MANAGEMENT PLANS and WILDLIFE MANAGEMENT BY OBJECTIVES

To manage the state's big game populations, CPW uses a "management by objective" approach (Figure 1). Big game populations are managed to achieve objectives established for Data Analysis Units (DAUs). DAUs are geographic areas that typically contain an individual big game population. For large mobile carnivores like black bears, DAUs are primarily administrative constructs with generally similar habitats and/or human social considerations. DAUs are composed of smaller areas designated as game management units (GMUs), which provide a more practical framework where the management goals can be refined and applied on a smaller scale, typically through hunting regulations.

The bear management planning process is designed to balance public demands, habitat, and big game populations into a management scheme for the individual DAU. The public, hunters, federal and local land use agencies, landowners, and agricultural interests are involved in determining the plan objectives through input given during public meetings, the opportunity to comment on draft plans and when final review is undertaken by the Colorado Parks and Wildlife Commission.

The strategic goals and specific mortality objectives defined in the plan guide a long-term cycle of annual information collection, information analysis, and decision-making. The end product of this process is a recommendation for numbers of hunting licenses for the DAU (Figure 1). The plan also specifically outlines the management techniques that will be used to reach desired objectives. CPW intends to update these plans as new information and data become available, at least once every ten years.

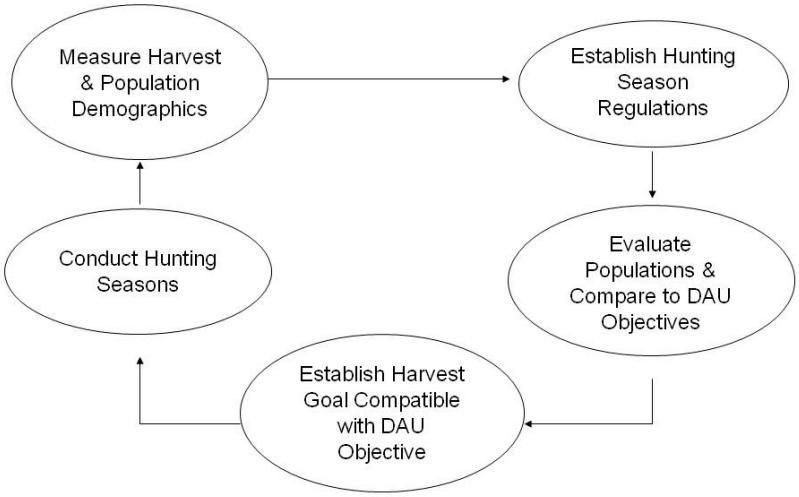

Figure 1. Management by objectives process used by the CPW to manage big game populations on a DAU basis.

Black bear management issues and what tools should be used to address them are particularly complex and multifaceted. Strategies in communities within B-11 and in other North American states and provinces involving attempts at bear behavioral change, community education, enforcement of ordinances requiring bear-proof garbage containers, the human dimensions component of human-bear conflicts, etc. have been reviewed elsewhere (e.g., Peine 2001; Gore 2004; Tavss 2005; Kiel 2007; Baruch-Mordo et al. 2009, 2011, 2013; Johnson et al. 2018). The structure of a bear management plan focuses on one specific tool, primarily hunting, out of a suite of tools, including education, enforcement, and habitat modification, which also can be used to manage conflicts. This plan provides harvest-related monitoring structures along with strategic goal alternatives that will attempt to influence the bear population size in B-11. However, the types of conflicts that occur between people and bears often require more than simple changes in licensing or hunting structure in order to completely resolve the problem. Active involvement by residents and businesses in the communities, trash companies, HOAs, and local governments to reduce and ideally eliminate human food sources for bears are also critical to resolving bear management issues.

DATA ANALYSIS UNIT DESCRIPTION

Location

Black bear DAU B-11 is located in the Roaring Fork and Eagle River valleys, including the Frying Pan River, Crystal River, Homestake, Gore, Brush, and Gypsum Creeks, and also includes part of the Colorado River watershed. The DAU includes Pitkin County, most of Eagle County, and portions of Garfield, Gunnison, and Grand Counties. The Game Management Units (GMUs) in B-11 are 35, 36, 43, 44, 45, 47, 361, 444, and 471. Major towns in the DAU include Aspen, Snowmass Village, Basalt, Carbondale, Glenwood Springs, Gypsum, Eagle, Edwards, Avon, and Vail.

B-11 covers approximately 7,400 square kilometers (1.83 million acres) of land, managed by various government agencies and private landowners (Figure 2). Nearly four-fifths of the DAU are public lands. The US Forest Service (USFS) manages 63% of the land in the DAU. The Bureau of Land Management (BLM) is the land manager for 14% of the DAU. The state of Colorado manages 1% of the DAU which is mostly held as State Wildlife Areas and Colorado School Board lands. Less than 1 % of

the DAU is local city, county, and land trust/non-governmental organization properties. The remaining 22% of lands within the DAU are in private ownership.

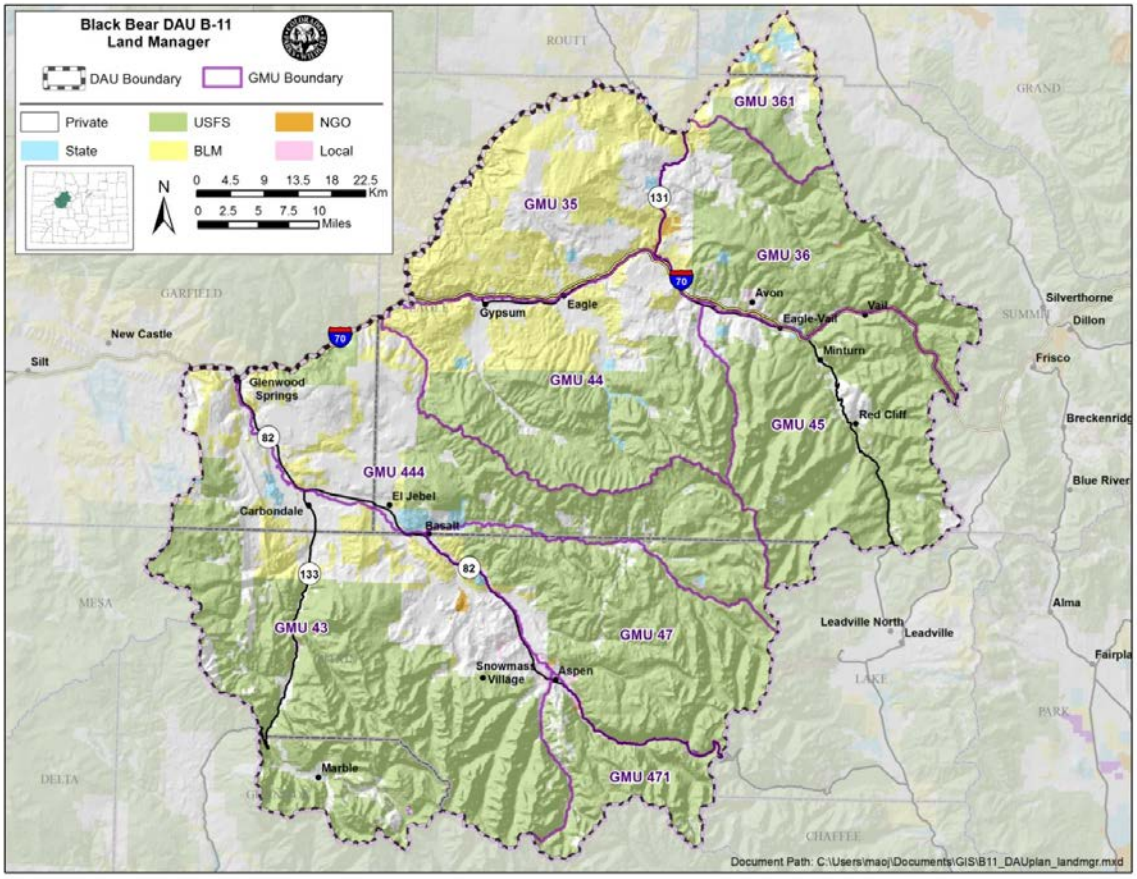

Figure 2. Location and land management type in B-11.

The entire DAU is considered overall black bear range, although bear densities vary by habitat type. Approximately 20% (1,500 km^2) of the DAU's land area is considered fall concentration habitat for black bears (Figure 3). About 4% (320 km^2) of the DAU is considered human conflict areas, particularly in the towns of Aspen, Snowmass Village, Glenwood Springs, Eagle, Edwards, Avon, and Vail. Bears concentrate in the fall during hyperphagia in areas with high mast crop production and/or accessible human food sources.

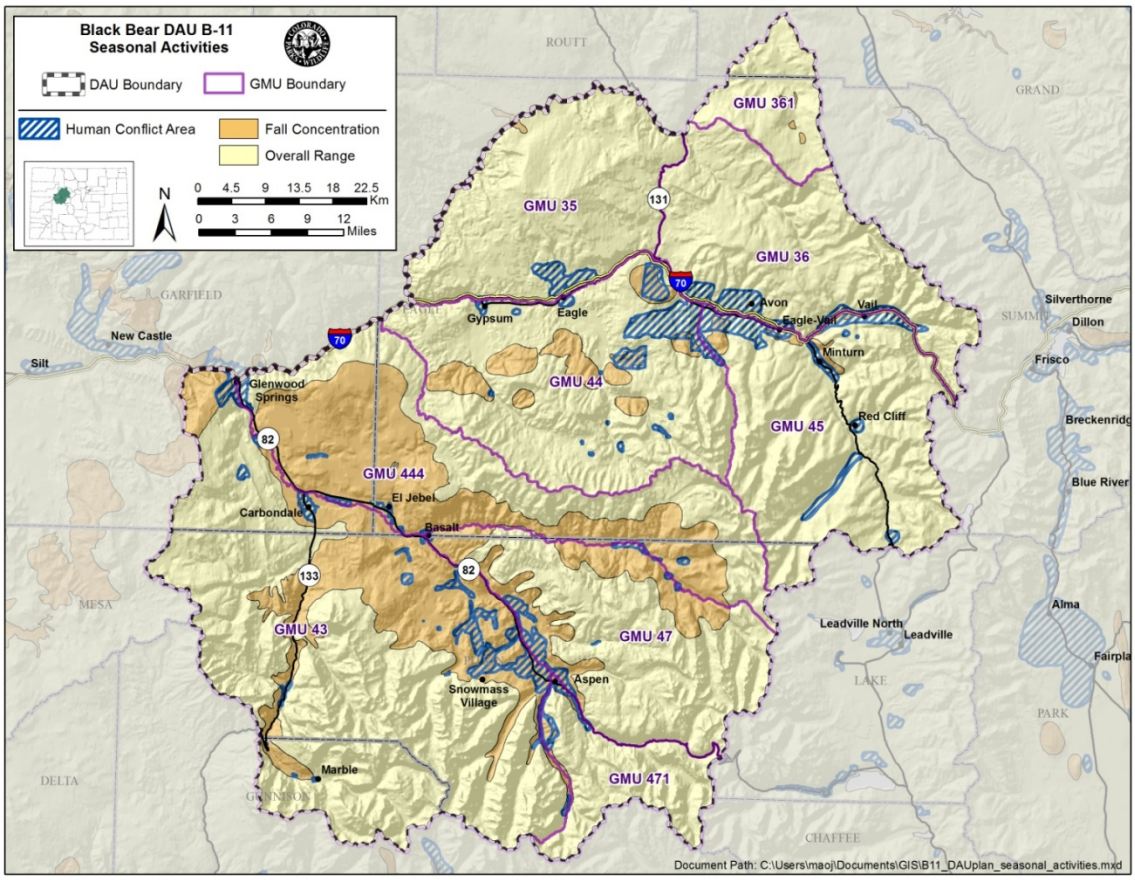

Figure 3. Black bear seasonal activities in B-11.

Land Use and Land Status

Human development along the I-70 corridor and in the Roaring Fork Valley (State Highway 82) and the associated human-bear conflicts in these developed areas are the dominant issues regarding bear management in B-11. In the last 2-3 decades, all of the counties in B-11 have experienced consistent and sometimes rapid human population growth (Appendix A), as well as commensurate increases in roads, property subdivision, and development in bear habitat. Domestic sheep and cattle graze some of the lands in GMUs 35, 36, 43, 44, 45, and 444, and livestock depredation by bears can be a problem. See "Game Damage" section for additional information.

Topography & Climate

Elevations in the DAU range from over 14,000 feet in the Holy Cross and Maroon Bells-Snowmass Wilderness areas to less than 5,700 feet along the Colorado River. Low elevations have moderate winters and warm summers, and high elevations have long, cold winters and short, mild summers. Precipitation varies from 17 inches annually at 6,000 feet elevation to 30-40 inches at 14,000 feet elevation. Prevailing winds are out of the west and southwest. Temperature generally ranges from a low of –20 degrees F to a high of 95 degrees F.

Vegetation

Vegetation types in this unit are largely determined by elevation and aspect (Figure 4). The mountain peaks above approximately 11,600 feet contain mostly bare rock or alpine communities. Spruce-fir grows mostly between the elevations of 8,000 and 11,600 ft. Aspen and aspen-conifer mixes

dominate the slopes from 7,000 to 8,500 feet. Mountain shrubs show up on lower slopes near 7,000 feet. Pinyon-juniper covers the lower foothills, and sagebrush parks appear on the more level sites as elevation drops. Riparian vegetation grows along the creeks and rivers.

Aspen and riparian habitats provide bears with forage in the spring through mid-summer, and coniferous forest provides shade and cover for resting habitat. In late summer into fall, lower elevation mountain shrub and oakbrush become important habitats for bears as fall mast ripens. With the abundance of aspen, serviceberry, chokecherry, and oakbrush, natural bear habitat is excellent in B-11 (although forage quantity varies by year based on weather conditions). In addition to natural food sources, bears living near human communities have another significant source of high-quality nutrition in the form of anthropogenic food (all sources associated with human activities including trash, pet food, barbeque grills, landscaping fruit trees, and bird feeders).

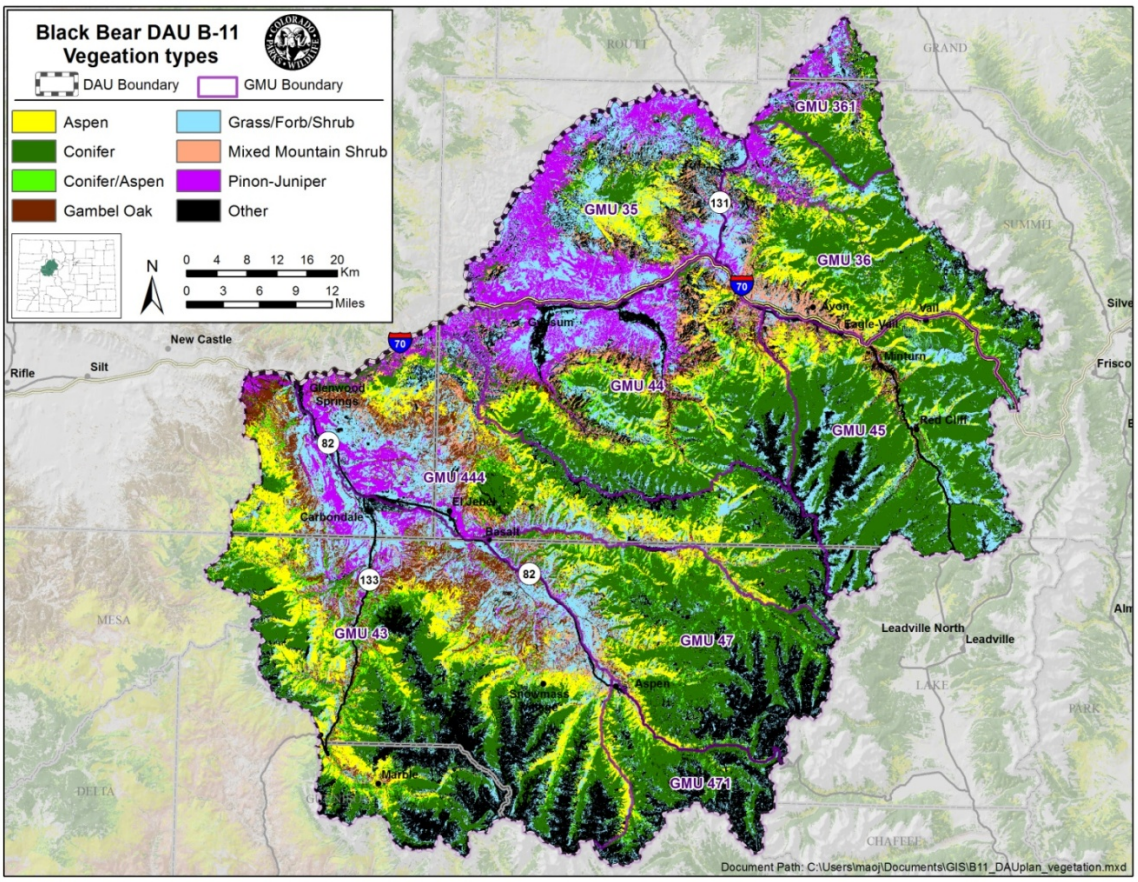

Figure 4. Vegetation classes in B-11.

MANAGEMENT HISTORY

Administrative

Bear DAU B-11 consists of GMUs 35, 36, 44, 45, 47, 361, 444, and 471 (Figure 2). GMU 361 was established in 2010 by splitting the former GMU 36 into the current GMUs 36 and 361. The DAU is bounded on the north by the Colorado River; on the east by the Gore Range divide, the Eagle River-Tenmile Creek divide, and the Continental Divide; on the south by the Roaring Fork River-Taylor River divide, the Roaring Fork River-East River divide, the Crystal River-East River divide, and the Crystal River-Anthracite Creek divide; on the south and west by the Crystal River-Muddy Creek

divide; and on the west by the divide between the Crystal River and Divide/Baldy/Garfield Creeks, and by South Canyon Creek.

Hunting Seasons

Prior to 1935, black bears were not considered a game animal, which afforded them no protection from being shot on sight if they were encountered. In 1935, they were awarded some protection by being classified by the state legislature as a game animal. This regulation established limits on the annual harvest and on the number of licenses that an individual could possess. From 1935 to 1963, bears were hunted in the fall usually concurrently with the annual deer and elk seasons. In 1964, a spring hunting season was established with unlimited licenses available. This continued until 1986, when licenses for the spring season were limited. The fall hunting seasons occurred concurrently with the established deer and elk seasons, and licenses were unlimited until the limited September rifle seasons were established in 1989 (Gill and Beck 1990). Hunters wishing to hunt bears during the established deer and elk rifle seasons had access to unlimited licenses until 2005 when license caps were established for these seasons. In 1992, a state ballot amendment was passed which changed bear hunting statutes within the state by prohibiting bear hunting prior to September 2nd and banning the use of bait and dogs. In 2015, all B-11 licenses became List B licenses, meaning a hunter can hold up to 2 bear licenses for B-11 huntcodes.

Under the current (2020-2024) big game season structure, archery and September rifle bear seasons run from September 2-30. Muzzleloader season starts on the 2nd Saturday of September and runs for 9 days, concurrent with deer and elk muzzleloader seasons. Starting in 2015, a single concurrent bear rifle season replaced the individual 1st-4th rifle seasons. The concurrent rifle season opens with 1st rifle elk season, ends with the close of 4th rifle deer/elk season, and is valid only during open rifle deer or elk seasons. The September private-land-only (PLO) season and an extended PLO season (October 1 to the end of 4th rifle season), which were originally instituted in B-11 in 2008, have become unlimited, over-the-counter (OTC) seasons under the 2020-2024 big game season structure.

