PROCEEDINGS
of the

THIRTEENTH WESTERN BLACK BEAR WORKSHOP

Bear Management in the Changing West

May 21–24, 2018

Sanctioned by: Western Association of Fish and Wildlife Agencies (WAFWA)
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Moderator – Craig McLaughlin, Colorado Parks and Wildlife

PREFACE

Chronology of Western Black Bear Workshops:

The 1st WBBW Tempe, AZ 1979
The 2nd WBBW Logan, UT 1982
The 3rd WBBW Missoula, MT 1985
The 4th WBBW Yosemite National Park, CA 1991
The 5th WBBW Provo, UT 1994
The 6th WBBW Ocean Shores, WA 1997
The 7th WBBW Coos Bay, OR 2000
The 8th WBBW Pray, MT 2003
The 9th WBBW Raton, NM 2006
The 10th WBBW Reno, NV 2009
The 11th WBBW Coeur d'Alene, ID 2012
The 12th WBBW Canmore, Alberta 2015
The 13th WBBW Grand Junction, CO 2018

The 13th Western Black Bear Workshop was held in Grand Junction, Colorado from May 21–24, 2018. The workshop theme was Bear Management in the Changing West.

This meeting was structured to ensure that managers from WAFWA's member agencies and beyond had opportunity to share relevant information and gain additional perspective and knowledge to strengthen their ability to monitor and manage black bears. After the jurisdiction reports we kicked off the workshop with an introductory talk which touched on a number of conflict, bear behavior and demographic topics to set up our first day focus on bear conflicts. Throughout the week, workshop attendees were able to attend presentations on conflicts, conflict mitigation, bear ecology, habitat and predation. To stimulate thoughts about the current state of black bear management in the west and to help compare approaches used by member states and provinces, results from a jurisdictional survey were presented.

Our workshop also included two panel discussions: including one on stakeholder perspectives on conflict management of black bears, and a second that focused on agency lessons learned in liability and litigation resulting from various fatal and non-fatal bear attacks. An evening poster session on May 22nd featured 9 posters and vendors' booths. We also enjoyed a clinic on the application of unmanned aircraft systems or drones for wildlife work, including as a tool for assessing bear agricultural damage.

Rich Beausoleil, Bear and Cougar Specialist for Washington Department of Fish and Wildlife, delivered the keynote address. Rich's presentation provided a brief background to western bear management and then challenged attendees to not become complacent or place bear management actions and assumptions on autopilot. Rich argued for the values of empirically derived population abundance and density estimates, for critical evaluation of sustainable off-take rates, and encouraged us to take a new look at the composition and age metrics many of our agencies have been employing for some time. His presentation advocated for standardization of terms and parameters across western North America in the biological and demographic reporting we do and made an argument for continued evaluation of our current approach to conflicts and natural food subsidies provided by humans. Rich's final comments urged us, as biologists, to keep science at the forefront of our bear management recommendations.

The workshop steering committee met multiple times in the year leading up to the workshop, selecting session topics, generating the agenda and contacting participants to ensure a successful meeting.

We extend our appreciation to the following session moderators: Mark Vieira, Stewart Breck, Matt Eckert, Craig McLaughlin and Chuck Anderson. Elissa Knox provided additional assistance during the meetings and Marie Haas provided administrative, planning and contracting support for all aspects of the workshop. Kristin Cannon and Shannon Shaller organized the poster session and coordinated all logistics for giveaways and

drawings. Garett Watson organized the wrangling of donated beverages.

We recognize the DoubleTree Hotel in Grand Junction, which provided the meals, lodging and workshop meeting accommodations for a successful gathering.

There were 173 registered workshop participants, representing entities from across western North America and a few from the Midwest and East Coast. We received $39,855 in registration (many of them late registrations) and vendor fees. We expended $37,843 which left us with $2,012 and this balance was sent to WAFWA. We did not use the seed money made available from the 2015 workshop in Alberta ($2,819), so remaining balances from those two workshops are consolidated with WAFWA. The current balance in the Western Black Bear Workshop account ($4,831) is available as seed money to assist with costs of hosting the next workshop in 2021. The 14th Western Black Bear Workshop will be hosted by the Wyoming Game and Fish Department. Dates and location of that workshop are to be determined.