License allocation history

Before 1999, bear licenses were valid statewide. Starting in 1999, a quota for B-11 was established for the September rifle season (Figure 5). Archery and muzzleloader licenses also became DAU-specific, but were unlimited until 2005 when a quota was established for those seasons as well (Figure 5). The concurrent (1st through 4th) rifle seasons were also unlimited until 2005 when those licenses became over-the-counter (OTC) with caps. However, at the level the caps were set, they had little functional impact on concurrent rifle season bear hunter opportunity because the license caps were rarely reached (Figure 6). Under the current Big Game Season Structure (2020-2024), these licenses became limited, rather than OTC with caps, but license quotas were left unchanged.

In 2010, archery, muzzleloader, and September rifle season quotas were raised significantly in an effort to reduce the bear population in response to multiple years (2004, 2007, and 2009) of high human-conflict issues in urbanized areas during years of natural food failures. The licenses for these seasons also were geographically split into 3 portions of the DAU (Figure 7) to attempt to focus harvest in the upper Roaring Fork valley where human-bear conflicts were especially severe. The split within GMU 43 follows Capitol Creek and southward along the ridgeline of the Elk Mountains. The southeastern part of GMU 43 is grouped with GMUs 47 and 471 under the 47 huntcode to

encompass the upper Roaring Fork valley, and the remainder of GMU 43 has its own huntcode for these seasons. GMUs 35, 36, 44, 45, 361, and 444 are grouped together under the 35 huntcode.

Quotas were raised again in 2012 and 2013 to attempt to continue to reduce the bear population through harvest and to meet demand for licenses. The cumulative license quota increases in 2012 and 2013 appear to have fulfilled hunter demand for licenses. Previously many huntcodes sold out or came close to selling out, but as quotas were further raised, the percentage of the quota sold dropped below 100% for most huntcodes in 2012 and well below by 2013 (Figure 6). However, in 2015, quotas were again raised significantly, mostly for the September rifle huntcodes (Figure 5). With all B-11 licenses becoming List B licenses in 2015, the quota increase was meant to ensure that enough licenses were available in case a large number of bear hunters wanted two B-11 bear licenses. In reality, only 6% of B-11 license holders (n=94) in 2015 purchased a second B-11 license as a List B tag.

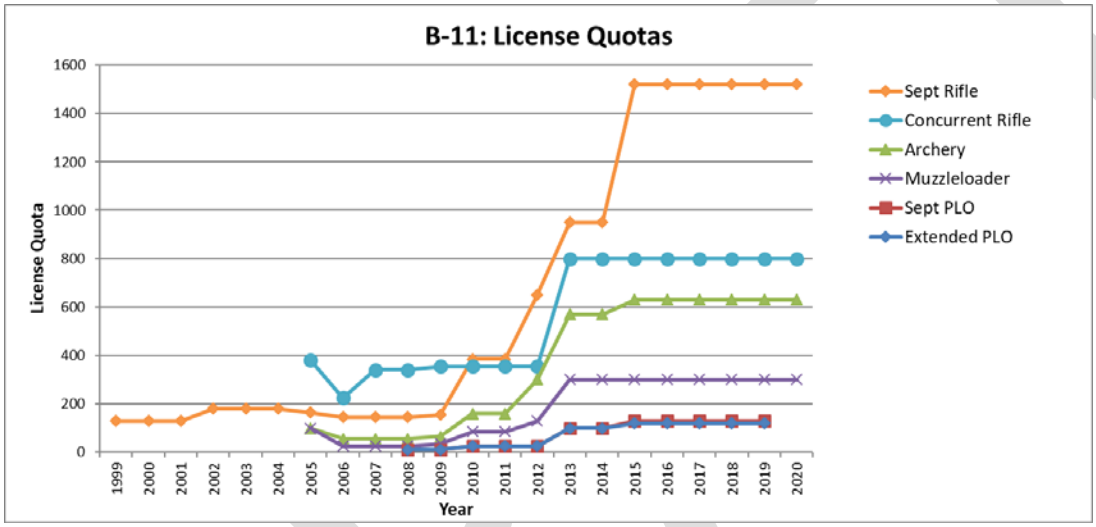

Figure 5. License quota history in B-11 by season, 1999-2020.

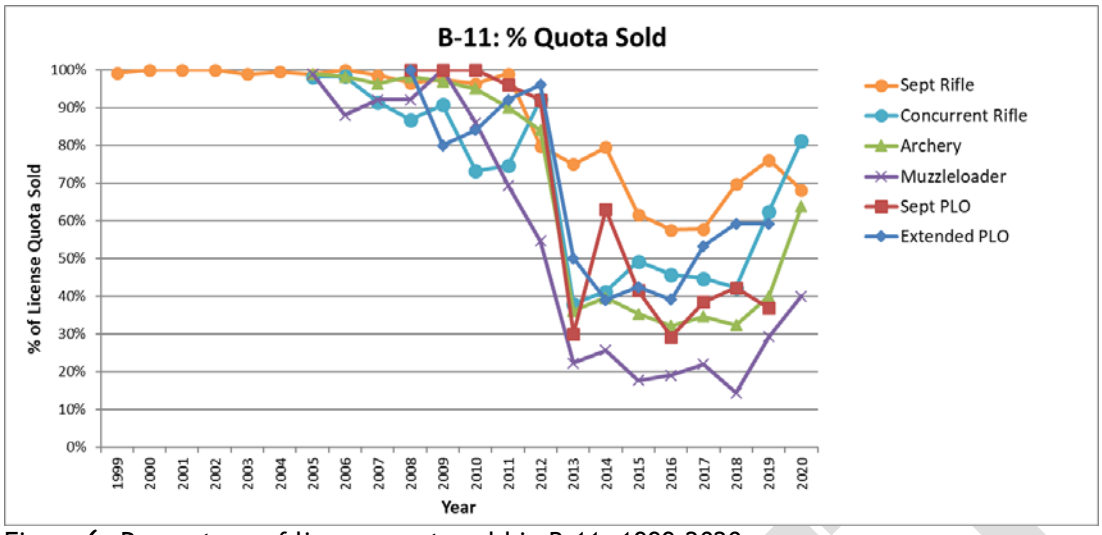

Figure 6. Percentage of license quota sold in B-11, 1999-2020.

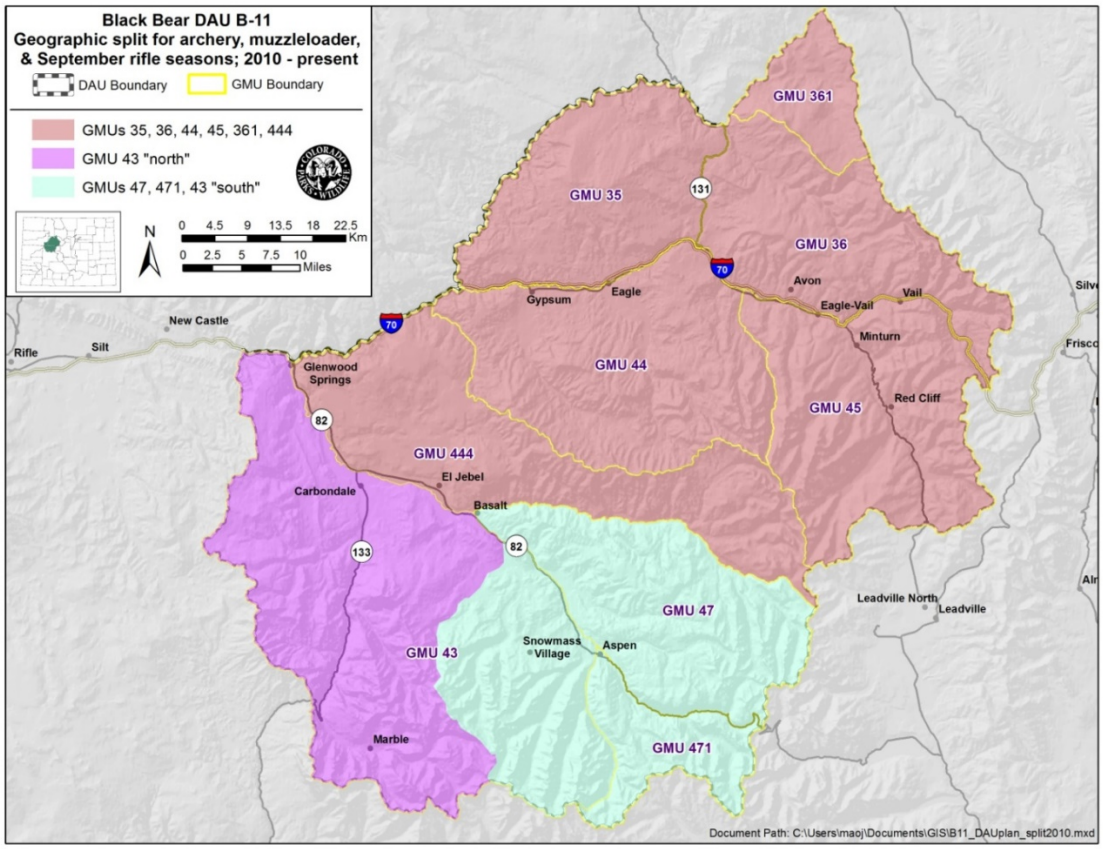

Figure 7. Geographic split established in 2010 for archery, muzzleloader, and September rifle licenses in B-11.

Mortality - Harvest and Non-Harvest

In general, overall annual bear mortality in B-11 has increased especially over the past 20 years (Figure 8). Since 1979, total bear mortality in B-11 has ranged from a low of 18 in 1993 to a high of 161 in 2012. While the 10-year average of annual bear mortality is 118 bears, the 3-year average is slightly higher at 135 bears, mostly due to higher harvest in recent years.

Mortality from hunter harvest has increased, particularly in the past several years since the increase in license quotas. The 10-year average of hunting mortality is 80 bears per year, whereas the 3-year average is 100 bears. Earlier, when bear license quotas were lower, from 1979-2009, annual harvest averaged 28 bears. Through the 1980s and 1990s, harvest comprised almost all of overall bear mortality (Figure 8 and Table 1). In the 2000s, control and other mortalities increased, adding to total mortality as well as increasing in proportion. Since 2010, however, when the significant license quota increases began, harvest now accounts for 2/3^{rds} of overall mortality. The vast majority of harvest occurs during the September seasons because this month coincides with the peak of the bear hyperphagia period. Harvest and success rates decline in late October and November as bears begin hibernating.

Control mortalities include bears killed for human conflict and damage control purposes by CPW, landowners and their agents, or U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS)/Animal Damage Control (ADC). The 10-year average of control mortality is 23 bears, and the 3-year average is 17 bears. CPW-killed bears generally constitute 2/3rd of all control kills, and bears killed by landowners/sheep-herders are about 1/3rd of all control mortalities.

"Other" mortalities are predominantly roadkilled bears but this category also includes other accidental and miscellaneous mortalities. Both the 10-year and 3-year averages for "other" mortalities are 15 bears/year. Roadkills generally make up over 80% of this category. Roadkill mortalities are high during years of natural food failures when bears must range more widely in search of food and therefore encounter roads and vehicles more frequently.

For the purposes of this B-11 management plan, we also define "non-harvest human-caused" mortalities as the sum of the control mortalities and the roadkill subset from "other" mortalities. Non-harvest human-caused mortality represents all non-hunting mortality that is directly human-caused and excludes bears that died of accidents such as drowning or electrocution. These accidental mortalities are opportunistically recorded and are negligible among the total "other" mortalities.

The 3 most recent poor food years (defined as having a fall forage quality score of <5; years 2017, 2019, and 2020) had an average of 43 non-harvest human-caused mortalities of bears per year (among these, control mortalities averaged 27 bears/year). In contrast the past 3 good food years (defined as having a fall forage quality score of >=5; years 2015, 2016, and 2018) had an average of 22 non-harvest human-caused mortalities/year (average of 15 control mortalities per year).

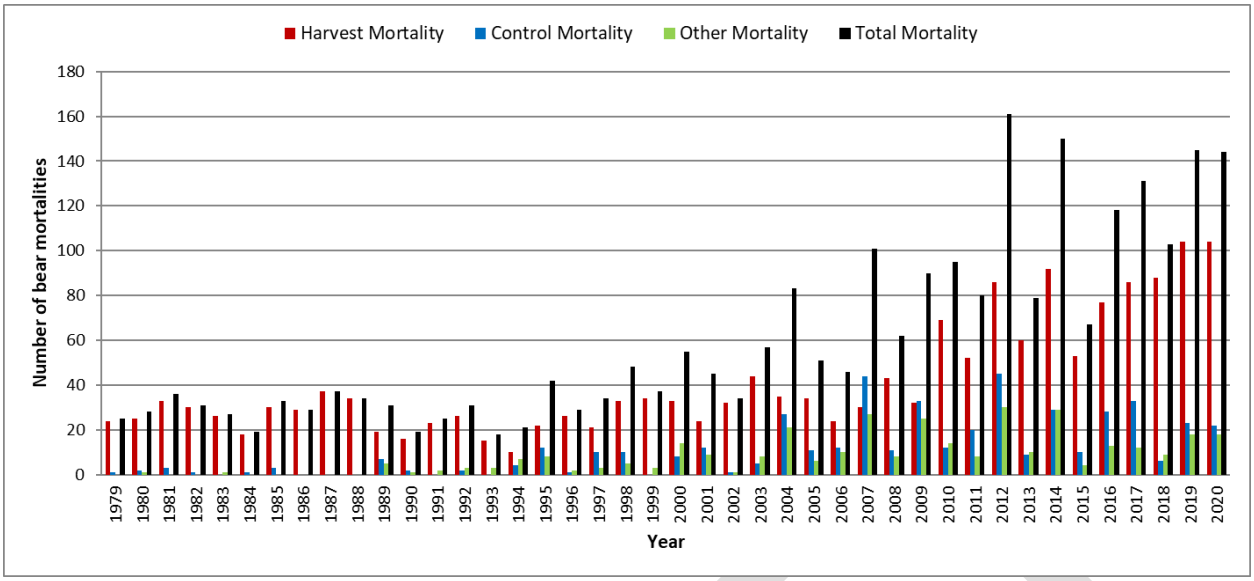

Figure 8. Harvest, control, other, and total annual black bear mortality in B-11, 1979-2020.

Table 1. Average annual number of bear mortalitites in B-11 by decade.

Time period	Harvest		Control		Other		Total
	N/yr	% of Total	N/yr	% of Total	N/yr	% of Total	
1980s average	28	90%	2	6%	1	3%	31
1990s average	23	74%	4	13%	4	13%	31
2000s average	33	53%	16	26%	13	21%	62
2010s average	77	68%	22	19%	15	14%	107

Mortality by method of take

Among methods of take, the September rifle season contributes the most (76%) toward total annual harvest, followed by September archery (10%) and the 1st-4th concurrent rifle seasons (9%) (Figure 9).

With the license quota increases in 2010, 2012, 2013, and 2015, B-11 bear harvest has increased dramatically, largely due to an increase in September rifle harvests (Figure 10). Harvest in other seasons has fluctuated but generally remained the same as before the license quota increases.

Hunter success rates can vary annually depending on the quality of natural fall forage; in poor food years, bears are more mobile while in search of forage, and therefore their encounter rate with hunters is higher. In addition, bear density may be declining after multiple years of higher harvest. More bear hunters in the field may crowd each other, and because more licenses are now available to hunters, less experienced bear hunters may have lower success rates. The 3-year average success rate for the September rifle season is 7%, slightly down from an earlier average of 10% about 10 years ago (Figure 9). Archery, muzzleloader, and concurrent rifle season hunters are averaging a 2-5% success rate. The September PLO season has a success rate of 7% and the extended PLO season averages a 5% success rate.

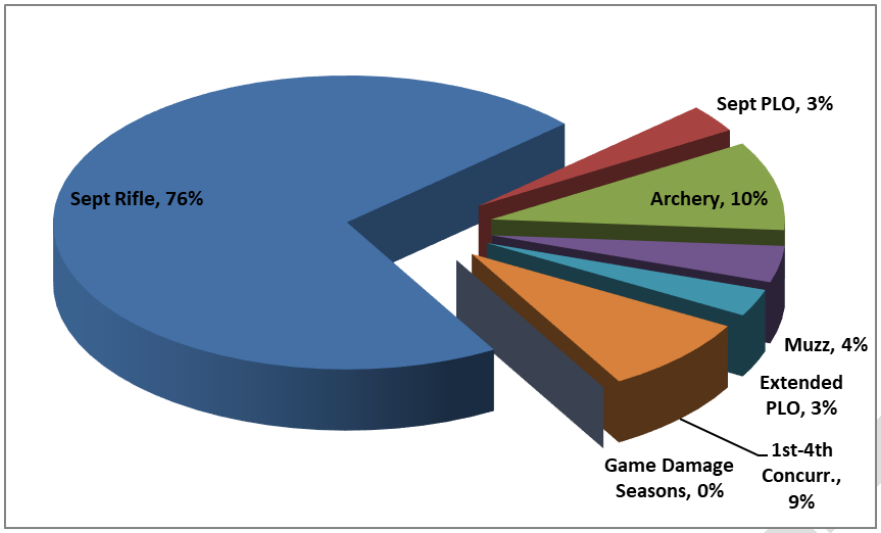

Figure 9. Percent contribution of each season toward total harvest in B-11, 3-year average of 2018-2020.

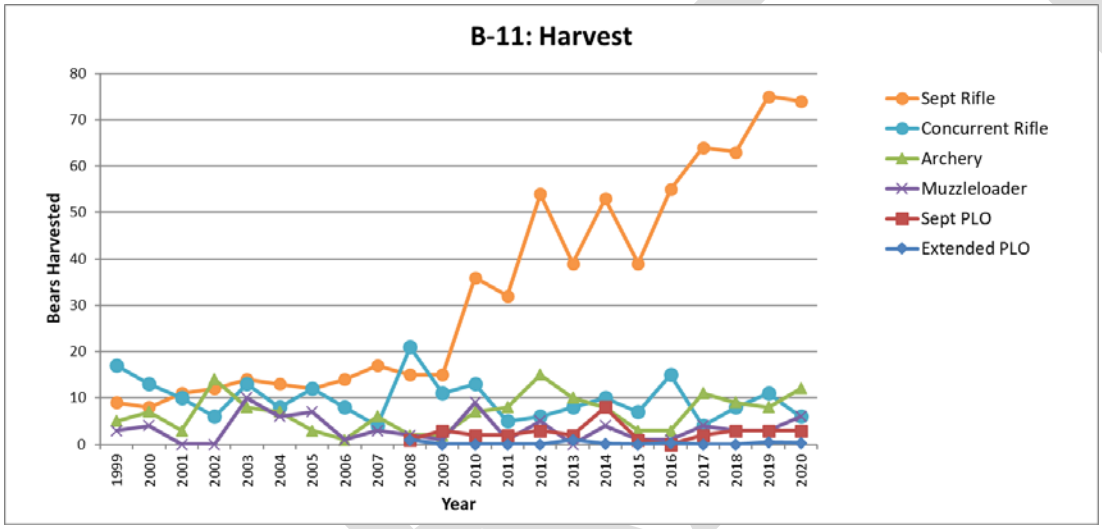

Figure 10. Number of bears harvested in B-11 by season, 1999-2020.