–Mark Vieira, Workshop Steering Committee Chair

Bear Management in the Changing West

13th Western Black Bear Workshop
DoubleTree Hotel, Grand Junction, Colorado
May 21–24, 2018

AGENDA

Monday – MAY 21, 2018

Arrival & Welcome Social:

4:00 – 6:00 PM	**Registration** (*outside Grand Ballroom)*
6:00 – 10:00 PM	**Evening Social Mixer** *(Grand Ballroom)* – Drinks and hot apps provided

Tuesday – MAY 22, 2018

6:30 – 8:00 AM	**Breakfast** *(Aspen Room, Telluride Room, and Kokopelli Room)*

Welcome:

7:15 – 8:00 AM	**Registration** (*outside Grand Ballroom)*
8:00 – 8:10 AM	**Workshop Introduction and Welcome** – Mark Vieira, Colorado Parks and Wildlife, 13th Western Black Bear Workshop Steering Committee Chairman *(Grand Ballroom)*
8:10 – 9:10 AM	**Keynote Address**: **Considerations for Adapting to Change in Black Bear Management** – Rich Beausoleil, Bear and Cougar Specialist, Washington Dept. of Fish and Wildlife

Jurisdiction Reports

9:10 – 10:10 AM	**Alberta** – Paul Frame **Oregon** – Derek Broman **Washington** – Rich Beausoleil **Alaska** – Stephanie Sell
10:10 – 10:30 AM	**Break**
10:30 – 11:45 AM	**Idaho** – Jim Hayden **Colorado** – Mark Vieira **Wyoming** – Dan Bjornlie **Utah** – Darren DeBloois **Oklahoma** – Jeff Ford
11:45 – 12:45 PM	**Lunch** *(Aspen Room, Telluride Room, and Kokopelli Room)*

Jurisdiction Reports

12:45 – 1:30 PM	**Arizona** – April Howard **Nevada** – Pat Jackson **New Mexico** – Rick Winslow
1:30 – 2:00 PM	**Jurisdiction Black Bear Survey Report** – Craig McLaughlin, Colorado Parks and Wildlife
2:00 – 2:20 PM	**Break**

Conflict Topic Introductory Paper:

2:20 – 3:20 PM	**The influence of human development on black bear behavior and demography: lessons learned from Durango, Colorado** – Heather Johnson, formerly Mammals Research Section, CPW (current position USGS Alaska Science Center)

Panel I: Perspectives in Conflict Management Stakeholder Panel, Moderator – Stewart Breck

3:20 – 4:45 PM **Matt Howell** – Four Corners Safari Club International
Martin Lowney – Colorado Director, APHIS/Wildlife Services
Steve Barkley – Code Enforcement Officer, City of Durango
Perry Will – Area Wildlife Manager, Colorado Parks and Wildlife
Mike Orlando – Florida Fish and Wildlife Conservation Commission

4:45 – 7:00 PM **Dinner on your own**

Poster Session: Organizers – Kristin Cannon and Shannon Schaller, Colorado Parks and Wildlife

7:00 – 10:00 PM **Posters, Vendors, Social, & Door Prize Raffle** *(Grand Ballroom)* – Drinks provided

Wednesday – MAY 23, 2018

6:30 – 8:00 AM **Breakfast** *(Aspen Room, Telluride Room, and Kokopelli Room)*

Welcome:

8:00 – 8:30 AM **Registration** *(outside Grand Ballroom)*

8:30 – 8:40 AM **Notes/Announcements** – Mark Vieira, Workshop Chairman *(Grand Ballroom)*

Session I: Conflict, Moderator – Matt Eckert

8:40 – 9:00 AM **Evaluation of human-black bear conflicts and management in Wyoming** – Brian DeBolt, Wyoming Game and Fish Department

9:00 – 9:20 AM **Understanding the effect of conflict on human behavior and tolerance for black bears** – Stacy Lischka, Colorado State University

9:20 – 9:40 AM **Using stable isotopes to inform human-bear conflict management** – Lindsay Welfelt, Washington State University

9:40 – 10:00 AM **Implementing an Effective Community-Supported Ordinance to Secure Trash from Black Bears: A Case Study from Boulder, Colorado** – Val Matheson, City of Boulder

10:00 – 10:20 AM **Break**

Session II: Conflict Mitigation, Moderator – Craig McLaughlin

10:20 – 10:40 AM **Summarizing Colorado's black bear two-strike directive 30 years after inception** – Mat Alldredge, Mammals Research Section, Colorado Parks and Wildlife

10:40 – 11:00 AM **The Use of Conductive Electrical Weapons in the Aversive Conditioning of Black Bears** – Matt Ortega and Kelly Crane, District Wildlife Managers, Colorado Parks and Wildlife