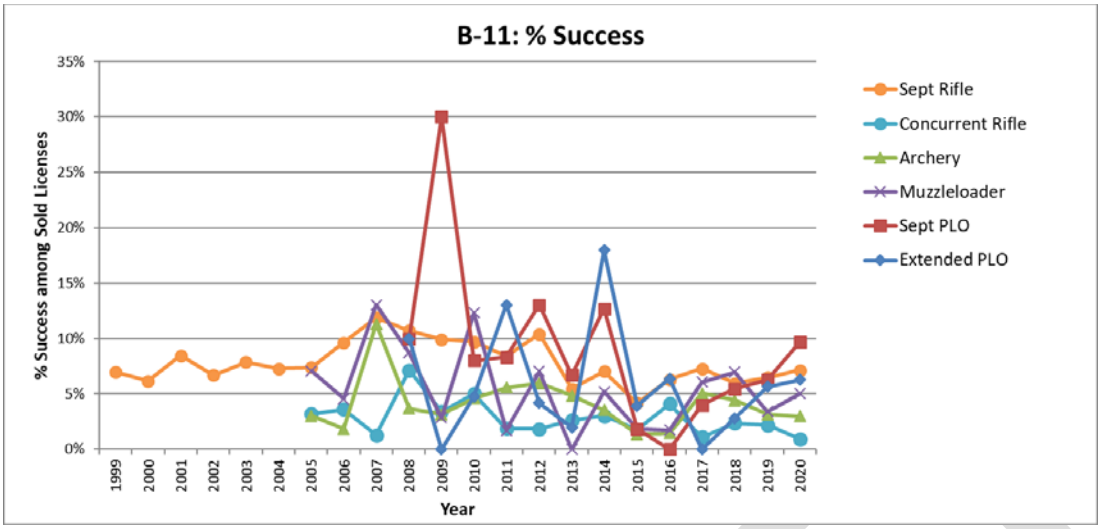

Figure 11. License success rates in B-11 by season, 1999-2020.

Mortality by age and gender

Beginning in 2006, a premolar tooth has been extracted from dead bears handled by CPW at mandatory checks. These teeth are collected and submitted annually for aging via cementum annuli sectioning at Matson's Lab in Montana. The total sample size from 2006-2019 of B-11 bear mortalities whose ages have been determined by this method is 877 bears out of 1,456 recorded mortalities.

The technique of counting annual rings in cementum of bear teeth is a reliable method for determining ages of black bears (Harshyne et al. 1998, Costello et al. 2004). This is especially true for bears less than five years of age. For bears five years of age or older, errors increased with the age of the bear (McLaughlin et al. 1990, Harshyne et al. 1998, Costello et al. 2004). Since most female black bears in Colorado do not reproduce until their 5th year, classification of females into sub-adult (non-reproducing) and adult (reproducing) age classes using cementum annuli is quite reliable. Therefore, all female black bears age five and over with evidence of having nursed young are considered adults for the purposes of harvest data analyses.

Matson's Lab also examines the cementum annuli to identify the years in which a sow successfully raised a cub, enabling a reconstruction of a sow's reproductive history. Based on teeth collected from female bears in B-11 from 2006-2019, the average age of first reproduction was 4.7 (SE = 0.11; range = 3 to 7; n = 74). Similarly, sows captured for the Aspen research study had an average age of first reproduction of 4.7 (SE = 0.30; range = 3 to 7; n = 12) and the statewide averages have been 4.9, 4.6, and 4.7 years for 2017, 2018, and 2019 (M. Vieira, CPW, *pers. comm.*, 9/14/21).

The ages of both harvested bears (Figure 12) and non-harvest mortalities (Figure 13) are skewed towards the sub-adult (≤ 4 years old) age classes. Among known-age harvested bears in 2017-2019, 38% were subadult males; 21% were subadult females; 20% were adult males; and 21% were adult females (Figure 14). These data on the age and sex composition of harvested bears are used as indicators of population trajectory based on the relative vulnerability of each age-sex class to being harvested (see "Harvest Composition and Management Criteria" section below).

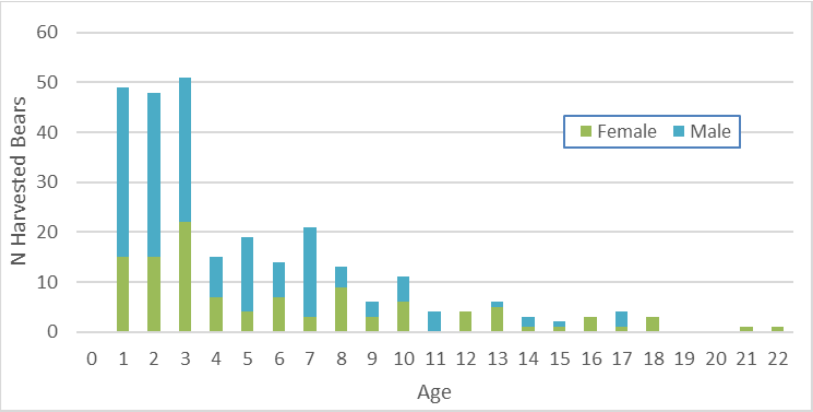

Figure 12. Age distribution of harvested bears in B-11, 2017-2019 (n=278).

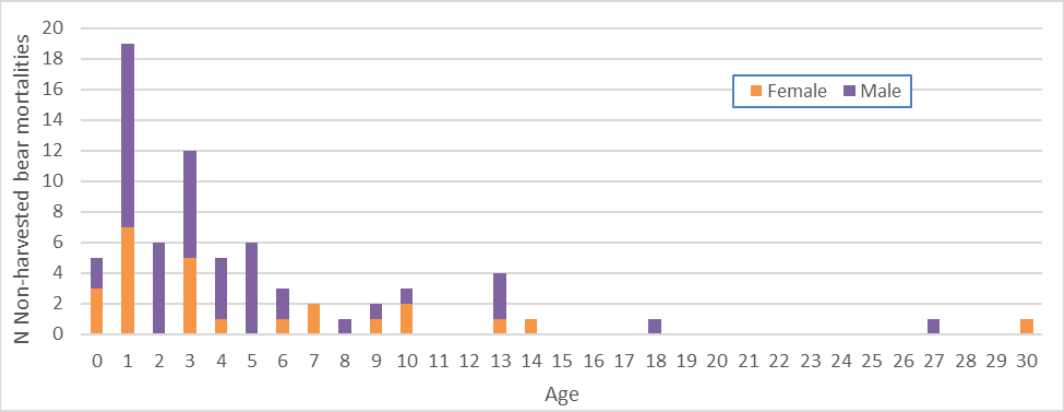

Figure 13. Age distribution of bears from non-harvest mortality sources in B-11, 2017-2019 (n=72).

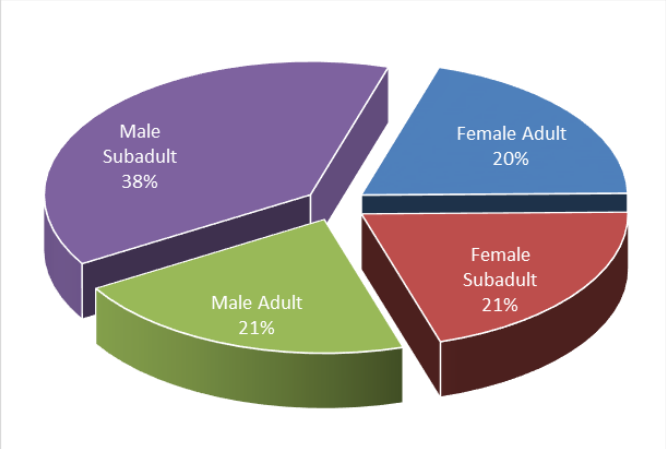

Figure 14. Age and sex composition of harvested bears in B-11, 2017-2019 (n=279 bears).

Urban Human-Bear Conflict Management

Human conflicts with black bears in B-11 are common occurrences, particularly during poor natural food years and in towns within bear habitat where human-related attractants remain high. Both bear and human populations have increased over the past several decades, resulting in increased conflicts between bears and humans. In the 1970s through 1990s, development of residential housing encroached upon summer and fall habitats for bears, and over the past several decades, the human population has grown, especially in Garfield and Eagle Counties (Appendix A), leading to both an

increased overlap between bears and humans and an increased availability of human food sources. The tourist-driven resort towns in B-11 have a large transient/seasonal human population, making it challenging to achieve effective public education of Bear Aware principles, such as securing garbage and keeping doors and windows closed and locked.

Human-bear conflict management is costly not only to the public and municipalities that must pay for damaged property and (in rare cases of human injury) medical costs, but also to CPW staff, USFS staff, and county and city law enforcement agencies. For example, during the poor natural food year of 2009, CPW Area 8 (Glenwood Springs Service Center) personnel spent 5,651 hours handling human-bear conflict issues, equating to $160,954 of personal service cost and $45,687 of fuel and travel costs. These costs do not include lost opportunity costs such as law enforcement, fish stocking, or other wildlife management work that was not done while Area personnel were focused on black bear conflict management.

While the primary scope of CPW authority lies in the management of bears, it is important to note that the reduction of human-bear conflicts also depends on change in human perception and behaviors. CPW has a history of working closely with municipalities and county governments, federal and county land management agencies and other stakeholders in an attempt to alter human behavior. This collaboration has resulted in the implementation of trash storage ordinances in most major towns and cities within B-11. Recently, stricter enforcement of these ordinances has also started to generate increased compliance. To supplement municipal efforts, CPW has increased routine nighttime hazing patrols to deter bears away from residential and urban settings before they habituate to human-related attractants. In addition to traditional Bear Aware campaigns, CPW worked with Pitkin County Open Space and Trails to organize the WildLives awareness campaign. The campaign focused on providing wildlife messaging, including Bear Aware advisories, to non-traditional audiences through digital media such as YouTube or Google and advertisement campaigns on public transportation and electronic advertisement boards in the airport. Other efforts have involved working closely with the municipalities of Aspen, Snowmass Village, and Basalt in the Roaring Fork valley to routinely post banners, cardboard kiosks, and signs informing visitors of the potential for human-bear conflict and how to avoid it. In 2019 CPW began to organize and coordinate a county-wide Bear Summit in Pitkin County aimed at identifying key human bear conflict topics and soliciting community buy-in and support. The goal of the summit was to identify meaningful goals among towns, counties, land managers, and stakeholders that could be implemented to complement one another and reduce attractants and minimize conflicts on a county-wide scale. This summit was stalled in 2020 due to pandemic restrictions and budgetary constraints, but CPW staff has maintained conversations with local governments and is working to re-engage in a collaborative summit.

As recognized by this plan, these efforts are not effective unless implemented and practiced by all stakeholders. Community-wide participation should be a goal and focus for CPW and our partners. Additionally, efforts must be ongoing. Bear activity in these areas remains high even in good natural forage years, and the transient nature of residents and visitors requires continual educational efforts to ensure everyone is being reached.

Human-Bear Incident Reports

Starting in 2019[1], CPW began keeping track of human-bear encounters reported to CPW, county sheriff offices, and municipal police/animal control departments through an electronically recorded Wildlife Incidents database. These incidents range from a report of a bear sighting in a residential or urban area to a physical interaction between a bear and a person. For the purposes of defining a "conflict" in this B-11 management plan, we categorized incidents that involved a complaint type[2] of Attack, Aggressive Behavior, Food Source Property Damage, or Non-Food Property Damage to be a *conflict*, and we classified incidents with a complaint type of Sighting or Unsubstantiated as *non-conflict*. With less than 3 full years of Wildlife Incidents App data so far (Table 2), it is difficult to conclude any trends at this point. However, CPW staff in Area 8 anecdotally estimate that over the past 12+ years, 600-900 conflict reports are common in poor natural food years, compared to 300 or fewer conflict reports in good natural food years. Bears involved in conflicts are handled according to CPW policy at the discretion of the field officer or supervisor. Depending on the situation, the bears may be targeted for hazing or capture and then either translocated or euthanized.

Table 2. Number of conflict and non-conflict reports in B-11 documented in the Wildlife Incidents database, 2019-2021.

	Conflict					Non-conflict		
Year	Attack	Aggressive Behavior	Food Source Property Damage	Non-Food Property Damage	Conflict Total	Sighting	Unsubstantiated	Non-conflict Total
2019 (starting 4/1/2019)	3	23	542	33	601	528	25	553
2020	3	19	304	68	396	448	19	465
2021 (through 12/10/21)	0	10	375	73	458	516	7	523
3-year average	**2**	**17**	**407**	**58**	**485**	**497**	**17**	**514**

Injuries to Humans

There have been 15 recorded incidents within B-11 of bears injuring humans, all occurring during poor/marginal natural food years in 2004 (1), 2007 (2), 2009 (3), 2010 (1), 2011 (2), 2014 (1), 2017 (1), 2019 (3), and 2020 (3) (Appendix B). Nearly all of these incidents occurred in the town of Aspen. Many involved a surprise encounter with a bear foraging in or near a house or dumpster, often left unlocked and/or open. Typically, the bears had already habituated to feeding near people due to the abundance of unsecured trash in towns.

Human-Bear Conflicts in Campgrounds and Dispersed Campsites

On National Forest lands within B-11, incidents involving bears in campgrounds or dispersed campsites began to increase about a decade ago. In response, in 2014 the White River National Forest (WRNF) instituted a bear-proof food storage requirement in many developed campgrounds and some designated dispersed campsites, as well as anywhere in the backcountry in the Maroon Bells-Snowmass Wilderness Area. In 2019, WRNF enacted food storage requirements at nearly all

[1] Prior to 2019, incidents that CPW received were recorded on paper forms, but the paper records have not been consistently digitized in a database and also lacked the incidents documented by other local law enforcement and animal control offices. Therefore, the two datasets are not directly comparable.

[2] For incidents in which multiple complaint types were selected, we classified the incident by its most severe complaint type, using the following ranking from most severe to least severe complaint type: Attack, Aggressive Behavior, Food Source Property Damage, Non-Food Property Damage, Sighting, Unsubstantiated.

developed campgrounds and at additional designated dispersed campsites. Throughout this time, human-bear conflicts at campgrounds and campsites continued; during some years, incidents have been more frequent than others. When bear incidents have occurred or are imminent at a developed campground, USFS has occasionally enacted emergency orders temporarily restricting camping to hard-sided vehicles only or even closed portions of campgrounds. CPW officers will respond to bear incidents in designated campsites, but generally not elsewhere on public lands unless an injury to a human has occurred.

Control kills and translocations

Whereas in the past, control kills of bears for human-related conflict were uncommon, since the mid-2000s control kills have increased both in number and as a proportion of total bear mortality in B-11 (Figure 8 and Table 1). In B-11, bear conflict years are now the "new normal." In the past 15 years, over half of the years (2007, 2009, 2011, 2012, 2014, 2016, 2017, 2019, 2020) had high human-bear conflicts, resulting in an average of 53 bears per year either killed or translocated during those years, compared to 21 bears killed or translocated in the other years (Table 3). Most of those high-conflict years had either poor or marginal natural foods (Figure 15), resulting in bears foraging heavily for anthropogenic food sources.

Table 3. Number of bears killed or translocated due to human-related conflicts in B-11, 2006-2020.

	Control Killed					Translocated					Total bears handled for conflict
Year	Cub	Subadult	Adult	Age not recorded	Killed total	Cub	Subadult	Adult	Age not recorded	Transloc. Total	
2006	2	2	8		**12**	2	7	5		**14**	**26**
2007	5	9	27	2	**43**	7	18	16		**41**	**84**
2008	1	5	6	1	**13**	9	11	1		**21**	**34**
2009	2	11	18	3	**34**	15	25	15		**55**	**89**
2010		10	1	1	**12**	10	4	7		**21**	**33**
2011	1	8	11	1	**21**	10	9	5		**24**	**45**
2012	6	21	17	1	**45**	13	11	7		**31**	**76**
2013		7	3		**10**		1			**1**	**11**
2014	7	12	9	1	**29**	4	5	3		**12**	**41**
2015	1	6	3		**10**		1	1		**2**	**12**
2016	2	7	8	12	**29**	1	3	2		**6**	**35**
2017	1	18	5	9	**33**	5	1	2		**8**	**41**
2018		3	2	1	**6**		2			**2**	**8**
2019	2	8	10	3	**23**		2	1		**3**	**26**
2020	1	7	18		**26**	5	5	3	1	**15**	**41**
Total	**31**	**134**	**146**	**35**	**346**	**81**	**105**	**68**	**1**	**256**	**602**

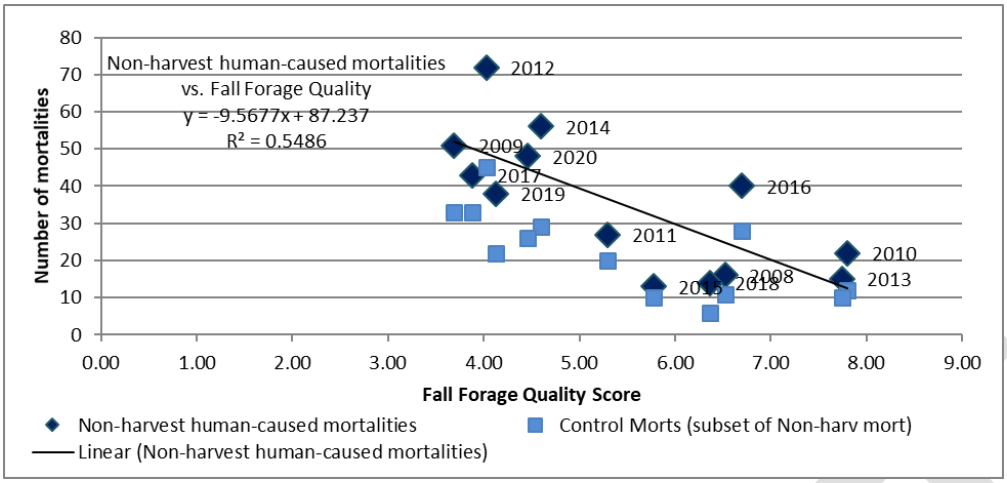

Figure 15. Non-harvest human-caused mortalities, including control mortalities, in B-11 are inversely correlated with the quality of fall mast (berries and acorns).

Based on an earlier analysis of bears translocated from B-11 from 2000-2013, the fates of 55% are unknown, 15% were known to be alive within their first year since translocation, and 30% were confirmed dead within the first year (Table 4). The vast majority of translocated bears were not radiocollared, so their known fates are based on opportunistic sightings, re-captures, and reported mortalities. At least 11% of translocated bears returned to their original locations, and at least another 10% returned to B-11 (but did not return to their presumed homeranges) within the first year (Table 4).

Table 4. Status of bears translocated from B-11 within 1st year after translocation, 2000-2013.
"Returned" = bear returned to the original capture site (e.g., same town or locality); "Within B-11" = bear returned to B-11 but not to its original capture site; "Not Returned" = bear did not return to B-11, "Unknown Loc" = bear's location was unknown. Some bears that are listed as alive with unknown locations are bears that were confirmed alive in later years. Percentages of the overall total are shown in parentheses.

Status within 1st year	Returned	Within B-11	Not Returned	Unknown Loc	Total
Unknown				**81 (55.1%)**	**81 (55.1%)**
Alive	**5 (3.4%)**	**2 (1.4%)**	**4 (2.7%)**	**11 (7.5%)**	**22 (15%)**
Dead	**12 (8.2%)**	**13 (8.8%)**	**17 (11.6%)**	**2 (1.4%)**	**44 (29.9%)**
Human conflict	8 (5.4%)	7 (4.8%)	5 (3.4%)	1 (0.7%)	21 (14.3%)
Harvest	2 (1.4%)	2 (1.4%)	6 (4.1%)	1 (0.7%)	11 (7.5%)
Landowner/herder		2 (1.4%)	3 (2%)		5 (3.4%)
Roadkill	2 (1.4%)	2 (1.4%)			4 (2.7%)
Other			3 (2%)		3 (2%)
Grand Total	**17 (11.6%)**	**15 (10.2%)**	**21 (14.3%)**	**94 (63.9%)**	**147 (100%)**

Aspen Black Bear Research Study, 2005-2010

The high incidence of human-bear conflicts in B-11 prompted Colorado State University, the National Wildlife Research Center (NWRC), and the former Colorado Division of Wildlife (now Colorado Parks and Wildlife) to initiate an urban bear research study in Aspen that ran from 2005-2010. Bears were captured in and near Aspen and were fitted with GPS collars to study their ecology in an urban landscape.