11:00 – 11:20 AM **Agency Use of Dogs for Carnivore Conservation and Management** – Rich Beausoleil, Washington Department of Fish and Wildlife

11:20 – 11:40 AM **Florida Black Bears: The Good, the Bad and the Ugly** – Mike Orlando, Florida Fish and Wildlife Conservation Commission

11:40 – 12:00 AM **Understanding and managing black bear damage with imperfect information** – Martin Lowney, Colorado Director, APHIS/Wildlife Services

12:00 – 1:00 PM **Lunch** *(Aspen Room, Telluride Room, and Kokopelli Room)*

Panel II: Agency Lessons in Liability and Litigation from Bear Attack Events, Moderator – Mark Vieira

1:00 – 1:45 PM **Speaker Presentations**
Martin Bushman, Utah Attorney General's Office
Brian DeBolt and Dan Bjornlie, Wyoming Game and Fish Department
Kelly Crane, District Wildlife Manager, Colorado Parks and Wildlife
Michael Rusing, Attorney, Rusing Lopez & Lizardi, P.L.L.C.

1:45 – 2:45 PM **Discussion**

2:45 – 3:05 PM **Break**

Clinic I: Drones

3:05 – 4:45 PM **Unmanned Aircraft System applications at the National Wildlife Research Center: how can we apply this to black bears?** – Justin Fischer, Geographer, USDA/APHIS/Wildlife Services

6:00 – 10:00 PM **Banquet** *(Grand Ballroom), dinner served at 7pm*

Thursday – MAY 24, 2018

6:30 – 8:00 AM **Breakfast** *(Aspen Room, Telluride Room, and Kokopelli Room)*

Welcome:

8:00 – 8:30 AM **Registration** *(outside Grand Ballroom)*

8:30 – 8:40 AM **Notes/Announcements** – Mark Vieira, Workshop Chairman *(Grand Ballroom)*

Session III: Bear Ecology, Habitat and Predation, Moderator – Chuck Anderson

8:40 – 9:00 AM **Natural rewilding of the Great Basin: genetic consequences of recolonization by black bears (*Ursus americanus*)** – Jon Beckmann, Wildlife Conservation Society

9:00 – 9:20 AM **A 30-year-old female American black bear in Utah: a reproductive case history and implications for data collection and management** – Hal Black, Brigham Young University

9:20 – 9:40 AM **Understanding habitat relationships: an agency approach for improving lack bear density estimates** – Lindsay Welfelt, Washington State University

9:40 – 10:00 AM **Dynamic foraging tactics of black bears preying on caribou calves in Newfoundland, Canada** – Nathaniel Rayl, University of Massachusetts (current position with Mammals Research Section, CPW)

10:00 – 10:20 AM **Effects of calf predation and nutrition on elk vital rates in New Mexico** – Nicole Tatman, New Mexico Department of Game and Fish

10:20 – 10:30 AM **Final Remarks**

10:30 – 11:00 AM **Open Business Meeting** – Mark Vieira, Workshop Chairman

11:00 AM **Adjourn Workshop**

11:30 – 1:00 PM **Lunch** *(Aspen Room, Telluride Room, and Kokopelli Room)*

Keynote Address:

Considerations for Adapting to Change in Black Bear Management

Richard Beausoleil, Bear & Cougar Specialist, Washington Department of Fish & Wildlife, 3515 State Highway 97A, Wenatchee, WA 98801, USA. Email: richard.beausoleil@dfw.wa.gov

Good morning, folks. I thought it would be useful to start today's discussion with a historical look back at wildlife agencies and our professional organizations. As you may know, in New England, Massachusetts was the first jurisdiction to officially create a wildlife management agency in 1871, some 250 years after the pilgrims arrived and 93 years after the establishment of statehood. That was followed by the first western jurisdiction to establish a wildlife agency, which was California in 1878, and shortly thereafter by the rest of the western agencies in attendance at this workshop today. In addition, as it relates to our hosts of this year's workshop, Colorado's Division of Wildlife originated in 1897; so they just celebrated their 120th anniversary and after the merger now known as Colorado Parks and Wildlife. I hope that we have some federal agency staff in attendance here today, because it is important to mention that the USFWS was created in 1871, USGS in 1879, and USFS in 1905, and WAFWA, which is a consortium of almost all jurisdictional agencies represented here today, originated in 1922.