Aspen's urban and peripheral areas have an abundance of both natural foods (aspen habitat and berry and acorn mast) and human foods (garbage, fruit trees, pet food, birdseed, etc.) available to bears. In some years, natural food sources fail due to spring frosts or drought conditions. Garbage is the most readily available human food. Despite ongoing efforts to encourage people to secure trash containers and dumpsters, over half of trash containers were found to be either non-bear-resistant or not secured (Lewis 2013). When foraging in the urban landscape, bears were most likely to select locations that had garbage present (both secured and unsecured trash containers) and that were closer to riparian areas; in addition, bears also selected for sites with ripe anthropogenic fruit (e.g., crabapples in downtown Aspen) during hyperphagia (Lewis 2013).

In years when natural foods failed, bears used high human-density urban areas to forage on garbage and other human foods throughout the summer and into fall hyperphagia season (Baruch-Mordo 2014, Lewis 2013). Many of the human-bear conflicts occur during those natural food failure years when bears enter homes and vehicles either through open/unlocked doors and windows or through forced entry by breaking through locked doors and windows. In good natural food years and once fall mast became available, the same individual bears that foraged on human food sources in poor years moved out of the urban areas to feed on natural foods in adjacent undeveloped areas, suggesting in a cost-benefit framework that bears may perceive a risk of using urban areas despite the benefits of foraging on garbage and fruit trees, and that bears' use of urban areas and reliance on human food resources can be reversible behaviors (Baruch-Mordo 2014). Conflicts generally subsided in good natural food years, but for some bears that continued to forage within the urban landscape, trash remained the most common food source, followed by natural mast (Lewis 2013), which reinforces the management recommendation that securing trash attractants is important even in good natural food years.

Litter sizes averaged 2.21 cubs and did not differ between good natural food years and food-failure years (Baruch-Mordo 2014); however, survival of subadult and adult bears was significantly lower in poor food years compared to good food years, mostly due to human conflict mortalities (Baruch-Mordo 2014). Population models parameterized on vital rates from the Aspen bear study suggest that during poor food years, the high mortality of adult females due to human conflict outweighs the effect of undiminished litter sizes, which leads to a net declining population trajectory (Lewis 2013; similar results were found in the Durango bear study, Johnson et al. 2020). More frequent food-failure years may be becoming more common as the climate becomes warmer and drier, and are predicted to cause a steeper decline in the bear population as a result of increased adult female mortality in high conflict years (Lewis 2013).

To reduce human-bear conflicts, reducing the foraging benefits that bears obtain from human foods would be more effective than increasing the behavioral costs (for example, by hazing) to bears in urban areas (Baruch-Mordo et al. 2013). In a modeling simulation using data from the Aspen bear study, if the availability of trash and other anthropogenic food sources were reduced by 55-70%, then bears were predicted to avoid urban and urban-interface areas (Baruch-Mordo et al. 2013). To minimize human food sources, garbage needs to be secured from bears; strict enforcement of trash ordinances with issuance of warnings and tickets was found to be more effective at achieving secured dumpsters and garbage containers than using bear-aware educational campaigns to educate residents (Baruch-Mordo et al. 2011). Although educational campaigns are still important, trash and food

storage ordinances must be enforced to achieve any meaningful reduction of the availability of human foods (Baruch-Mordo et al. 2011, Johnson et. al 2018).

Aside from the research publications cited above, the key findings from the Aspen bear research study and implications for city policy were also summarized in a pamphlet prepared for city managers and general audiences (Appendix D). Additionally, as requested by Pitkin County Commissioners and White River National Forest, recommendations for local communities and county/city governments on how to reduce human-bear conflicts are included in Appendix E.

Game Damage

Bear-related personal property claims were removed from CPW game damage liability in August 2001. From 2002-2019, there were 336 black bear claims paid out in B-11. The overall annual average of bear-related game damage claims has been $24,013 per year. Sheep kills were the overwhelming majority of claims, averaging 8 claims/year (65% of claims) and $20,036/year (75% of total claim payments) (Figure 16). Landowner-caused bear mortalities account for 15-20% of total known non-harvest human related bear mortalities, but there is no clear correlation between fall forage quality and the number of landowner-caused mortalities.

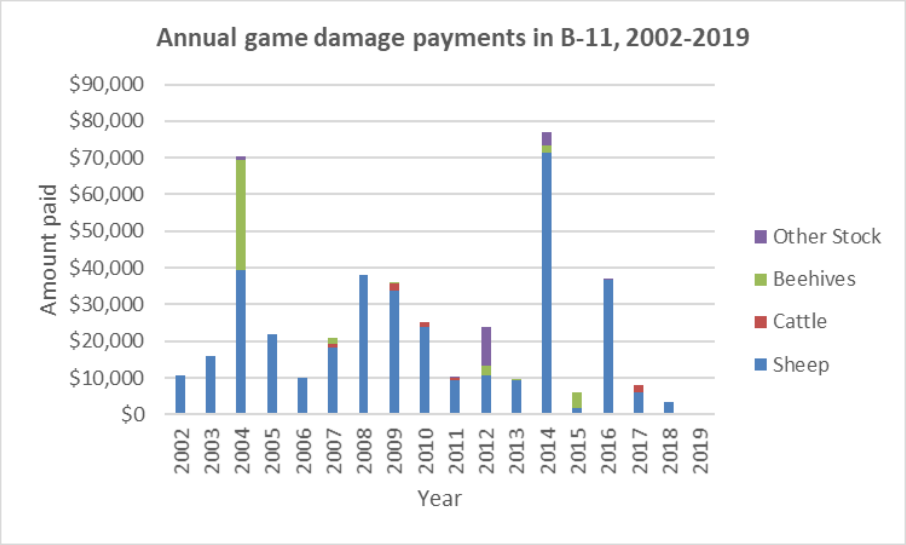

Figure 16. Game damage payments attributed to bears in DAU B-11, 2002-2019.

Current harvest and total mortality objectives

In 2000, a basic bear management plan was developed for B-11 that recommended an annual harvest objective of 30-35 bears, a game damage objective of <$15,000 for a three-year average, and a nuisance objective of 10 conflicts per year (Byrne 2000). The harvest and total mortality objectives were set in 2010 to 80 harvest mortalities and 110 total mortalities, based on the expected mortality at that time. Total mortality and harvest have been close to or exceeded these objectives in most 5 recent years (Figure 17).

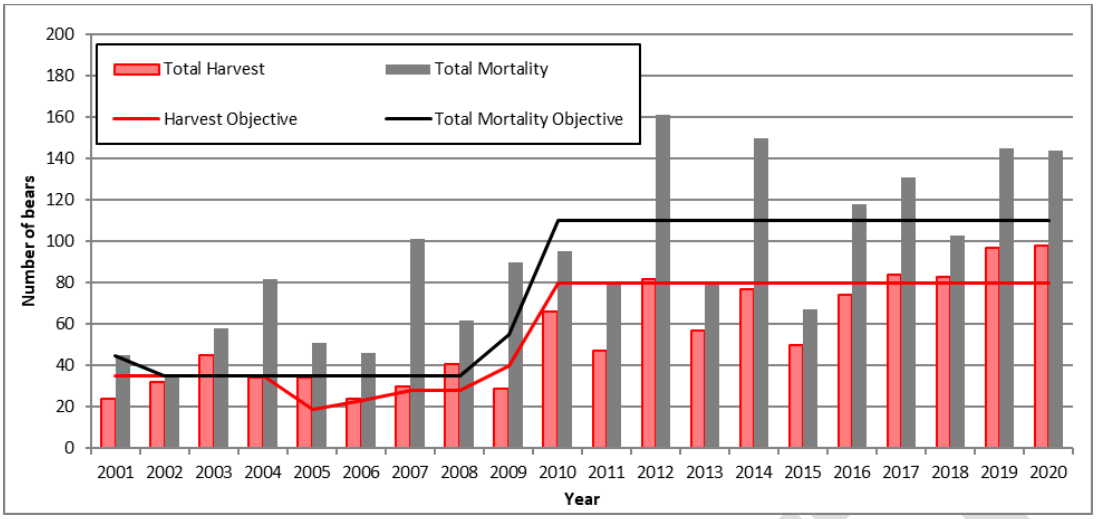

Figure 17. Annual harvest and mortality in B-11 in relation to DAU objectives.

POPULATION MANAGEMENT CONSIDERATIONS

Population Estimates

Various bear population models have been developed over the years. Each model uses a combination of field data and assumed values when field data is not available, and is therefore subject to the assumptions used. Because there are many unknowns about bear population demographic rates, there is wide variation among the population model estimates, highlighting the challenges of determining bear population size. A summary of model estimates is shown in Table 5, and each model is discussed in more detail in Appendix C. These models represent our current best estimates of bear population based on the available information. For the purposes of calculating harvest and total mortality objectives, we used an average of the 4 model estimates, ~1,040 bears, as the population estimate for B-11.

Table 5. Population estimates for B-11 from four population models.

Model	Population Estimate of Independent Bears (subadults + adults)
1. General Vegetation/Bear Density Extrapolation	834
2. Use/Occupancy and Density Extrapolation	1,425
3. Deterministic Population Model - Liberal	1,287
4. Deterministic Population Model - Conservative	609
Est Current B-11 bear population (Avg. of Models 1-4)	**~1,040**

In addition to population models, mortality rates and age/sex-specific harvest composition can be used as indices of population trajectory. These indices are also discussed in further detail below (see "Total Mortality Rate" and "Harvest Composition and Management Criteria" sections), but a summary shown in Table 6 shows that the current values for B-11 of these indices suggest that the population is stable to decreasing. The mortality rate index is based on several layers of assumptions for the various population models and these models are not updated every year, whereas the simpler harvest composition indices are based on data from mandatory checks of harvested bears and are updated annually. Therefore, the harvest composition indices are likely a more accurate reflection of the current bear population trajectory.

Table 6. Summary of various population trajectory indices for B-11 based on 3-year averages of 2017-2019 harvest data.

Population index type	Value	Population Trajectory
Adult males in harvest	20%	Decreasing
Females in harvest	40%	Stable/Decreasing
Adult females within female harvest	49%	Stable
Mortality rate	13%	Stable

Bear Fall Forage Quality: Mast Production Surveys

Fall mast (berry and acorn) conditions influence bear reproductive success and certain gender- and age-specific survival rates due to changes in vulnerability to mortality (Beck 1991, Costello et al. 2001). Therefore, managers consider forage conditions when formulating annual management recommendations. Mast production surveys have been conducted since 2008 in B-11. Following survey protocols developed by Costello et al. (2001), we made slight modifications to provide a basic five-point matrix of fall mast fruit production for Gambel oak, juniper *spp.*, chokecherry, and serviceberry. The annual mast production score is combined with a mast potential rating based upon the type and number of different mast-producing plant species. Forage condition results within DAUs can then be represented numerically to reflect an annual index of bear fall forage quality, ranging from a score of 1 (worst) to 10 (best) (Table 7).

These results can provide managers with information about relative forage conditions over time, which they can use along with their professional judgment to develop management recommendations. As an example of how this index can be applied, fall forage quality was used as one of the population model inputs as a factor influencing birth rates and cub survival in the deterministic population models. Additionally, for the purposes of this management plan's objectives, we define a "poor food year" as one with a fall forage quality score of <5 which then forms the basis for deciding which years' data to include when assessing trends in the number of human-bear conflicts.

Table 7. Black bear fall forage quality scores in B-11, 2008-2020.
Grey-shaded years with score <5 are considered "poor food years."

Year:	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Fall Forage Score:	6.52	3.69	7.80	5.29	4.03	7.75	4.60	5.78	6.69	3.88	6.37	4.13	4.46

Total Mortality Rate

Mortality rate can be useful in standardizing mortality among DAUs with varying habitat suitability. Miller (1990) demonstrated that under optimal conditions of reproduction and survival, maximum sustainable total mortality for black bears could be as high as 14.2%. Beck and White (1996 unpublished) conducted black bear population simulation analyses which, given their assumptions, produced stable bear populations with annual mortality at up to 15%. This range may be useful in gauging current human-caused mortality levels. The actual value of the mortality density thresholds will vary based upon the habitat quality within the DAU and results from the habitat model analysis, but the following guidelines could be used to develop threshold levels:

Increasing	5% - 10% mortality
Stable	10% - 15% mortality
Suppression	15% – 20% mortality

In B-11, the average number of bears reported killed from 2017-2019 was 135 per year. Assuming that the bear population is about 1,040 bears, then the mortality rate is estimated to be about 13%. This value is based on many assumptions to arrive at estimates of population size, but if accurate, it suggests that the population's trajectory is stable based on mortality rate from recent years.

Based upon the current model-estimated population of ~1,040 bears in B-11 and using these guidelines for total mortality rates, a total annual mortality of approximately 52-104 bears could allow for an increasing population; 104-156 bears could maintain a stable population; and 156-208 bear mortalities could suppress the population. The actual effect of a specific mortality rate depends on additional factors, including the age and sex composition of mortalities (see below) and the frequency of poor natural food years.

Harvest Composition and Management Criteria

Black bear vulnerability to harvest and other mortality factors varies depending upon differences in habitat, hunter effort or pressure, access, and forage conditions. Bears are less vulnerable where cover is dense over large geographic areas. They are more vulnerable where vehicle access is good. The greatest influence in annual variation in bear vulnerability is forage conditions. When natural forage quality or availability is poor, bears must become much more mobile in search of food, especially during the fall hyperphagia period. Increased mobility tends to result in bears being more visible to hunters, more likely to encounter human food sources, more frequently found along or crossing roads, and more concentrated in areas where there may be relatively more forage available. All of these tendencies can result in increased hunter harvest, increased human conflict mortality, more roadkills and other forms of mortality in poor food years compared to good food years.

Not all segments of a bear population are equally vulnerable, however, regardless of other influences. Hunting pressure affects harvest rate, which affects age structure, sex ratios, and densities of black bear populations. Adult males are typically most vulnerable because they are bold (often use open areas) and have larger home ranges. Sub-adult males are slightly less vulnerable. Consequently, the adult male segment of a population is the first to be reduced under hunter pressure. As harvest rates increase, the proportion of subadult (< 5 years old) black bears in the harvest typically increases, whereas the proportion of adult males declines as the population's age structure changes. A low percentage of adult males (≥5 years old) in the harvest may be an indication of over-harvest. This criterion is a more sensitive indicator of black bear population levels than median age (Idaho Dept. of Fish and Game 1998). The mean percent of adult males in the harvest in relatively stable populations in Idaho (Beecham and Rohlman 1994) and New Mexico (Costello et al. 2001) under moderate to high harvest levels was 30% and 28%, respectively. Studies of black bear populations in Alaska, Virginia, and Arizona showed similar relationships between lightly and heavily hunted populations. Therefore, 25% to 35% adult males in the harvest could indicate a stable black bear population (Table 8; from Wyoming Game and Fish Dept. 2007). Levels lower than 25% may indicate a higher level of harvest, which has reduced the adult male segment of the population, whereas levels higher than 35% may indicate a much lighter harvest level. Based on the most recent 3 years of available data on age of harvested bears in B-11 from 2017-2019, adult males comprised 20% of the total harvest (Table 9), suggesting a declining population.

Table 8. Black bear age and gender in harvest composition as indicators of population trend.

Age/Gender Class	Decreasing population	Stable population	Increasing population
Adult Male in All Harvest	< 25%	25 - 35%	> 35%
Total Female in All Harvest	> 40%	30 - 40%	< 30%
Adult Female in Female Harvest	> 55%	45 - 55%	< 45%

Table 9. B-11 harvest composition, averages by 3-year intervals.
Red shading = declining population; yellow shading = stable population; green shading = increasing population.

3-year intervals:	'06-'08	'07-'09	'08-'10	'09-'11	'10-'12	'11-'13	'12-'14	'13-'15	'14-'16	'15-'17	'16-'18	17-'19
Adult Male in All Harvest	17%	16%	19%	26%	24%	26%	20%	21%	24%	23%	22%	20%
Total Female in All Harvest	46%	43%	35%	31%	34%	34%	42%	40%	43%	40%	40%	40%
Adult Female in Total Female Harvest	44%	40%	54%	60%	61%	62%	55%	59%	55%	49%	44%	49%
N bear teeth submitted for cementum aging	83	92	132	136	190	181	224	189	203	203	250	279

As harvest levels increase and additional adult and sub-adult males are removed from an area, the proportion of females in the harvest begins to increase (Fraser et al. 1982, Kolenosky 1986, Beecham and Rohlman 1994), because female are least vulnerable, especially if accompanied by cubs. The average percentage of females in the harvest of black bear populations under moderate and high hunting pressure in Idaho (Beecham and Rohlman 1994) and New Mexico (Costello et al. 2001) was 35% and 40%, respectively. Beecham and Rohlman (1994) suggest a desired proportion of female harvest of 35% to maintain a stable population, whereas Beck (1991) suggested maintaining <40% females in harvest. Therefore, a range of 30% to 40% females in the total harvest could indicate a stable black bear population (Table 8; from Wyoming Game and Fish Dept. 2007). Based on this indicator, B-11 is within the stable range but on the edge of the decreasing range, with 40% of the harvest being females during the 2017-2019 seasons (Table 9). Proportions higher than 40% suggest that the population is being reduced through removal of female bears. Monitoring this criterion helps ensure a stable reproductive portion of the population and the ability of the population to rebound in the event of a decline.

With increasing harvest of a black bear population, younger females are removed and older females become more common in the harvest. **Thus, the proportion of adult females within the overall female harvest should rise with harvest rates, increasing mean age of females in the harvest** (Kolenosky 1986, Beecham and Rohlman 1994). This phenomenon is especially important with late-reproducing species like bears, since removing adult females has the dual effect of not only reducing the number of bears in the population, but also decreasing reproductive potential of the population and, thus, its ability to respond to declines. The delayed response of slow reproducing populations to reductions was noted by Harris (1984) and was demonstrated in modeling efforts by Miller (1990), who predicted black bear populations reduced by 50% would take an average of 17 years to recover if hunting pressure was reduced by 25%.

The percent of adults within the female harvest, rather than mean or median age of the females in the harvest, can also be used to gauge the presumed population trajectory. Averaged over a three-year period, this criterion provides a more meaningful measurement of female harvest age

structure, especially in areas with small sample sizes. The mean percent of adult females in the harvest of two New Mexico black bear populations under moderate and high harvest pressure was 55% and 70%, respectively (Costello et al. 2001). The mean percent adult females in the Wyoming statewide female black bear harvest from 1994-2005 was 47%, with a range of 32% – 57%, suggesting that 45 – 55% adult female harvest provides a stable proportion of adult females (Table 8; Wyoming Game and Fish Dept. 2007). In B-11, the adult proportion of female harvest has been 49% averaged over 2017-2019 (Table 9), indicative of a stable population under this criterion.

Looking at these three indices of age/sex of harvest together, the bear population in B-11 should be stable to slightly declining under current management and harvest levels. To better evaluate harvest data, we recommend that harvest objectives and attendant limited license allocations be set for a minimum of 3-year periods. This would allow for a more complete analysis of the effects of harvest by holding dates and quotas the same for each 3-year cycle. In order to increase the sample size of the harvest data and to reduce the influence of high or low annual harvest rates due to environmental or other factors, 3-year running averages should be used in harvest data analyses rather than analyzing annual data individually. While the evaluation of harvest criteria will be analyzed using a 3-year average, data from the previous 10 years (two black bear generations) or longer should be analyzed to illustrate longer-term trends in harvest and related population trends.

Social Factors

The social factors that influence management scenarios in B-11 include human conflicts and game damage. As described above in the "MANAGEMENT HISTORY" section, human-bear conflicts during years of natural food failures have been significant, mostly involving bears in trash, or bears entering or attempting to enter a home, cabin, trailer or car. These conflicts are dealt with by CPW field staff individually depending on severity of the incident and other site-specific qualities, and whether the bear in question had been handled previously for conflict. CPW's Human-Bear Conflict policy provides options for staff to consider when responding to conflict bears. Due to the statewide increase in bear and mountain lion attacks on humans, CPW implemented a predator attack policy to serve as guidance for dealing with these traumatic events.

A major reason that these conflicts persist is that unsecured trash containers and other human food sources continue to be available to bears (e.g., Lewis et al. 2015), despite the adoption of trash ordinances in several towns and counties meant to prevent wildlife-human conflicts. Counties and municipalities have worked with CPW staff to identify novel and non-traditional ways of reaching new publics. The seasonal nature of the workforce and visitors to many of these towns creates a unique challenge in targeting the proper, uneducated audience. Additionally the short-term stay of these audiences makes it difficult to instill a sense of ownership and personal responsibility for the problem.

As long as anthropogenic foods are available, they will continue to be an attractant for bears, leading to conflicts with humans and usually the removal of the bear. Under such scenarios, urban areas that draw in bears may function as population sinks, in which the mortality rate exceeds the recruitment rate of the population. At the population scale, mortality of adult females due to conflict removals could negate any improvement in their body condition and cub production gained from feeding on anthropogenic food sources (Lewis et al. 2014).

To ultimately reduce human-bear conflicts, residents and municipalities need to ensure that these potential food sources are made unavailable to bears by strictly enforcing the use of bear-proof trash containers and dumpsters. Doors and windows on houses and vehicles should be kept closed and locked to minimize the possibility of a bear entering in search of food. Fruit trees (e.g., crabapple trees in downtown Aspen) are also a major attractant for bears; instead, non-fruit-bearing trees should be used in landscaping.

As stated above in the "Management History" section, the vast majority of game damage claims involving bears in B-11 were livestock damage. Most of these claims are from producers whose primary source of income is from domestic sheep production.

Predator-prey dynamics

Black bears can be highly effective predators upon newborn ungulates, and bear predation is often a major proximate cause of mortality for elk calves (e.g., grizzly and black bear: Singer et al. 1997, Barber-Meyer et al. 2008; black bear: Smith et al. 2006, White et al. 2010). The effects of predation on prey populations are complex and vary with predator and prey densities and species composition, habitat cover and forage conditions, weather, body condition, and other biological and ecological factors (Singer et al. 1997, Smith et al. 2006, White et al. 2010, Griffin et al. 2011). Predator control is often suggested by the public to improve ungulate populations, but its efficacy depends on a wide array of ecological interactions.

Predator control may be effective when prey density is low relative to carrying capacity and when there are not alternate prey species or food sources present to bolster the predator population. For example, in an Idaho elk population thought to be below its carrying capacity, reducing black bear and mountain lion densities boosted summer calf survival (White et al. 2010) and calf ratios going into winter (C. G. White, Idaho Department of Fish and Game, pers. comm. 2012).

However, predator control may be ineffective when prey populations are close to carrying capacity and when predation is compensatory to other sources of mortality (Bartmann et al. 1992, Ballard et al. 2001, Zager and Beecham 2006, Hurley et al. 2011). Also, bear reproductive success (e.g., age of first litter, reproductive interval, cub survival rates) can be higher in areas with higher ungulate fecundity (Schwartz and Franzmann 1991), so as deer and elk populations grow (e.g., due to habitat improvements and/or predator reductions), bear populations could subsequently benefit from the additional availability of prey. Therefore, reducing the bear population in B-11 may, or may not, ultimately improve deer and elk populations.

STRATEGIC GOALS AND MANAGEMENT OBJECTIVES

Process for Developing Strategic Goals and Management Objectives

The structure of a bear management plan focuses primarily on one specific tool, hunting, out of a suite of tools such as education, enforcement, and habitat modification that can also be used to manage the bear population and human-bear conflicts. This plan provides harvest-related monitoring structures to assess the bear population, along with strategic goals that will attempt to influence the bear population size in B-11 and, ideally, to reduce conflicts.

In reality, the conflicts that occur with bears require more than changes in licensing or hunting structure in order to resolve the problems. In addition to (and probably more effective than) bear population reduction, a drastic reduction in unsecured trash and other human food sources is also necessary to minimize the incentives for bears to forage in urban areas for anthropogenic foods.

B-11 Strategic Goal Alternatives

The top management priority in DAU B-11 is to reduce conflicts between humans and bears. Current conflict levels are not sustainable for CPW staff to continue to provide adequate response. Increased severity of human-bear conflicts poses a threat to serious concern for the health and safety of residents and visitors in these communities. In addition, the quality of bear hunting experience and the persistence of a sustainable bear population are secondary priorities after human-bear conflict management.

As discussed in the "Urban Human-Bear Conflict Management" section above, human-bear conflicts in B-11 have dramatically increased in the past two decades because of growing numbers of both bears and people and, as a result, increased overlap between bears and humans and greater availability of human food sources for bears. To reduce human-bear conflicts, we recommend a dual strategy of (a) reducing the overall bear population through increased harvest and through removal of conflict bears, while also (b) working with counties and municipalities to implement and strictly enforce ordinances on trash and other attractants.

Attempts in other North American states and provinces to reduce human-bear conflicts through hunting have been equivocal. Differences among these management attempts could be due to varying levels of bear harvest relative to bear population size, varying management responses to bear conflicts, and varying compliance with ordinances and recommendations to secure human-source foods and attractants; all of which highlight the complex and multi-faceted nature of human-bear conflict management. Some studies found that increasing bear harvest did lead to a reduction in complaints and conflicts (Raithel et al. 2017, Garshelis et al. 2020) and that following high levels of bear harvest, the reductions in both complaints and bear population size were sustained for multiple decades (Garshelis et al. 2020). However, other studies found that increasing bear harvest was not correlated with fewer conflicts (Obbard et al. 2014, Tavss 2005, Treves et al. 2010). Bears that were harvested may not have been the individuals involved in conflicts, or the level of harvest was enough to reduce the population. More importantly, the underlying cause of the conflicts, namely unsecured trash and other human food sources, went unresolved.

On the other hand, strict enforcement of bear-proof trash storage has resulted in reducing conflicts (Peine 2001, Tavss 2005, Johnson et al. 2018). Bear population reduction alone is unlikely to significantly reduce conflicts if trash and other human food attractants continue to be available to bears. **It is incumbent upon residents, communities, and other local enforcement agencies to eliminate garbage, fruit trees, and other attractants in order for the overall management strategy to be effective at reducing human-bear conflicts (see Appendices D and E).** Properly securing bear-proof trash containers and dumpsters, unifying the trash pick-up day within each neighborhood, closing and locking windows and doors on homes and vehicles, using round-handled door knobs, and switching to non-fruit producing landscaping trees (such as the *Malus x* 'Spring Snow' crabapple tree instead of a fruit-producing crabapple tree: Gilman and Watson 1993) would reduce human food sources available to bears and other wildlife. Supplying and/or subsidizing the purchase

of bear-proof trash cans and dumpsters would help residents and communities with the costs of switching to these containers and would increase compliance with trash ordinances (Johnson et al. 2018). **Proactive and consistent enforcement of the ordinances by authorities, with high monetary fines for non-compliance, are also needed to ensure that trash containers are properly secured** (Baruch-Mordo et al. 2011)**.**

To reduce the bear population, we have set objectives for total bear mortality and harvest mortality. Annual monitoring of mortality, gender and age structure, black bear density studies, and annual forage condition survey results are all incorporated into determining annual mortality objectives and assessing the bear population trend and size. A summary of recent harvest and mortality metrics is provided in Table 10.

Social metrics will also be taken into consideration to decide when the bear population has been reduced sufficiently. Examples of social metrics include the number of human-bear conflicts that is socially tolerable (or conversely, not acceptable) in poor natural food years, public attitudes towards bears and human-bear conflicts, and bear hunter satisfaction.

Table 10. Summary of current 3-year average harvest and mortality data for B-11.

Total mortality (2018-2020 average)	135 bears/year
Total mortality rate (assuming a population of 1,040 bears)	13%
Harvest mortality (2018-2020 average)	100 bears/year
Non-harvest human-caused mortality (2018-2020 average)	34 bears/year
Non-harvest human-caused mortality in past 3 poor food years (fall forage quality score < 5; 2017, 2019, 2020)	43 bears/year
Harvest composition (2017-2019 data):	
% Adult Male in Total Harvest	20%
% Female in Total Harvest	40%
% Adult Female in Female Harvest	49%

Local CPW staff have developed two alternatives to consider for strategic goals for the B-11 bear population over the next 10 years (Figure 18): one stable population trajectory associated with no increase in human-bear conflicts, and one decreasing population trajectory aimed at reducing human-bear conflicts.

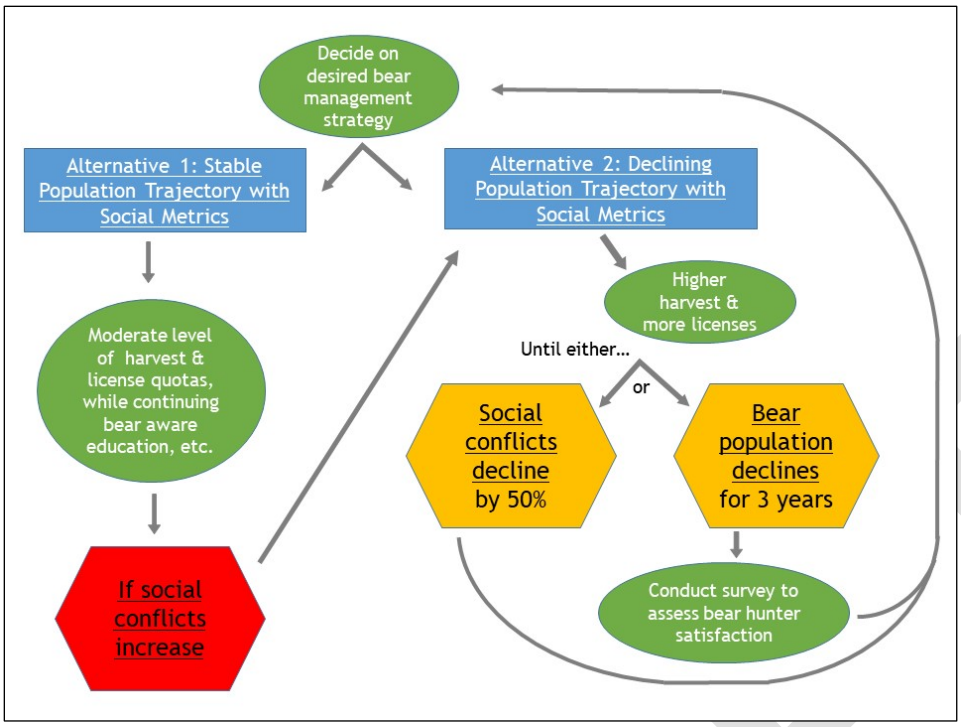

Figure 18. Alternatives under consideration for B-11 managment strategies.
Simpilified for graphical display. See main text for further details of the alternatives.

Alternative 1: Stable population trend with social metric threshold

Under Alternative 1, B-11 would be managed for a stable bear population trajectory and for no increase in human-bear conflicts. A decrease in human-bear conflicts is desired and CPW will continue to work with communities to educate residents and visitors on Bear Aware practices, and encourage municipal and county authorities to strictly enforce trash ordinances. To allow a few years for communities to work on education and enforcement strategies, starting in the 5th year of implementation of this management plan, we will examine whether these strategies are effective based on the number of human-bear conflicts. If human-bear conflicts have increased beyond a 3-year average of 450 conflicts per year, then the management strategy for B-11 would be changed to a bear population reduction strategy by increasing harvest, as described in Alternative 2.

The trend in 3-year averages of age/sex composition of the harvest should be consistent with that of a stable population:

(a) proportion of adult males in the harvest within 25-35%,
(b) total females at 30-40% of total harvest,
(c) adult females at 45-55% of the female harvest.

The total mortality rate as a proportion of the population should fall in the 10-15% range. Based on the current population estimate in B-11 of 1,040 bears, total mortality needed to maintain a stable population is 104-156 total bear mortalities per year. Deducting the current 3-year average non-harvest human-caused mortality of 34 mortalities from the total mortality objective, the harvest objective should be 70-122 harvested bears per year.

Within the framework of an overall stable population, flexibility will be maintained to manage for minimized game damage and human-bear conflicts in localized areas of concern. Not

every management index must be in complete agreement, but most indices should point toward a stable population.

CPW will continue to work with local municipalities, communities, and trash companies to emphasize both Bear Aware information and education, as well as enforcement of trash ordinances and other regulations aimed at reducing or prohibiting artificial food sources available to bears. Funding for efforts to reduce human-bear conflicts will be instrumental. Internal CPW funds have been allocated to address human-bear conflicts in B-11, but additional matching funds from local governments and organizations will also be necessary to affect change on a scale significant enough to positively influence outcomes. Examples of methods to increase compliance with trash ordinances and to reduce human-bear conflicts include: increasing enforcement through ticketing for violations of trash ordinances, subsidizing the cost of bear-resistant garbage containers for local residents, redesigning dumpsters to make it easier for users to correctly lock, and modifying trash hauling trucks to accommodate this equipment. Additional efforts can be made to identify long term communication strategies for reaching seasonal residents and short term visitors.

Currently, B-11 averages approximately 450 human-bear conflicts per year, with a range of 600+ conflicts in poor natural food years and 300 conflicts in good natural food years. Fall forage scores indicate that about half of the past 13 years have been poor natural food years. If the number of human-bear incidents (based on incidents logged in CPW's Wildlife Incidents App that are classified as conflicts; specifically, Attack, Aggressive behavior, Food-source property damage, or Non-food property damage) exceeds a 3-year average of 450 conflicts/year, then the management strategy would shift to a bear population reduction objective through increased harvest (as described in Alternative 2).

Under Alternative 1, opportunities to obtain a bear license would remain ample. License quotas would remain similar to those of recent years. Unless communities are successful at securing trash and other human food sources, human-bear conflicts would likely continue to be high in years of poor natural foods. Vehicle collisions with bears and game damage would also remain similar to current levels, assuming a stable bear population.

Alternative 2: Decreasing population trend with social metric thresholds

B-11 would be managed for a decreasing population trend until social metrics show a reduction in human-bear conflicts of at least 50% over a running 3-year average, or until harvest composition indices indicate 3 consecutive years of declining population, at which time CPW would conduct a survey of B-11 bear hunters to assess hunter satisfaction.

To achieve a strategic goal of decreasing the bear population in B-11 to a lower density, the harvest and total mortality objectives would be liberal. The trend in 3-year averages of age/sex composition of the harvest should be consistent with that of a decreasing population:

a) proportion of adult males below 25% of total harvest,
b) total females over 40% of total harvest,
c) adult females over 55% of the female harvest.

Total mortality rate as a proportion of the population could increase into the 15-20% range. Based on the current population estimate of 1,040 bears, a total mortality of 156-208 total bear mortalities per year would suppress the population growth rate. Assuming the current average of 34 non-harvest mortalities per year, the harvest objective would be 122-174 harvested bears per year.

Under this alternative, the primary management goal for B-11 is to reduce human-bear conflicts through as many available means as possible. B-11 would be managed for a decreasing bear population until social metrics show a sustained reduction of human-bear conflicts in poor natural food years, along with consideration of bear hunter satisfaction. **Reducing the availability of human food sources (for example, by 55-70% of present levels, per Baruch-Mordo et al. 2013) would also reduce human-bear conflicts, and would be more effective than bear population reduction alone.**

The objectives for the following metrics of human-bear conflicts, based on running 3-year averages, are:

d) a 50% reduction in non-harvest human-caused mortality of bears (including bears killed by CPW or other agencies, roadkills, landowners, and game damage kills) to 15-20 bears/year, and
e) a 50% reduction in the number of human-bear incidents logged in CPW's Wildlife Incidents App that are classified as conflicts (Attack, Aggressive behavior, Food-source property damage, or Non-food property damage) to <225 complaints/year.

To gauge B-11 bear hunter satisfaction as the bear population declines, CPW will also:

(f) conduct a survey of B-11 license holders, once all 3 harvest age-sex composition indices (measured on 3-year averages) indicate a declining population for 3 consecutive years. The survey will assess hunter satisfaction with topics such as bear hunting opportunity, quality, license availability, and hunter crowding.

If the objectives to reduce social conflicts are met or if most of the bear hunters surveyed are dissatisfied with bear hunting in B-11, then CPW will assess whether to continue with high harvest and mortality objectives or whether to transition to a stable population objective, depending on the collective biological and social issues at that time.

Under Alternative 2, opportunities to obtain a bear license would be abundant and higher than current levels. Licensing would be set to maximize hunting opportunities. Limited license quotas would be set high enough that effectively any interested hunter could obtain a bear license. In addition, under the current (2020-2024) Big Game Season Structure, hunters with valid deer and/or elk licenses in GMUs overlapping with B-11 would have the option to purchase an "add-on" bear license. The primary objective is to reduce human-bear conflicts, but notably, unless the availability of trash and other human food sources are substantially reduced and/or the bear population is reduced significantly to a very low density, conflicts in urban areas will likely continue to occur during poor natural food years. The number of livestock conflicts and roadkilled bears may decline as the bear population declines.

Public Process

Public Meetings

A 30-day comment period was open from October 11 to November 10, 2021, during which time the draft plan, along with an online public survey (see below and Appendix F), was available through the CPW website and publicized through a CPW news release and social media posts.

We held meetings with Garfield, Eagle, and Pitkin boards of county commissioners in October 2021. We did not receive written comments from any of the counties. We distributed the draft plan to the local USFS and BLM staff, and received a comment letter from White River National Forest (Appendix G). We also met with the Lower Colorado River Habitat Partnership Program (HPP) and the Eagle County Community Wildlife Roundtable (ECCWR) and received comment letters from them (Appendix G). We also presented the draft plan to the Roaring Fork Valley Future Forest Roundtable.

We held a public meeting in Glenwood Springs on October 22, 2021, which 22 members of the public attended. We presented the draft plan, the 2 population management alternatives under consideration, and the expected consequences of each alternative. Most of the public comments and discussion revolved around the need to increase compliance with trash ordinances and to reduce the availability of attractants.

Public Survey Responses

We conducted an online survey that was open throughout the 30-day comment period and was available to anyone to submit responses. We publicized the online survey on the CPW website, through press and social media avenues, at the county commission meetings, and at the public meeting. We received 384 responses, among which 365 (95%) completed the entire survey. Complete results are available in a supplementary document (Appendix F). In addition to the online survey responses, which included written comments, we also received 4 mailed-in or emailed comment letters (Appendix F).