One of the first notable jurisdictional wildlife management actions for declining big game populations took place in Michigan in 1879, when that agency instituted a 10-year moratorium on elk hunting. Wyoming did the same for bison in 1890. As we know, management for both of these species turned out to be agency success stories. Taking a brief look at agency management of black bear in the US where for over 100 years bears were not managed, but rather systematically removed or reduced throughout the country and overhunted for a variety of uses. However, since that time, reforestation from agriculture and management has resulted in population recovery. Especially since the 1960–1970s, black bears have been afforded protections as big game species, and benefited from the expansion of agency infrastructures, and similar to the ungulates mentioned earlier, black bear management could also be considered another wildlife agency success story.

Since the 1st Western Black Bear Workshop that Al LeCount and Arizona hosted in 1979, North American black bear managers have been attending workshops to share information, workshop ideas, have open dialogue with colleagues, and to learn more about black bear ecology and effective management, and of course managers in Eastern North America have been doing the same, for a bit longer than the west, with the 1st Eastern Black Bear Workshop being held in New York in 1972, 7 years prior to the western launch of the workshop series.

The only difference between the two Workshops is that the Eastern agencies conduct workshops every 2 years rather than the 3-year cycle that the Western agencies have adopted. So for that reason, despite only a 7-year difference in age, Western workshops are celebrating their 13th gathering, while Eastern agencies just celebrated their 23rd workshop. And on that topic, I hope there are agencies in this room that are considering tossing their agency hats in the ring to host this workshop in 2021.

Now, many of us consider Aldo Leopold to be the father of wildlife management, and rightfully so with his significant authorial works, his part in creating the country's first national wilderness area in 1924 (Gila Wilderness Area in New Mexico), and founding the Wilderness Society in 1935, and so that title is certainly warranted. But something you may not attribute to the formation of wildlife management were earlier writers and painters in the mid-1800s. People such as Frederic Church, George Perkins March, and Henry David Thoreau who, by pursuing their own vocations, may have helped build the public's appreciation for wildlife, and wild spaces, and arguably, may have helped contribute in some small part to the establishment of wildlife management. More familiar to us however, are the sportsman and conservationists who had a significant role in the creation of wildlife management when they realized that overutilization of wildlife, and exploitation of their habitats, had led to the extinction of some species, and notably among those pioneers was Theodore Roosevelt and John Muir.

In 1902, a fact that is relevant to our Western Black Bear workshop here today, then President Roosevelt, brought prominent national attention to black bears when he refused to kill a Louisiana black bear that was roped to a tree by a fellow hunter. The next day a cartoon depicting the event titled "Drawing the Line in Mississippi" by Cliff Berryman, appeared on the front page of The Washington Post. This article illustrated the President, with his hand outstretched, refusing to shoot the roped bear. Subsequently, that bear became known as "Teddy's bear".

Shortly thereafter, a candy storeowner designed a stuffed bear to display in his store window and attract attention; calling it "Teddy's bear". When residents began soliciting the sale of the bear, the owner sought Roosevelt's permission to use his name. The President agreed, and the production of the teddy bear began. So Teddy's sportsman persona transcended into becoming a cultural icon as well.

As reluctant as I may be to admit it, given the political climate today, politics in the early days significantly benefited wildlife management efforts with the passing of the Lacey Act in 1900, the Federal Aid in Wildlife Restoration Act of 1937, more commonly known as the Pittman Robertson Act, and CITES in 1973. These Acts were obviously influenced by well-intentioned people, representing the majority, with a keen eye on the future to have wildlife present on the landscape and be enjoyed and appreciated by future generations. While there are clearly many more examples of beneficial legislation, I will leave it at that and just say that these examples show that, when guided by sound-science, the political partnership can be an essential one.

So much has changed since agencies and wildlife management were established 130 years ago. When you think about it, in regards to big game status, agency protection, and our western black bear workshops, the 1970's is really where black bear management begins, so we really have not been doing this for a long time, about 50 years.

We have made significant progress in this time, and as we said, black bear management can certainly be considered an agency success story. However, I cannot help but think there are topics that need more consideration for improvement in regards to our understanding of black bears and their management, especially in the changing West. Being from the smallest of the western states, but with the 2nd highest human population, there are many topics that come to mind to discuss today. I can tell you that the topics only get more complex with increasing populations of people. We could talk about the effects of today's politics, the makeup of wildlife commissions, climate change, the variable human dimensions of wildlife management, the environmental movement, social media and the effect it can have on agency management, and so much more. But I am going to keep it simple and stay in our ….workshop wheelhouse…. so to speak, and talk about bear biology and management. Because if we approach our black bear management with rigor and using science as the foundation, and we make our management defensible and transparent, it's likely we can more easily deal with the looming uncertainty around all these issues in the changing west.