Below are some highlights from the online survey:

- 94% of respondents were residents of Colorado (Question 1) and 79% were residents within B-11's administrative boundaries (Question 2).
- 79% of respondents reported that black bears are "very important" to themselves and another 16% selected "somewhat important." 3% rated black bears as "somewhat unimportant" or "very unimportant" to themselves (Question 6).
- 65% reported that negative interactions between humans and black bears in B-11 are either "very significant" or "somewhat significant." 10% rated this topic as "neither significant, nor insignificant," while 13% selected either "very insignificant" or "somewhat significant" (Question 9)
- 13% of respondents have hunted black bears in Colorado (Question 24). Among those individuals, 65% had hunted in B-11, while 35% had hunted bears elsewhere in Colorado (Question 25).
- Among the respondents who have hunted in B-11:
    - 47% were either "very satisfied" or "somewhat satisfied" with their bear hunting experience. 19% were "neither satisfied, nor dissatisfied." 33% were "very dissatisfied" or "somewhat dissatisfied" (Question 27).
    - Most (53%) of the B-11 hunters reported that their primary reason for hunting bears in this DAU was "to provide meat for myself, family, and/or friends to eat." Another 28% said their primary reason was "the opportunity to hunt black bears every year" and 14% said it

was “to enjoy nature and spend time outdoors.” 6% were “not sure,” while 0 hunters selected “the chance to harvest a trophy black bear” (Question 29).

- Preferences between the two alternatives for B-11 bear population management (Question 13) based on respondents’ answers to other questions:
    - Overall (Figure 19a), most respondents overwhelmingly (75%) prefer the strategy to “maintain a stable population.” 20% prefer to “reduce the bear population through harvest until human-black bear conflicts are reduced by 50%.”
    - Respondents who live in B-11 vs elsewhere (Figure 19b) were similarly >70% in favor of the management strategy to maintain a stable population.
    - Between bear hunters and non-bear-hunters, the preferences were markedly different (Figure 19c). 77% of bear hunters prefer the alternative to reduce the bear population. 84% of non-bear-hunters prefer the alternative to maintain a stable bear population.
    - Among the respondents who have hunted bears (Figure 19d), there was a distinct difference between B-11 hunters, 81% of whom prefer to reduce the bear population, and bear hunters who have not hunted in B-11, who were split nearly evenly between the two alternatives.
- Among the management actions available to CPW to reduce or prevent negative interactions between black bears and people (Question 22):
    - Almost all (93-97%) respondents found it acceptable for CPW to “educate citizens about how to coexist with bears,” “support city ordinances that require citizens to use bear resistant garbage containers,” and “fine individuals who are feeding bears intentionally or unintentionally.” Many respondents were also accepting if CPW were to “fine individuals who do not keep bird feeders, pet food, and other unnatural food sources secured from bears” (83%) and “trap and relocate bears that cause conflict” (72%).
    - There was moderate support (61% of respondents) to “provide financial assistance to residents for bear-proofing garbage, gardens, and fruit trees,” but there was a distinct difference in responses to this topic, correlated with the person’s preferred bear population management strategy (i.e., their response to Question 13):
        - Respondents who supported a stable bear population management strategy more strongly supported providing financial assistance for bear-proofing (69%).
        - In contrast, among those who supported a bear population reduction strategy, only 35% supported providing financial assistance.

Figure 19. General public's preferences for bear population management alternatives based on responses to the 2021 online survey, among (a) overall respondents, (b) respndents who are B-11 residents vs. others, (c) respondents who are bear hunters vs. non-bear-hunters, and (d) respondents who are bear hunters in B-11 vs. elsewhere in Colorado.

- Finally, overall there was low support to "increase hunting licenses to increase bear harvest in areas with conflicts" (28% acceptance) or to "kill bears that cause multiple conflicts" (34% acceptance). Not surprisingly, there was a distinct disparity in acceptance of these 2 management actions depending on respondents' preferred bear population management strategy (Question 13):
  - Among those respondents who supported a stable bear population management strategy, 9% found it acceptable to increase bear hunting licenses and 20% found it acceptable for CPW to kill bears that cause multiple conflicts.
  - In contrast, those who preferred the bear population reduction strategy also 96% accepting of increasing bear hunting licenses and 86% accepting of CPW killing bears that cause multiple conflicts.

Data Monitored to Inform Management

All known dead black bears, from both harvest and non-harvest sources, are checked by CPW staff to obtain biological information. The proportion of harvest mortality of each gender will continue to be closely monitored on an annual basis to assure that female mortality rates are not contrary to the DAU strategic goals. Age structure in harvest and total mortality and reproductive history of adult females are derived from extraction of a premolar tooth from all dead bears.

Because of slow reproductive rates, black bear populations cannot sustain high harvest levels over prolonged periods. Research has shown that high harvest levels can quickly reduce black bear populations to levels where severe reductions in harvest quotas and season lengths may be necessary for greater than 10 years for full recovery of a population (Miller 1990, Beecham and Rohlman 1994). The following criteria will be assessed at the DAU level and will be used to guide population management of B-11 toward the DAU objectives.

- Harvest and mortality indices of population trend

Monitoring harvest and total mortality in relation to the estimated population size will be important in interpreting the trajectory of the population size. Table 11 outlines the guidelines that will inform management decisions based upon the selected strategic goal. These indices will be monitored annually based on 3-year averages.

Table 11. Indices of bear population trajectory based on age and sex composition of harvest and total mortality rate.

Index	Bear Population Trajectory		
	Decreasing	Stable	Increasing
% of Adult Males in Total Harvest	< 25%	25 - 35%	> 35%
% of All Females in Total Harvest	> 40%	30 - 40%	< 30%
% of Adult Females in Total Female Harvest	> 55%	45 - 55%	< 45%
Total mortality rate	15-20%	10-15%	5-10%

- Social metrics: human-bear conflicts

Human-bear conflicts are tracked and quantified through the Wildlife Incidents App, in which staff records various types of complaints and calls from the public about bears. These reports vary from simple sightings of bears to property damage and physical injury to humans.

All known bear mortalities are also tracked through mandatory reporting. Non-harvest human-caused bear mortalities, including conflict kills, livestock game damage kills, and roadkills, will provide another indicator of the amount of human-bear conflicts.

- Social metrics: hunter success and satisfaction

Hunter success rates and hunter satisfaction are considered annually when determining annual license quotas. As the bear population declines and/or as quotas increase, hunter success rates may decline. In turn, hunter satisfaction and participation rates might also decline if success rates drop.

Hunter satisfaction will be formally assessed through an online survey of license holders if and when all 3 of the harvest composition indices are in the range of a decreasing population trajectory for 3 consecutive years.

- Fall forage quality

Collected annually, a qualitative rating of fall mast production can be used when projecting reproductive rates, cub survival, vulnerability to harvest and other factors related to modeling and predicting population trends for the upcoming year. Annual fall mast production surveys are conducted in representative GMUs in DAU B-11. Results of these surveys are incorporated into population modeling efforts, along with mortality, age, and gender structure data.

Under Alternative 2, data from the 3 most recent poor natural years, as determined by the fall mast production surveys, would be used to assess social metrics of human-bear conflict. Specifically, years when the Fall Forage Quality is ranked <5 (on a scale from 1-10 based on mast production rating and number of mast-producing plant species present) will be considered "poor" natural food years.

- Game damage

Levels of submitted game damage claims will be evaluated on an ongoing basis. In most cases, management efforts will be targeted at individual bears and locations that are involved in these situations. Management actions include a wide array of techniques and strategies that are employed on a case-by-case basis.

Preferred Strategic Goal

The management alternative preferred by CPW staff is Alternative 1. This alternative attempts to address bear population management and human-bear conflict issues by using moderate harvest levels to maintain the current population size, while also continuing to use Bear Aware education and encourage local town and county officials to implement and/or enforce trash ordinances to reduce the availability of human-sourced food attractants near residences and in towns.

At present, during poor natural food years which are becoming more frequent as drought persists, complaints about bears in trash and bears breaking into homes strain the capacity of CPW officers to handle. By the time bears are subsisting on garbage for food or are breaking into homes, this is the end result of a broader phenomenon, namely the convergence of (a) a high bear population, (b) an increasing human population living in mountain communities, and (c) the failure of many communities to secure garbage and other anthropogenic foods that attract bears to these unnatural food sources when natural foods are scarce.

CPW's primary tool to manage the overall bear population size is through regulating the amount of harvest, but the agency does not have authority over enforcing people to secure their garbage. As seen in other communities in the U.S. and Canada dealing with human-bear conflicts, a meaningful reduction in conflicts only occurs when human-source foods are made unavailable to bears. Most local communities in B-11 and some counties already have trash ordinances in place, and where these ordinances have been consistently enforced (for example, Snowmass Village and Vail), human-bear conflicts are less common and usually manageable. Other communities including Glenwood Springs, Carbondale, and Basalt have begun to issue tickets for trash ordinance violations. Based on the results of the public survey (see below), there is strong support from the public (>80% of respondents) to enforce these ordinances and to issue fines to individuals and businesses for violations. CPW strongly encourages people to follow bear-proofing guidelines and also supports strict enforcement by local law enforcement authorities of ordinances to secure garbage and other attractants.

In summary, below are the specific management objectives. The total mortality and harvest objectives are based on current information and assumptions about population status and trajectory. These represent starting points in an ongoing process. Annual changes to mortality and harvest objectives are anticipated based on new information and evaluation of monitored data. For purposes of calculating mortality objectives to correspond with the strategic goal in the DAU, a presumptive post-hunt population of 1,040 independent bears will be used, based on the suite of models and extrapolations described above (Table 5).

Mortality Objectives

Total Mortality Objective

In order to achieve a DAU strategic goal of maintaining the current bear population size in B-11, the total mortality rate as a proportion of the population should be 10-15% of the population. Based on the estimate of B-11's bear population of 1,040 bears, the 3-year average total mortality should be 104-156 bears annually.

Hunter Harvest Objective

Annual hunter harvest objectives are determined by deducting the 3-year running average amount of non-hunter mortality from the total mortality objective. Assuming that the current average of 34 non-harvest mortalities per year persists, the 3-year average hunter harvest objective will be 70-122 bears harvested per year to maintain the current bear population size.

Age & Gender Harvest Composition Objective

The 3-year running average proportion of age and gender structure in hunter harvest should follow the stable population strategic goal, with 25-35% adult male in the total harvest, 30-40% female in the total harvest, and 45-55% adult female in the total female harvest (Table 11).

Social Objective

To define quantifiable amounts of human-bear conflicts that are realistically manageable by CPW staff, the following social metrics will be monitored:

Bear complaints maximum threshold

Annual calendar year bear complaints logged in CPW's Wildlife Incident App that are classified as conflicts (Attack, Aggressive Behavior, Food-Related Property Damage, or Non-Food Property Damage) should be less than 450 conflicts per year on a rolling 3-year average. Exceeding an average of 450 bear conflicts per year would prompt a shift to a bear population reduction strategy in the 5th year of implementation of this plan.

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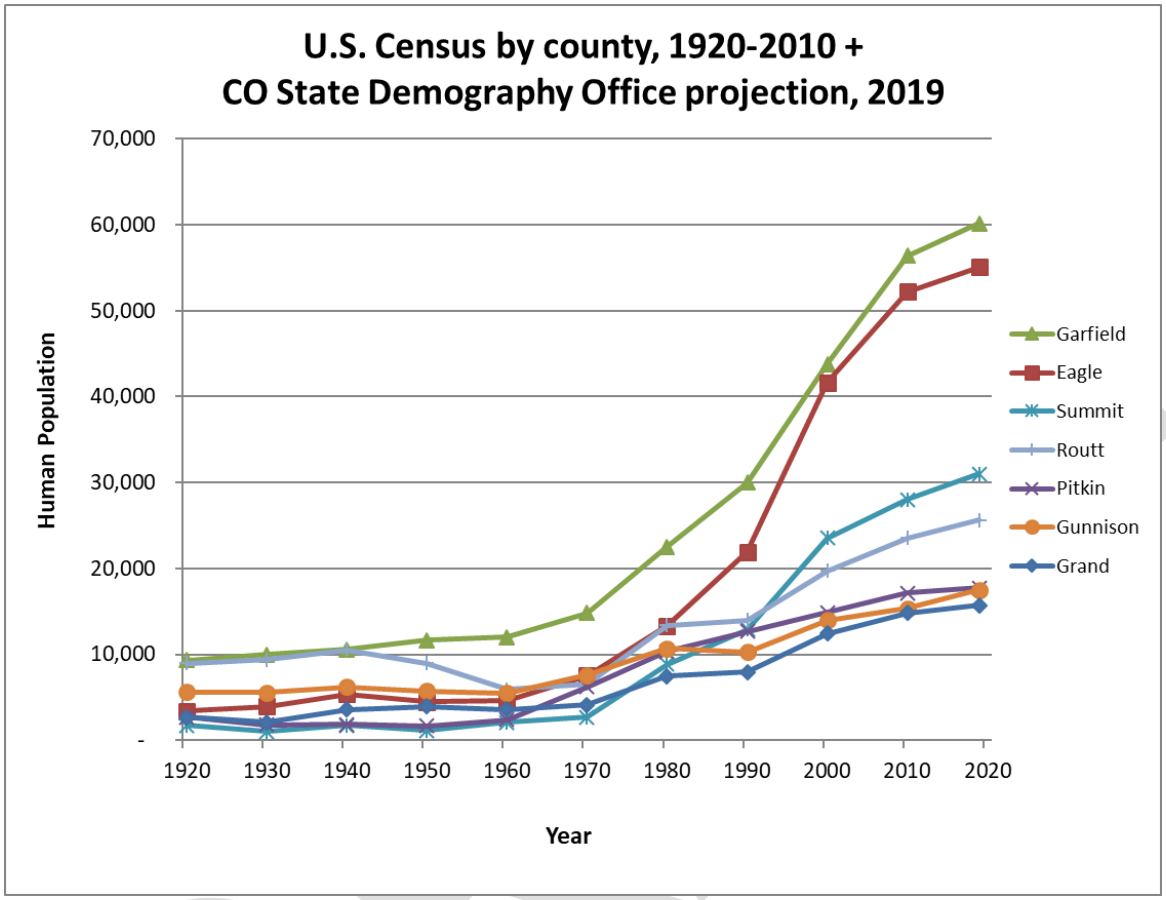
APPENDICES

Appendix A. Human population by county,1970-2019.

Sources: https://www.census.gov/popest/data/historical/index.html,
https://demography.dola.colorado.gov/population/population-totals-counties/#population-totals-for-colorado-counties

2020 U.S. Census data at the county level is expected to be available in March 2022.



Appendix B. Bear injuries to humans in B-11

Excerpted from unpublished CPW file "human-bear contacts.pdf" (8/23/11 version) and updated through 2021.

July 28, 2004: (Black Bear, GMU 43, Pitkin Co.) *Injury:* An adult black bear pawed the outside of the tent of a 19-year-old woman. As the bear pawed at the tent, the tent collapsed on the woman and the bear proceeded to roll her around and sniff her. After finding no food in the tent the bear left the area. The woman sustained no serious injuries, but was treated at the hospital for a small wound on the top of her leg and some bruises. Wildlife officers searched the area for several days but could not locate the bear.

October 11, 2007: (Black Bear, GMU 43, Pitkin Co.) *Injury:* A homeowner suffered a number of abrasions on his back and left calf when an adult, boar black bear swatted him in his garage. The homeowner kept dog food inside the garage next to the garage entry door to the home. Early in the morning, the man went to feed his dogs. He flipped on a garage light, startling a bear that was eating dog food next to the door. The homeowner turned immediately to go back in the house when the bear swatted him on the back and the calf. The bear remained in the garage for a short time. The man was treated and released from a local hospital. The garage door had been left up approximately two feet to allow the dogs to go in and out. A wildlife officer shot and killed the bear after it exited the garage. The bear's teeth were well worn and indicated that the bear was older.

October 16, 2007: (Black Bear, GMU 43, Pitkin Co.) *Injury*: A bear entered a ground level condo on the west side of Aspen through a slider door that was left unlocked. The bear was in a small kitchen area eating out of the refrigerator. A woman in the condo entered the kitchen to investigate some noises. She came around the corner of the hallway to the kitchen. At that point, the woman was standing between the refrigerator in the small kitchen area and the door the bear had entered. The bear stood up on its hind legs and swatted the homeowner across the head and face. The bear then exited the door it had entered. A trap was set at the condo shortly after the incident. The bear was euthanized by wildlife officers on Oct. 27.

August 10, 2009: (Black Bear, GMU 471, Pitkin Co.) *Injury:* At approximately 10:10 p.m. a woman had gone to the main floor of her Aspen home to work in her home office. As she passed through the entry way of the home, she reported that her small dog began barking frantically. The woman confronted a large bear. The woman screamed and turned to open the front door to get the dark brown bear out of the house. The bear struck the woman leaving lacerations on her back and chest. The homeowner was able to flee to the upstairs bedroom and call 911. The bear remained in the home for a short time but left as police responded. Wildlife officers arrived a short time later and began the efforts to locate the bear. It was determined that the bear gained entry to the home by physically forcing open a pair of French doors. Wildlife officers found no bear attractants around the property that might have guided the bear to the location. Based on the description of the bear and the method of entry, officers believed that the same bear was responsible for several other home entries in the area. Several days later, a large, dark brown, male black bear returned the scene and was euthanized.

August 31, 2009: (Black Bear, GMU 47, Pitkin Co.) *Injury:* Around 3 p.m. a woman sleeping on her deck was awakened by a sharp pain in her leg. She immediately awoke to find a bear had inflicted a puncture wound on her leg by either biting or scratching her. The woman reported that she jumped up, prompting the bear to leave the deck area. The bear remained in the yard until wildlife officers and Aspen police responded to the scene. As law enforcement units arrived, the bear went into a tree on the property. The 2-year-old female bear was euthanized.

September 10, 2009: (Black Bear, GMU 43, Pitkin Co.) *Injury:* Shortly after 8 p.m. a homeowner heard his dogs barking. A large, black-colored bear had entered through an unlocked and ajar entry

door. The dogs had the bear trapped against the door at the base of some stairs. The bear backed against the door and pushed it closed. The homeowner went down the stairs and grabbed his dogs trying to protect them. He brought the dogs up the stairs. The bear had no escape route but up the stairs. The homeowner tried to push a chair in front of the bear to stop it. The bear swatted him across the side of the head. The man opened a kitchen window and the bear left out that window. The man was treated and released from a local hospital. Wildlife officers set a trap for the bear at the site and patrolled the neighborhood, but the bear involved in the incident was never located.

June 18, 2010: (Black Bear, GMU 45, Eagle Co.) *Injury:* A 25-year-old Florida man working construction for the summer was taking a walk on his 9 a.m. break when he spooked a large bear. The startled bear charged the man. After the bear hit him once near his left eye and temple, the man put up his arm to protect himself. The bear scratched his left arm, and then knocked the man to the ground, unconscious. When he regained consciousness the bear was gone and the man, covered in bear hair, ran back to his jobsite to get help from his coworkers. The man suffered a black eye and minor cuts and bruises. He was treated and released from a local hospital. The man described the bear as black with a reddish head and estimated the bear to be 350-pounds. Wildlife officers arrived and began efforts to locate the bear using tracking dogs. The dogs picked up the bear's scent at the scene and the bear was located within 300 yards of the incident. The bear left the immediate area and was tracked by officers for about 12 hours. While tracking the bear officers could see the bear a few times but because of nearby homes they could not safely capture or euthanize the bear. Officers found large amounts of food trash in a roll off construction dumpster at the site of the original incident.

August 19, 2011: (Black Bear, GMU 43, Pitkin Co.) *Injury:* At approximately 5:30 a.m. two men sleeping in a tent were awoken by a bear circling their tent. The bear stood up on its hind legs before landing on top of the occupied tent, collapsing the tent and pinning the occupants. One of the men lay still under the bear in the collapsed tent and was bitten in the back of his leg by a bear when he moved. The man sustained a couple of minor puncture wounds on his left leg that did not require immediate medical attention. The campers were able to scare the bear off by shouting at it. The campers indicated that their food was stored high in a tree at least 75 feet from their campsite. The men reported the attack to the US Forest Service the next day.