As everyone in this room knows, the black bear is the most abundant of all 8 bear species that occur worldwide, and while all bears have a relatively low reproductive output, the expected abundance of black bears in North America is greater than all other 8 bear species, combined. So one of the topics I am asking that we all consider is this; because black bears are such an adaptable species that appear to be doing very well in North America, is black bear management a little bit on autopilot? Maybe not in states like Nevada and Florida where they have both recently had their first hunting seasons in decades and have had an incredible amount of things to answer to on all sides of the issue, but in North America in general, let me explain.

There have been periodic black bear management surveys of wildlife agencies over the years, and we will likely be getting an update of another one of those at this workshop, but they have varied over the years. These surveys have shown that roughly about 80% of western agencies do not derive their population abundance or density estimates empirically. I hope that statistic is changing with the advancement in DNA and the lowered costs of monitoring and estimating populations using these techniques, we will undoubtedly be hearing more on the status of that at this workshop. But, with population estimates being the foundation of everything we do in wildlife management, and what the public expects we will certainly have a handle on, can we say that we

are where we need to be? And if we can't, is using harvest statistics, and extrapolation from literature to manage bears enough?

Hopefully, we all know the limitations of using harvest statistics and population reconstruction for estimating abundance. Researchers of many species have answered it convincingly. But if you want to hear it from agency managers, who are also black bear researchers, then look no further than Dave Garshelis (MN) and Joe Clark (AR & TN), as they have advised us about this topic and other considerations in the 1990s with these documents from the black bear workshop series. Dave's manuscript is titled *Monitoring the effects of Harvest on Black Bear Populations in North America: A Review & Evaluation of Techniques*. Joe's manuscript is titled *Black Bear Population Dynamics in the Southeast: Some New Perspectives on Some Old Problems*. Please don't let Joe's reference to the southeast fool you, this is relevant in the west too. Both of these articles are as relevant today as they were when they were published. In the mid-2000s, Garshelis and Hank Hristienko (MB) reminded us again about using harvest statistics and their recommendation was, be careful. If you haven't seen these publications, or you need to get reacquainted with them, please read them out because they really are a must for any agency bear biologist. The words of these 3 gentlemen, should occupy our minds considerably when we review bear harvest data for our agencies and we try to interpret those statistics. They can also remind us how important obtaining true population estimates from research is.

The next issue for consideration, which is related to population estimates, is harvest rate. What is an appropriate harvest rate for black bears? It seems like a simple question, and after all these years we should have an answer right? However, I bet there would be some disagreement on this subject if we went around and asked all the bear biologists in this room. We know it is likely higher than that for grizzly bear right? Grizzly bear populations in North America, outside of the greater Yellowstone ecosystem, Alaska, and some areas in Canada, are still low and the bear is an unhuntable species in many of the areas they occupy because of overexploitation many decades ago and their inability to recover. An agreed upon sustainable harvest rate for grizzly bears is roughly 6%. So what is it for black bears? It is likely not quite as high as that for cougar, being that cougars breed about 50% sooner than black bears and can come back into estrus if young are lost between birth intervals whereas black bears do not. Recent work with cougar is starting to dial in on that number, and research shows a sustainable harvest rate to be around the intrinsic growth rate of 12–14%. So it would seem that a sustainable harvest rate for black bears is in the middle of grizzly bear and cougar, so between 6 and 12%. Many biologists agree that 9–11% would be about right in the west. I think with all these carnivores, we need to manage them under a different philosophy than the typical harvestable surplus model for ungulates & birds.

A complicating factor for estimating harvest rates and density is that bears do not occupy space and defend territories like cougars do, or spread out quite like grizzly bears do, so their densities can vary markedly from 5 to 35 bears/100km^2 in the west; and that is true even within jurisdictions. So a secondary consideration is should you use a single jurisdiction-wide density to estimate abundance & examine harvest rates, or should you use multiple density estimates to estimate harvest rates throughout your jurisdiction? Because environmental conditions can play a large role in harvest annually, as weather can impact bear behavior and hunter success, knowing regional harvest rates can be essential to staying within your agency's harvest objectives. It has been suggested in the literature that the only good way to monitor harvest rates is to estimate population size or trend locally and base harvest objectives on local estimates; some of us do that but many of us do not, my agency included.