August 20, 2011: (Black Bear, GMU 43, Pitkin Co.) *Injury:* At approximately 1 a.m. a 51-year-old man was awakened by a bear biting his sleeping bag and leg. The man was able to fight the bear off and called for help to his fellow campers sleeping in nearby tents. Despite repeated attempts to scare the bear away it would not leave immediate area. The three men watched the bear circling the campsite the remainder of the night. The man sustained substantial nonlife-threatening injuries to his lower right leg but was able to walk with assistance to meet Mountain Rescue Aspen members on a nearby trail. Rescue members transported the man to a local hospital where he was treated for his injuries. The man reported having an empty bag of freeze-dried food inside a backpack in his tent. Wildlife Services personnel with tracking dogs successfully tracked and found a 200 pound male black bear matching the description of the offending bear 1½ miles from the incident and euthanized it at approximately 7 a.m. August 21. The same bear is believed to have also been involved in the August 19 attack less than two miles away.

July 27, 2014: (Black bear, GMU 471, Pitkin Co.) *Injury*: At approximately 2 a.m., a woman was walking through an alley in downtown Aspen when she saw some workers from the Cantina restaurant looking out from the alley door at something. She went to check it out and surprised a bear which was in the trash dumpster. The bear turned towards her and she stepped back. She clapped her hands to run the bear off. The bear started to come at her and then swatted her. She proceeded to kick the bear which then turned and left. She described the bear as a large 400# bear, brown in color with some possible light spots. The woman had long claw marks/abrasions across her stomach and claw marks/puncture wounds on her upper left thigh, which required stitches. Officers from CPW,

Aspen Police Department, and Pitkin County Sheriff's Office responded on the scene and canvassed the area until light with no success. A trap was set the next day, but the bear was never found.

June 13, 2017: (Black bear, GMU 43, Pitkin Co.) *Injury*: A Redstone resident encountered a large adult bear by the back door of his house at approximately 5:30 am. The man attempted to scare the bear away by slamming the storm door, but the bear caught the door with its paw, then bit the man's arm once and ran away. The man drove himself to Valley View Hospital for medical treatment. When CPW officers arrived at the residence at mid-day on the same day, they found a large brown-colored black bear bedded near the house. The bear's size and color matched the description from the injured man. Officers also found grain/bird seed scattered on the driveway of the residence. The subsequent behaviors of the bear that the officers witnessed suggest that it was not fearful of people, that it was accustomed to being fed by people, and that it appeared to be asserting dominance over the site. The officers tranquilized and later euthanized the bear, which tested negative for rabies. The injured man later acknowledged that several bears frequently visit his property to eat the bird seed. CPW officers issued the man a written warning for unlawfully using food with the intent to lure a wild bear.

May 27, 2019: (Black bear, GMU 47, Pitkin Co.) *Injury*: A woman and her husband were hiking on the Hunter Creek Trail near Lone Pine Road in Aspen at approximately 9:15 am, when they saw a bear walking toward them on the trail. The woman said they tried to give the bear space and stepped off the trail. As the bear walked by, she said it suddenly turned, charged and bit her before it ran off and disappeared from view. According to investigating officers, the bite wound did not appear serious. CPW and USDA's Wildlife Services searched for several days for the bear, described as light brown and weighing approximately 200-300 lb. On 5/30 at approximately 8:30 am, witnesses reported seeing a bear in the proximity of the Hunter Creek trailhead that closely matched the description of the one involved in the attack. After following the bear's trail during the morning, officers killed it on Highway 82 near the intersection of McSkimming Road just before 1 pm. DNA testing revealed that the bear's DNA matched the sample recovered from the wounds of the victim. In addition, the stomach contents of the 3 to 4-year-old, 224-lb male bear consisted almost entirely of birdseed. The bear also tested negative for rabies. According to the wildlife officers that responded to the scene of the attack, it is very likely the bear's aggressive behavior was due to having lost its natural fear of people as it fed on backyard bird feeders. (Adapted from CPW press releases 5/27/19, 5/30/19, and 6/5/19.)

July 27, 2019: (Black bear, GMU 471, Pitkin Co.) *Injury*: An approximately 500-lb bear swiped at a man at the Aspen Meadows Resort resulting in torn clothing and a scratched arm. Several witnesses reported that the bear had previously approached several people, exhibiting no fear. CPW officers were unable to locate the bear. (Adapted from CPW press release 8/19/19.)

August 18, 2019: (Black bear, GMU 471, Pitkin Co.) *Injury*: In an alleyway in downtown Aspen at 11:30 pm a large black bear bit a local restaurant manager, resulting in four deep puncture wounds to the man's leg. The man was attempting to scare a bear out of the restaurant's dumpster that had been left open. While the man stood next to the dumpster, the bear climbed out and bit the man on the leg, then ran off. CPW officers located the bear within town limits on the day after the attack and euthanized it. DNA test results confirmed that it was the same bear that bit the restaurant manager. A necropsy revealed the male bear weighed approximately 400 lb, was healthy and tested negative for rabies. (Adapted from CPW press release 8/19/19.)

July 10, 2020: (Black bear, GMU 471, Pitkin Co.) *Injury*: The incident in Castle Creek began about 1:30 a.m. when a homeowner responded to noises in his house. A large bear had entered the home through the front door. The bear attacked the homeowner with a paw swipe, which resulted in severe lacerations to the victim's head and neck. The victim was transported to the hospital and is undergoing surgery. The victim is stable and the injuries are not life threatening at this point. The

bear was euthanized following a short pursuit by wildlife managers. (Adapted from CPW press releases 7/10/20.)

October 6, 2020: (Black bear, GMU 47, Pitkin Co.) *Injury*: Colorado Parks and Wildlife received a report of a bear attack in the Red Mountain area of Aspen. The reporting party stated that one of the landscapers working at a residence had been clearing brush and a large bear had charged him and knocked him to the ground. The victim was transported to the hospital. The reporting party said that a sow with cubs had been seen on the property the day of the incident as well as for several days leading up to it. CPW officers interviewed the victim at the hospital and investigated the scene and were able to confirm that a bear had been in the area and that the victim had sustained minor bruises and abrasions when he fell. No additional physical evidence was present. No bears were located in the area for several days after the incident.

October 22, 2020: (Black bear, GMU 36, Eagle Co.) *Injury*: The homeowner went out the back door at approximately 0745 hours on 10/22/20 to let his dog out. At that time a "large, brown bear" ran at him and swiped him with her paw, hitting him in his right arm, causing several cuts. The man separated himself from the bear and then she charged a second time but did not make contact with him. The man was able to safely get himself and his dog inside the house then had his wife drive him to the hospital where he received a couple stiches and was released. The bear was found in the tree outside the home's back door with two cubs. The sow was euthanized and the two cubs were relocated to a rehab center.

Appendix C. Bear population model versions

Black bears, being generally solitary (or with cubs) and living in densely vegetated habitats, are a difficult species to survey for population estimation. Several different population models have been developed to attempt to estimate B-11's population size. All involve various assumptions about demographic and environmental parameters, such as survival rates and population density relative to habitat quality. Because of these different assumptions and uncertainties, there is a wide range of population estimates represented by these different models.

Habitat-based Population Models

Two different habitat models have been developed to relate bear use, occupancy, and forage value to project possible populations by extrapolating bear densities. The population projections use densities derived from relevant Colorado data and from literature. Managers applied densities representative of similar habitats and vegetation types in Colorado to develop population projections and then select population ranges which best represent current conditions in the DAU.

General Vegetation/Bear Density Extrapolation

The first model was developed by Gill and Beck (1990) in an unpublished report to the Colorado Wildlife Commission and was modified by Apker (2003) in an internal DOW report. This model applies subjective probable black bear densities for different vegetation types to the amount of land area of those vegetation types. The vegetation type amounts for this model were derived from landsat GAP project coarse vegetation types. This vegetation/density model provides a snapshot extrapolation of possible bear population size in Colorado based on current vegetation classes and both measured and projected bear densities in those vegetation classes from the 1990s. This model and its subsequent extrapolation yields a projected bear population in B-11 of 834 black bears (Table 12).

Table 12. B-11 bear population estimated based on vegetation and density extrapolation.

Vegetation Class	Square Kilometers of Veg. Class in DAU	Percent of DAU	Assumed Bear Density (bears/100 km^2)	Projected Bear Numbers
Aspen	1503	20.27%	38.6	580
Douglas fir	78	1.05%	4.8	4
Forest dominated wetland/riparian	14	0.19%	3.9	1
Gambel oak	250	3.37%	38.6	96
Lodgepole pine	208	2.81%	3.9	8
Mesic upland shrub	75	1.01%	6.4	5
Mixed conifer	312	4.21%	3.9	12
Mixed forest	66	0.89%	6.4	4
Pinyon Juniper	1010	13.61%	4.8	49
Shrub dominated wetland/riparian	3	0.03%	3.9	0
Spruce fir	1661	22.40%	3.9	64
Subalpine meadow	281	3.79%	3.9	11
TOTAL	**5462**	**73.64%**		**834**

Use/occupancy and Density Extrapolation

Another density extrapolation model was developed more recently as field methods to measure bear densities were incorporated. This model has two components: an assessment of use/occupancy of various habitat types and a density estimate for each of 3 levels of use/occupancy.

In 2008, using the DOW Basinwide GIS Vegetation Classification project data, DOW managers were asked to qualitatively rank each vegetation type for its utility as basic bear habitat (use/occupancy), taking into consideration the relative forage value and the amount of seasonal use of each vegetation type. Use/occupancy was defined at 4 levels: primary, secondary, edge, and out (or not bear habitat).

Use/occupancy terms are defined as follows:

Primary – cover types that bears typically and normally are found at various times of year.
Secondary – cover types that bears occasionally use but is not preferred.
Edge – cover types infrequently used, but bears may be found in when adjacent to Primary cover types.
Out – cover types that are not black bear habitat or those in which bears would only travel through.

This analysis resulted in a matrix for assigning habitat quality and subsequently for assigning bear densities to different habitat qualities to extrapolate a potential population. The population results for B-11 can be incorporated into modeling or used as a comparison to independent population model runs.

To obtain a field estimate of summer bear density, we conducted genetic capture-recapture surveys in two hair snare grids from 2009-2011, one on the boundary between B-11 and B-17 (Divide/Thompson grid, 2009 & 2010) and the other in the Roaring Fork drainage (Aspen grid, 2010 & 2011) (Figure 20). This type of survey is a robust method of assessing bear density, but is costly so it was only run in this area for a few years to derive a snapshot estimate of current bear density. The first year of results from the 2009 Divide/Thompson grid were described in Apker et al. (2010) and preliminary analyses of 2009-2011 data (Runge et al., *unpublished*) are shown in Table 13.

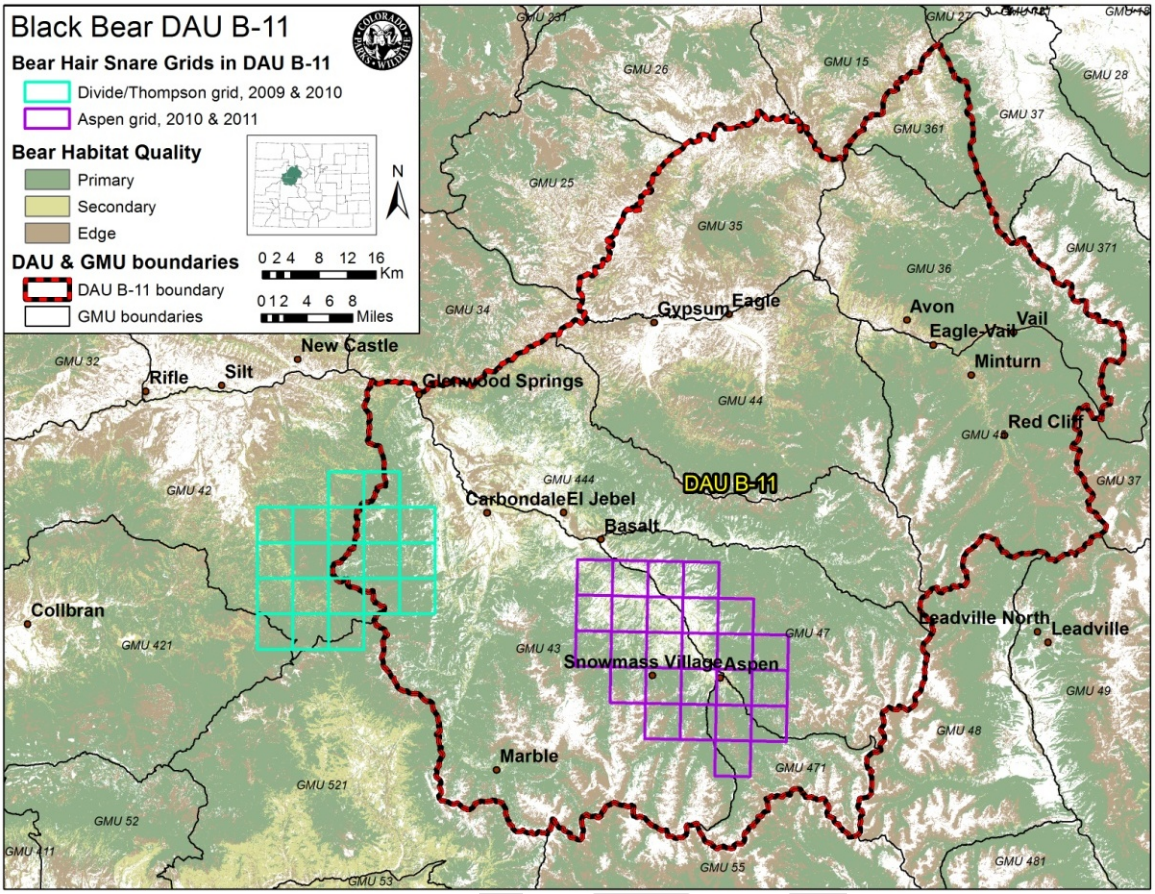


Figure 20. Bear hair snare survey sites used for genetic capture-recapture surveys in Divide/Thompson creeks (2009-2010) and the Roaring Fork Valley (2010-2011).

Table 13. Bear densities (per 100 km^2) estimated using genetic capture-recapture methods.

Year	Gender	Divide/Thompson Density	Divide/Thompson SE	Aspen Density	Aspen SE	Overall Average Density	Overall Average SE
2009	Female	26.0	6.0				
	Male	22.0	5.0				
	Total	48.0	7.8				
2010	Female	21.0	5.0	15.0	2.0	**18.0**	**4.2**
	Male	19.0	3.0	11.0	3.0	**15.0**	**5.7**
	Total	40.0	5.8	26.0	3.6	**33.0**	**9.9**
2011	Female			10.2	1.7		
	Male			10.3	1.6		
	Total			20.5	2.3		
Average within sites	**Female**	**23.5**	**3.5**	**12.6**	**3.4**	**18.1**	**6.9**
	Male	**20.5**	**2.1**	**10.7**	**0.5**	**15.6**	**5.8**
	Total	**44.0**	**5.7**	**23.3**	**3.9**	**33.6**	**12.6**

Bear density for Aspen was lower than the Divide/Thompson Creek grid. The Divide/Thompson grid contains mostly primary and secondary habitat, whereas the Aspen grid is about one-third non-habitat, is more fragmented by roads and housing developments, and has high rates of human conflict during natural food failure years. The 2010 survey occurred in the summer following the

food-failure year of 2009 which had high mortality of bears in the Aspen area due to human conflict, so the lower bear density in the Aspen grid compared to Divide/Thompson may reflect this high mortality rate as well as the less continuous primary habitat.

The average bear density between the two survey areas and across years was 33.6 bears/100 km^2 or 0.87 bears per square mile (Table 14). This density estimate was used to parameterize the use/occupancy density extrapolation model, in which primary, secondary, and edge habitat were assumed to have 1x, 0.75x, and 0.1x, respectively, of the bear density derived from the mark-recapture surveys. The use/occupancy density extrapolation model yielded a bear population estimate for B-11 of 1,425 bears (Table 14).

Table 14. B-11 bear population estimated based on use/occupancy density extrapolation.
Note: The distribution of the bear population across GMUs is reflective of summer distributions based on bear densities measured in the summer months.

GMU	Bear Habitat Categories			Bear Density			Projected Bear Population			
	Area (sq. km.)			(bears/100 sq. km.)			Primary	Secondary	Edge	Projected Total Bear Pop.
	Primary	Secondary	Edge	Primary	Secondary	Edge				
35	111	47	296	33.6	25.2	3.4	37	12	10	59
36	421	41	146	33.6	25.2	3.4	142	10	5	157
43	1,018	124	266	33.6	25.2	3.4	342	31	9	383
44	456	75	253	33.6	25.2	3.4	153	19	9	181
45	567	21	188	33.6	25.2	3.4	191	5	6	202
47	471	21	113	33.6	25.2	3.4	158	5	4	168
361	109	17	49	33.6	25.2	3.4	37	4	2	43
444	475	86	149	33.6	25.2	3.4	160	22	5	187
471	130	2	68	33.6	25.2	3.4	44	1	2	47
B-11 Total	**3,760**	**434**	**1,528**				**1,264**	**109**	**51**	**1,425**

Deterministic Population Models

Deterministic population models were developed on a framework of annual biological, harvest and density assumptions to project assumed populations using available data. We used a starting population taken from the early 1990s vegetation/density extrapolation and used plausible values for age specific survival and number of cubs per litter. The model includes input values to account for changes to reproduction and mortality rates in poor forage years. The models use mortality data with harvest as a direct model input and non-hunt mortality adjusted upward since we know our records do not document all non-hunt mortality.

While the models do yield population estimates, these estimates are predicated on many plausible, yet assumed input values. The results do appear to conform to population extrapolations derived by the habitat models. Nonetheless, the value of the models is most worthwhile in the population trajectories and responses to mortality and forage condition variability than the absolute population numbers they produce.

Two models in B-11 were compared: one projects a population with liberal, but plausible model parameters for survival, litter size, and non-hunt mortality; the other is a conservative population projection with more conservative parameters for these vital rates and non-hunt mortality.

Assumptions common to both Liberal and Conservative Models

The initial population size of 850 bears and the starting age distributions for both models was derived from extrapolations of habitat quantity and known bear densities from the literature. Sex ratio at birth was assumed to be 50/50. Litter size was set at 2.21 (based on Baruch-Mordo et al. 2014). We assumed an average age of first reproduction for females of 5 years and a birth interval of 2 years between litters.

Subadult and adult survival rates were based on values modified from Baruch-Mordo et al. (2014; weighted 2:1 good vs. bad food years) and cub survival fell within published ranges. Survival rates in the model were modulated by a mast index that is intended to reflect documented forage conditions on a yearly basis. Predicted population and age structure levels beyond 2012 (the most recent year of data at the time of the modeling effort) relied upon the continuation of assumptions used in the preceding years, as well as projected future mortality levels at levels necessary to stabilize the population.

Liberal Model

The assumptions used specifically in the liberal model include cub survival rates of 41% in poor food years, 67% in average food years, and 81% in good food years. Initial subadult and adult survival rates were assumed to be 91% for females and 90% for males.

Modeling efforts using the liberal inputs yielded a 2019 post-hunt population projection of 387 cubs, 254 subadult females, 519 adult females, 202 subadult males, and 311 adult males. Excluding cubs, the liberal model's current projection of independent bears is 1,287.

Conservative Model

The assumptions used specifically in the conservative model includes cub survival rates of 39% during poor food years, 65% in average food years, and 78% in good food years. Initial subadult and adult survival rates were assumed to be 90% for females and 89% for males.