Most agencies agree that female harvest is more of a management concern, as productivity and survival of adult females drives population dynamics. To analyze harvest objectives, most agencies typically use management zones, which is a configuration of a collection of game management units (GMUs).

When developing management zones, managers may want to take into consideration not only the differences in the characteristics of bear subpopulations and their density, but also the different characteristics of harvest, development patterns, and public access. The zones we develop should be large enough that data collection

and sampling efforts are sufficient and meaningful for modeling and other analyses. However, there is a tradeoff as it relates to female survival because as the management zone gets larger, the less sensitive the data becomes to female harvest rate and percent females in the harvest. In other words, if the zone is too large, the data can be washed-out and pockets of high harvest may be a management concern.

Here is another related topic to consider if you haven't already. We discussed this at an evening session in Alberta at the last Western Black Bear Workshop. A common management guideline used by agencies in the west is a table developed by Beecham for use in his 1994 book *A Shadow in the Forest*. Despite not having gone through a peer review process, western agencies latched on to this table and made it a central theme of black bear management plans for decades. Now, I don't think anyone in this room would disagree that Beecham is a giant in the bear world and a well-respected researcher and manager. He's a good friend of mine, and we've spoke about this several times and I can tell you from our conversations that he isn't entirely comfortable with the fact that agencies have made this a central guideline of black bear management. The table calls for the median female age of harvested animals to be 5–6 years old, generally the age they will have their 1st offspring, and female harvest to comprise < 39% of harvest at the management zone level. So what is the right scale to achieve that objective? Should we be concerned that at the zone level female harvest may fall within this guideline but locally in some GMUs the female harvest threshold can be exceeded and could reach into the mid-60 percentile? Remember that we just discussed how female survival is the primary factor for maintaining population stability, the 2nd is cub survival. The table also calls for restricting harvest when the median age for males falls below 2 years old. I challenge anyone in this room to tell me when this guideline would be violated given subadult male immigration. Therefore, for both sexes, the question I ask you to consider is this; Are these valid guidelines we should continue to use?

This discussion of ages and management objectives are typically based on teeth collected from hunter-killed bears and that brings up our next topic of consideration. I think it is safe to assume that all the agencies collecting teeth in North America are using Mattson's lab where they section teeth, stain the slivers, place them on a cover slide, and use a microscope to count annuli. Recent statistics show that, since their inception, Mattson's has aged 2.4 million bear teeth for wildlife agencies. However, some agencies are actually moving away from collecting teeth because they do not see fluctuation in median age data and they have decided that this metric is not sensitive enough to detect change. Now, they're right, but collecting teeth is one of the least expensive and time efficient tools managers have available to them to collect information and monitor harvest and supplement other data collection efforts. It also facilitates a working relationship with the hunting public and provides that direct connection between the agency and the resource. Almost all agency responses to surveys over the years indicate that tooth collection is important, but there's no doubt the value of tooth ages decrease if the tooth submission process is not mandatory and only a portion of teeth are collected. So given that we know ages of hunter-killed bears are of limited value for the most critical agency management objectives, such as population estimation and population trajectory, tooth data could be better utilized through integration with other data collection efforts such as population monitoring, survival rates, and so on. Maybe the more concerning issue is not in collecting teeth, but using median age. Dan, Carl and I worked with a couple other managers to develop a management forum to have these kinds of discussions, hopefully most of you are on that list, and from that interaction we know that more and more managers agree that median age is not a reliable technique. Because harvest data can demonstrate both increasing and decreasing population trajectories, as each can exhibit the same age structure and/or sex ratio, trends may not be consistent with the true population trajectory. Said another way, a low median age could be because all the adults have died or because cub production was high in a previous year. Now, predictably, higher median ages can be observed in a population that is lightly hunted and lower median ages in areas where hunting pressure is higher because of greater access and higher road densities. But when higher harvest situations are monitored, median age tends to drop abruptly and then remain constant, so median age does not appear to be sensitive to changes in harvest and thus not likely as useful to managers as previously thought. So, rather than using teeth for median age, maybe age data could be used to simply classify bears into adult and subadult categories, and agencies can simply track those long-term average trends. Or for high harvest areas, classifying

management zones into data analysis units, or even for establishing management zones based on more than just political boundaries. One suggestion made at the last workshop in Alberta, interestingly by John Beecham, was that maybe managers could also look at tracking the percentage of male and female bears >10 years of age rather than using median age. I will let you ponder that while we move on.

Let's close this topic out with one last note of suggested improvement, in the interest of standardization across agencies. When abundance, density and harvest rates are obtained and/or reported, it is so important that we be explanatory & transparent about these parameters because density and application of harvest rates are not standardized. What were the density methods used? How was density obtained? Is the density estimate local or statewide? What is the density describing, total population including cubs, all independent aged animals, or adults only? Where is the estimate from and is extrapolation of this density estimate to other areas of the jurisdiction justified? Finally, how were harvest rates applied? To the entire population including cubs? To all independent-aged animals? Or, to the adult only portion of your population? And if so, why? One reason this is important is that cubs are protected by law in most states, so it's likely that including them in your density estimate could deflate the observed harvest rate on independents thus leading to false assumptions. Anyway, you get the point, we need to keep a keen eye on standardization. I wish reporting of density and harvest rates were as simple as one of Julia Child's recipes of throwing everything into a bowl and getting the same result but it just isn't. Standardization of these topics is crucial, so let's work together as best we can to align these parameters

One of the final considerations I would like to discuss is human-bear conflict. Before I do, I have to make a quick left turn and make my standard pitch, which many of you have heard before, which is to ask agency folks to consider abolishing the terms "nuisance" and "problem" when referencing human-bear conflict. From its inception, the term nuisance was not malicious in nature right? It started out as a research category for bear biologists keeping track of data from collared animals in different research groups. But these terms have become engrained in our agency vocabulary and they undeniably place blame on the animal rather than the attractant which is provided by people. When the term is used in public, it removes the human factor and places us further from the solution. So rather than erroneously describing an animal, please consider describing the situation, which is a human-bear conflict that people need to take the lead on preventing in the future. I am confident that such an effort would pay off handsomely, and at this stage it really would take an applied effort to address this throughout a wildlife agency with statewide staff, documents, agency websites, etc. Human-black bear conflicts are reported to be stable to increasing in most areas, and conflict is likely to only get worse in the future as habitat loss and human population expansion continues. The main cause of escalating conflicts is food—which is calories right. Data from our project in Washington shows a large number of bear GPS locations being around people. Most bears come close to humans because it is beneficial to do so. By offering them easy-to-access calories in abundance, humans invite bears to take advantage of those calories. Many things attract bears to people but the attractants that overwhelmingly result in human-black bear conflict are what I refer to as the "Big 3": garbage, bird feeders, and fruit trees. These items are more than triple the caloric benefit of almost anything vegetative that nature can provide on the landscape. That's why after 20 years of responding to and managing black bears and conflicts, I've concluded that it is time for wildlife agencies to completely denounce the feeding of birds. Whether that's agency by agency, or collectively thru WAFWA, or even wider thru AWFA, or using all the outlets, it needs to happen. Bears taking advantage of calories from people is no different than Mark Vieira hitting the drive-thru on a busy day to get Craig the data for the commission meeting, its time management.

Then there is no cure-all for garbage management. But as the industry and the managers in Florida have shown, solutions exist to decrease garbage & attractants. The new gravity-operated cans that are self-locking are a great improvement, they solve the age-old problem of floppy lid cans and the need to have cans that can be used with existing trash truck equipment, without the driver having to get out of the vehicle. However, those solutions cost money and require agreements with city, county, and other state officials. Such communication and collaboration with elected officials tends to fall outside the scope of state wildlife agency and biologists activities. To truly educate the public about the negative impacts of feeding wildlife, and to

tackle human-bear conflicts at the source, agencies may need to reconsider their allocation of their resources and staff as well as their messaging.