Modeling efforts using the conservative inputs outlined above yielded a 2019 post-hunt population projection of with 204 cubs, 122 subadult females, 287 adult females, 82 subadult males, and 119 adult males. Excluding cubs, the conservative model's current projection of independent bears is 609.

Appendix D. Key study findings of Aspen bear research and implications for city policy

Excerpted from summary documents by Sharon Baruch-Mordo presented to City of Aspen mayor Mick Ireland, April 2013.

BEAR STUDY FINDINGS	IMPLICATIONS TO CITY POLICY
What is an urban bear?	
Bears use town when natural foods fail but go back to the wild in subsequent good years → REVERSIBLE behavior This was seen across all genders and ages Garbage is #1 attractant followed by fruit trees such as crabapple trees	Removing "bad" or "problem" bears won't solve the problem (more below) Bear movements in-and-out of town lead to false perception of success of reactive management after conflict years Focus on reducing garbage, but also address problem of crabapple trees (especially in Mall area)
Are we effective in reducing garbage availability with education and enforcement?	
On-site education was not effective Bear Aware campaign was not effective PD patrolling (no notices dispensed) was not effective Ticketing (notice of violation) WAS EFFECTIVE BUT with multiple applications and subsequent contact by PD officer	Proactively enforce ordinance and do so consistently: *every* year and *all* year-long (examples such as Juneau, AK, and draw on other behavior-changing law enforcement campaigns e.g., DUI, seatbelts) Develop better communication to successfully transmit education message; current education may miss important audiences, e.g., tourists (hotels), service workers (Spanish language)
Additional insights from sampling ~800 trash containers and dumpsters in Aspen: Some container/dumpster designs more prone to violations (e.g., free standing dumpsters, open enclosures) Trash can be widely available due pickup occurring throughout the week by the different refuse companies	Require any new development to use low-risk dumpsters (centralized garbage rooms, metal, self-closing doors, round handles) Require garbage companies to unify days of collections per residential area (IDEAL: city-operated collection)
Where should we invest management resources: targeting bears or people?	
Reducing garbage availability by 70% has the potential to reduce bear foraging in town Similar results likely not feasible with aversive conditioning (negative treatment) of bears	Invest officer time in proactive and preventative enforcement of ordinances to minimize the need and time to respond to bear calls (e.g., 2012 Aspen PD statistics)

RISKS OF STATUS QUO:

Human safety: increasing chance for severe injury/fatality
Lawsuits due to lack of effective enforcement (city liability); precedence includes AZ and UT cases
Damaging national media coverage for the city of Aspen (economic impacts); precedence includes Gatlinburg, TN
Forces Colorado Parks and Wildlife to kill or move bears when problem is manageable by city:
Negative impacts to bear population → animal welfare concerns; negative impacts to constituencies who engage in non-consumptive (viewing, tourists) and consumptive (hunting) bear activities
Increases overall costs of dealing with bear conflicts → shifts funds away from the Aspen PD and other city resources.

Appendix E. Recommendations to Reduce Human-Bear Conflicts

Written by Kevin Wright, [now retired] District Wildlife Manager, January 2015

- **Proactively** enforce ordinances to secure garbage/trash through use of certified bear-resistant containers. This takes an enforcement position to **actively patrol** each year looking for non-compliance and educating the public. Encourage the use of bear-resistant containers by allowing tickets to be voided if a bear-resistant container is purchased. Residential, business, and construction sites need to be patrolled. Construction sites are a major attractant with approximately 70% non-compliance. Enforcement should occur in all years, regardless of whether it is a good or bad natural food year.
- Use community bear proof dumpster sheds (similar to Town of Snowmass Village's dumpster sheds). Works well for new subdivision construction. All homes within the neighborhood bring their trash to these sheds so there is no curbside pick-up at each individual home, thus reducing the attractants.
- Ensure all city/county-owned buildings and properties use certified bear-resistant containers. Set the example for residents and businesses.
- Mandate that any container a trash hauler delivers for its customers is a certified bear-resistant container. Customers can either use a container from the hauler or purchase their own. Haulers would need to begin a replacement program for their customers.
- Work with trash companies to have the same day of pick-up in different neighborhoods commonly known as zones of pick-up.
- Prohibit any nut- or fruit-producing tree/shrub to be used in any landscaping. If allowed, including fruit tree orchards, they should be enclosed with electric fencing (see below for specifications).
- All chickens coops and apiaries should be electrified. Electric fence specifications for deterring black bears should be minimum 0.7 joules, 6000 volts, 4 feet, 5 strands wire.
- All food composting should be in a certified bear-resistant food compost container.
- Consider round-handle door knobs for all outside doors for new construction and remodels (ADA exception).
- Continue to educate the public including locals, businesses, visitors, construction managers, realtors, property managers, hotels, restaurants. Message should be both in English and Spanish. Education alone is not effective but **needs to be paired with active enforcement.**

Appendix F. General Public Survey Results and Comments

Note: For privacy reasons, individuals' names, email addresses, and mailing addresses were redacted from the documents below.

Written/emailed public comment letters:
https://drive.google.com/file/d/1Hq8OjPZNzfwrlKPEQ5IoFcIgh-oRnjYd/view?usp=sharing

Online public survey responses

- Overall responses:

https://drive.google.com/file/d/1h6BQQph-gmXtl3ZD7igZhsU__Jphi4dJ/view?usp=sharing

- Responses to all questions, segmented by response to population management alternative question (Q13):

https://drive.google.com/file/d/1u0SMayp_h-0rjj1uedt7M-fMlj6g0tFI/view?usp=sharing

- Written comments from online survey:
    - Comments on the population management alternatives (Q14), grouped by response to population management alternative question (Q13):

https://drive.google.com/file/d/19euJ5FvnjqI2ecAvqZWCpFW3Vm1TY6Wa/view?usp=sharing

    - Additional comments about black bear management in the Roaring Fork and Eagle River Valleys (Q35), grouped by response to population management alternative question (Q13):

https://drive.google.com/file/d/17OIVDX1PdnsoZ5XH8vFLsYCImLezITuv/view?usp=sharing

Appendix G. Comments from other agencies and organizations

USDA United States Department of Agriculture | Forest Service | White River National Forest | 900 Grand Ave Glenwood Springs, CO 81601-3602

File Code: 2600
Date: November 5, 2021

Matt Yamashita
Area 8 Manager

Dear Mr. Yamashita,

The White River National Forest (WRNF) plays an important role in the management of black bears in Data Analysis Unit (DAU) B-11 and is appreciative of the opportunity to comment on the draft DAU B-11 Black Bear Population Management Plan. While an overview of the Forest's comments are provided here, specific comments on the draft plan are provided in the attached electronic version.

Generally, the Forest agrees with implementing a strategy to reduce the black bear population in B-11 to help reduce conflicts between humans and bears. In portions of the Eagle-Holy Cross and Aspen-Sopris Ranger Districts, significant staff time has been spent to reduce and manage conflicts, along with investments in campground and facility infrastructure to secure human foods and garbage. A reduction in bear numbers through increased hunter harvest is a logical and welcomed part of a multifaceted solution to reducing conflicts between humans and bears.

With regard to the alternatives drafted, WRNF supports a reduction strategy such as Alternative 2 that prioritizes reducing human-bear conflicts and includes measurable trigger points that indicate when objectives are being met.

With regard to the scope of the plan, Colorado Parks & Wildlife (CPW) is an acknowledged expert on methods to secure human foods and garbage in order to minimize bear conflicts. Because of this, it may be insufficient to develop a plan for harvest objectives and measures to indicate sufficient harvest, without including the role CPW plays in providing guidance on use of bear-resistant containers, deterring bears using non-lethal means, and designing facilities to reduce their attraction to bears. This would provide a comprehensive understanding of how bears are to be managed in B-11.

Thank you for the opportunity to comment. For clarification on any of the above information, please contact Phil Nyland, Aspen/Sopris Wildlife Biologist, at (970) 404-3156 and Jennifer Prusse, Eagle-Holy Cross Wildlife Biologist, at (970) 827-5260.

Sincerely,

SCOTT FITZWILLIAMS Digitally signed by SCOTT FITZWILLIAMS Date: 2021.11.04 12:22:43 -06'00'

SCOTT G. FITZWILLIAMS
Forest Supervisor

Enclosed: Black Bear Population Management Plan For DAU B-11 with WRNF Comments

cc: Jennifer Prusse, Phil Nyland, Natasha Goedert

Lower Colorado River HPP
PO Box 216
Hot Sulphur Springs, CO 80451

Matt Yamashita
Area Wildlife Manager
Colorado Parks and Wildlife
0088 Wildlife Way
Glenwood Springs, CO 81601

October 26, 2021

RE: B11 Black Bear Population Management Plan

Dear Matt,

Thank you for taking the time to present the B11 Bear Management Plan to the Lower Colorado River Habitat Partnership Program Committee. I appreciate your work to educate and inform the committee on big game management in the committee area. While HPP works to reduce conflicts related to deer, elk, moose and pronghorn, I believe you provided valuable information for the committee to be aware of. They will benefit from and use this information as they work to represent the program and make informed decisions.

The committee appreciates you keeping them apprised of the workings of your area and for your continued support of the program.

Sincerely,

Michael Blanck
Program Manager
Habitat Partnership Program

Julie Mao
Colorado Parks and Wildlife
Attn. B-11 Plan
0088 Wildlife Way
Glenwood Springs, CO 81601

November 10, 2021

Subject: Black Bear Population Management Plan - DAU B-11 Roaring Fork and Eagle Valleys

Dear Ms. Mao:

The Eagle County Community Wildlife Roundtable (ECCWR) appreciates the opportunity to comment on Colorado Parks and Wildlife's Draft Black Bear Population Management Plan. ECCWR is a group of stakeholders with diverse perspectives working together to understand and address issues facing wildlife populations within Eagle County. The Eagle County Community Wildlife Roundtable focuses on achieving and maintaining healthy populations of terrestrial and avian wildlife species, protecting wildlife from habitat fragmentation and other impacts, and enhancing important habitats such as breeding and reproduction areas, movement corridors, seasonal feeding areas, and riparian wetland areas. We also emphasize conservation, coexistence, and wildlife policies that steward, enhance and protect wildlife populations in ways that are scientifically sound and supported by the community as a whole.

Our members agree with CPW that it is in the best interest of our community and our black bear population to reduce human-bear conflicts (i.e., attacks, aggressive behavior, and food and non-food property damage) and also to reduce non-harvest, human-caused mortality of bears (e.g., roadkills, bears killed by enforcement agencies and landowners, and game damage kills). As a group with diverse perspectives, ECCWR aims to use this letter to provide insights into the range of perspectives held by our roundtable members related to this plan regarding the following areas: scientific merits of the plan, our community's values, alignment with local jurisdictions, flexibility of the plan, and whether the plan nets a positive outcome for wildlife.

It is important to acknowledge that while the ECCWR strives to be a diverse and inclusive group, not all perspectives are represented within our membership and therefore we encourage CPW to make efforts to engage communities not represented within the ECCWR. Specifically, the ECCWR urges CPW to proactively engage communities with traditional knowledge, including tribes. We believe this approach is consistent with Executive Order D 2020 175, which specifies that Colorado agencies shall respect and value life experiences from community residents to ensure that State agency staff hear diverse perspectives and actively build relationships with a goal of full participation, which includes involving community partners in decision-making from the beginning to end of projects.

<u>Science/Lived Experience</u>
ECCWR recognizes CPW for your thoughtful approach in drafting the plan - the plan provides a very detailed and thorough report, and we appreciate your efforts. Below we are sharing a variety of ECCWR perspectives related to science and lived experience. Some members of the ECCWR fully support CPW's proposal and preferred alternative and are comfortable deferring to CPW's wildlife expertise.

Alternatively, some members of the ECCWR are concerned that the plan focuses on the management tool available to CPW (i.e., harvesting), however, research referenced by the CPW Black Bear Plan (e.g., Kiel 2007; Johnson et. al. 2018; Treves, Kapp, and MacFarland 2010; Lewis et al 2015; and Tavss 2005) indicates that reducing the bear population is not the most effective way to directly reduce human-bear conflict. Therefore, some members of the ECCWR are concerned that the goals of the plan to reduce human-bear conflict and to reduce non-harvest human-caused mortality cannot be achieved by reducing the bear population. Given the plan indicates that the existing population is declining or stable, the proposed 40% increase in harvesting could result in detrimental impacts and in the worst-case scenario, an unsustainable bear population. Some members would like the plan to use the carrying capacity of the available black bear habitat to set population objectives and to further consider ecological connections beyond human conflict. As part of this analysis, it would be important to specifically evaluate data related to climate change's impact on the prevalence of food failure years and whether any specific habitat management or improvement activities could be conducted within the County (especially on public lands) to mitigate such impacts. We acknowledge that the unknown potential impacts of the plan alternatives on ungulate populations is addressed within the plan.

Conversely, ECCWR has members with lived experiences related to bear-livestock conflicts. In their experiences, there are high costs of these conflicts to landowners, livestock managers, and regulatory agencies, and their occurrence seems to indicate that the carrying capacity of the black bear population is being exceeded by the current population size. ECCWR's professional Colorado Outfitter/Guide representative, who was born and raised in Eagle County, believes there has been a significant increase in the black bear population, and related negative impacts to other species of wildlife. From this professional's experience, he has identified an increase of bears not just in urban areas, but also in more remote areas where he, his guides, and his clients spend an extensive amount of time.

Another sportsperson representative on the ECCWR has shared that growing up in Minturn, he never thought about bears, because they were not around. He shares some of the concerns expressed in this letter, including the burden that is placed on CPW officers who have to remove bears (both in terms of time and the emotional toll), the impacts of bears on ungulate populations, the challenges of educating the public about wildlife and the difficulty of enforcing wildlife rules. This representative also expressed that he believes human-bear conflicts were not as much of an issue prior to Initiative 10 (the Colorado Black Bear Hunting Restriction Initiative), an initiated state statute approved by voters in 1992, that prohibited black bear hunting using bait and dogs and prohibited hunting between March 1 and September 1. This representative believes that the large increase of humans in bear habitat and the prohibition on spring hunting are largely contributing to the human-bear conflict issue. Other members of the ECCWR fully support Initiative 10 and strongly object to the idea of making using bait or dogs in black bear hunting and/or spring hunting legal again. There seems to be general agreement that the increase of humans in bear habitat is one cause of increased conflict.

One of our citizens at large representatives has been an East Vail resident for 33 years, and over the past 8 years has experienced a decline in the number of bear sightings and human-bear conflicts in her neighborhood. She attributes this decline to increased enforcement of wildlife and trash violations by the Town of Vail. She believes that residents value wildlife and are changing their behavior. She believes that

the evidence supports that education and enforcement will continue to reduce conflicts and that decreasing the bear population will not.

Community Values

ECCWR is currently undertaking surveying efforts to aid in understanding community values related to wildlife, unfortunately this data will not be available prior to the November 10, 2021 submission deadline for comments on the plan. However, some previous survey data is available to ECCWR which suggests that our community highly values wildlife. Two of the key objectives of the roundtable are to: 1) identify aspects of wildlife management that can be improved, and 2) to provide actionable recommendations related to management and to implement the changes where possible. ECCWR is interested in actively working to address the human behavior causes of human-bear conflict, including those identified in the plan such as the need for properly securing bear-proof trash containers and dumpsters, unifying the trash pick-up day within each neighborhood, closing and locking windows and doors on homes and vehicles, using round-handled doorknobs, and switching to non-fruit producing landscaping trees. The ECCWR would value CPW's partnership in identifying priority areas of focus and respectfully request this effort to address these conflicts be considered when selecting the Bear Management Plan alternative.

Jurisdictional alignment

There are a number of jurisdictions encompassed in the management unit addressed in the plan. Different jurisdictions have varying ordinances, trash receptacle requirements, and levels of enforcement. Even where wildlife resistant trash containers are in place, it is still critical that they are properly utilized in order to be successful. ECCWR recognizes that CPW currently incurs costs responding to human-bear conflicts and that there are also opportunity costs associated with these responses as they prevent CPW from doing other work, including monitoring hunting and fishing activities. ECCWR could use the 'Recommendations to reduce human-bear conflicts' located in Appendix E of the plan to work with local jurisdictions to align ordinances with best management practices, and to align ordinances across jurisdictions within Eagle County. ECCWR is willing to help with the ongoing education necessary to create human behavior change, which can in turn modify bear behavior. We would like to engage with CPW and local jurisdictions to think creatively about options for enforcement. The group discussed that wildlife-resistant trash receptacles may be cost prohibitive for some jurisdictions and would appreciate any insights CPW can provide into how other jurisdictions have funded these improvements and whether there may be any funding sources available for the ECCWR or local jurisdictions to support this type of improvement within our local communities.

Flexibility

Again, ECCWR recognizes that CPW identifies the tool available to the agency (harvesting) in this plan, however, it seems that there is greater ability to achieve the goals identified in the plan via alternative measures (as listed in the 'community values' section of this letter) that have proven to be effective in reducing conflict.

Net positive

ECCWR agrees that the current level of human-bear conflict is not positive for the community, CPW, or the local bear population and we would like to see a decrease in human-bear conflicts and the number of

non-harvest human-caused bear mortalities. Apart from this consensus, there are varying viewpoints on whether the proposed alternative offers a net positive outcome for Eagle County's wildlife.

While some members of the ECCWR fully support CPW's suggested approach, and some do not, others are concerned that increasing available bear tags will not result in more harvest because there is not sufficient demand for the tags, and that the harvest that does occur may not have a nexus to human-bear conflicts (i.e. targeting specific bears and/or geographic locations). Additionally, there are a number of factors including human behavior, ecosystem health, and climate change that are not addressed by either of the two alternatives identified in the plan.

Conclusion

ECCWR is interested in actively working to address the human behavior causes of human-bear conflict and would like to engage with CPW and local jurisdictions to think creatively about options for enforcement. The group would appreciate information from CPW related to any grant or funding opportunities for upgrading local trash receptacles and/or funding increased local enforcement. Additionally, it would be beneficial to identify areas in our community that are experiencing high conflict levels so these could be prioritized.

It would be helpful if CPW could provide any data or studies related to specific management options or successes with reducing bear-livestock conflict, as this is an important topic within our community. ECCWR also requests CPW's help in understanding the relationship of climate change to poor food years, and your assistance in identifying habitat improvement opportunities on public lands that could help to mitigate such impacts. ECCWR would like to see CPW's management plans take a more holistic and ecosystem-based approach, which may include addressing the impacts of bears to large ungulates, evaluating the role of bears in seed dispersal, etc. A critical piece that seems to be missing from the draft plan is the impact the management alternatives will have to overall biodiversity.

The ECCWR is pleased to share its range of perspectives. Some members support CPW's approach and preferred alternative. Alternatively, as mentioned above, some members have concerns and would prefer to see CPW choose alternative 1 while the community works to decrease anthropogenic food source availability. It is important to note that if our community is successful in reducing anthropogenic food sources, this could result in a reduction to the overall carrying capacity of the environment for bears who can currently turn to these food sources during poor natural conditions. There is a concern that attempting to regulate conflicts and non-harvest human-caused bear mortality through harvest alone could result in a decline in the local black bear population and studies show that because bears are a late-reproducing species, once reduced, populations can take multiple decades to recover. In this case, one option may be to select alternative 1 while the community works to decrease anthropogenic food source availability and reassess in three - five years. Alternatively, CPW, as a trusted wildlife expert, may choose its preferred alternative, alternative 2. There is no consensus within the ECCWR regarding which alternative the group would recommend. However, it is recommended that CPW incorporate ecosystem science and considerations as noted above in the next iteration of the black bear management plan.

Sincerely,

Eagle County Community Wildlife Roundtable