This is not to say agencies haven't done a lot to address these attractants. More than 1/2 of North American agencies have anti-feeding legislation that allows game wardens to issue fines for attracting wildlife, and 2/3 of the agencies in this room have it. These fines start at roughly $100 and increase with repeat offenses to over $1000. Overwhelmingly surveys have showed that agencies without legislation say they want it, and agencies with legislation say it's working and many would even like to see fines increased to encourage compliance. None of us want to use these fines as a hammer right? Because some members of the public are doing it unintentionally, but this is absolutely an essential tool in reducing human-bear conflicts. However, it makes me wonder, do we leave the door open to public criticism by fining one segment of the public and allowing other segments to intentionally feed wildlife via bear baiting and diversionary feeding? Depending on the jurisdiction, both topics can be controversial I know, but it's important to recognize that these activities place millions of pounds of food on the landscape per year and warrant agency consideration. And it goes beyond bears right? Agencies allow baiting of other species like turkey, deer, and elk and bears are benefiting from this food. So, it's something to keep in mind. We know the advantages of baiting such as increasing hunter success and enabling greater hunter selectivity, in terms of sex class and presence of offspring, especially in spring hunts. As of 2015, 19 jurisdictions allowed baiting for black bears, but that number rises sharply when bait for other species like deer, elk and turkey are included. You may know that in Wisconsin in 2017, Kirby et al. estimated that > 15 million pounds of food was placed by hunters annually on that landscape for bears alone. What is the net effect of subsidizing bears with this food? In the Pacific Northwest of the U.S., diversionary feeding, also referred to as supplemental feeding, has been promoted as a means of reducing black bear damage to commercial timber. The concept is that by providing an attractive alternate food, hungry bears will decrease the stripping of bark off trees to obtain food in early spring. It has been conservatively estimated that in western Washington alone, ~360,000 kg of bear food is being placed on the landscape annually (exact numbers are unknown as they have been considered proprietary since 2007 and statistics are no longer provided). After almost 3 decades of use, the perceived efficacy of this diversionary feeding program, which is coupled with removal hunts, is certainly debatable. So again, what is the net effect of these subsidized food sources? Is bear behavior in these areas changing and contributing to habituation, food-conditioning and increased bear-human conflict? That continues to be discussed in the literature from folks like Steyaert et al. 2014. In a 2016 study, Beringer et al. reported that supplemental food significantly bolstered population growth rates through enhanced reproduction but concerns arose that included disease transmission, intra-species aggression, and toxicity from chocolate-based food items. Given the sheer amount of food on the landscape, it is likely that den entry, den emergence, reproduction, age at first reproduction, dispersal, survival, and density may all affected by feeding. So in deciding whether feeding has a net positive or negative effect, we have to rely on future research to test the assumptions of these complex issues in a more comprehensive manner. But it's certainly something to think about as agency biologists.

So, there's still a lot of consideration and challenges ahead of us in regards to black bear management. I think it is safe to say that as bear managers we should never be on "cruise control" and we should always question our interpretation of data. But we have a lot to be proud of as well. The Eastern & Western Black Bear Workshop series is one of those successes, as well as proceedings from those workshops, which started and are maintained by agencies & bear biologists in this room. We have sponsorship from an organization made up of all our agencies known as WAFWA. The International Association for Bear Research & Management (IBA) and its publication Ursus were started and are maintained by bear researchers and managers since 1968. We have incredible resources and a lot of data to work with. As is IBA's newsletter, International Bear News, which as of a couple years ago now has a Manager's Corner section. To date, submissions have been comprised of insightful research, management, and education updates. But also, managers simply talking about their struggles and challenges; they ask questions and look for advice. And of course we have the online forum I mentioned. If you are not a member, please think about becoming one because we need more of a collective voice, and the organization has a lot to offer. I know there are many choices out there regarding

memberships, but one that focuses specifically on bears makes it unique. There is also the Bear Specialist Group of IUCN, which is closely affiliated with IBA. These are outstanding organizations with some incredibly dedicated members. The amount of expertise that lies within our small network of members is nothing short of impressive and inspiring. I for one am proud to be a member of all of these organizations and I always will be. One thing there is left to do is to consider establishing a Western Black Bear Technical Committee, like the SE and NE bear managers have in the Eastern US. A meeting where we can get together annually and discuss regional black bear management and try to better align our programs, especially in the arena of data collection, database management, and human-bear conflict management. Jim Hayden from Idaho brought this idea up in Alberta at the last workshop. We haven't had much movement on it so id propose we discuss it sometime while we are here, possibly at the business meeting after we discuss the plan for the 14th Western.

In closing, as professionals that manage black bears under the North American Model of Wildlife Conservation and the Public Trust Doctrine, we should continue to make science the hallmark of the work we do, and the basis for our black bear management recommendations. Safeguard yourself, your agency, and the resource the best you can by relying more on research and less on harvest statistics as the basis for black bear management programs. The public expects lot from jurisdictional agencies; they expect us to be impartial, transparent, accountable, inclusive, and to use science as the basis for our decisions. Therefore, we are always at an intersection of ethics honesty integrity and respect. In addition, the stakeholders and pendulums are always changing. As human populations increase in your jurisdictions like they have in mine, there will continue to be more stakeholders, more advisory groups, more councils, more committees, and more management boards. Agencies are opening up their umbrellas and engaging more publics than we typically have in the past. Overall, I think this is a good thing and it is likely to increase in the future, so embrace it. However, with an open door to more and more constituents, more and more values, opinions, and ideas are getting a seat at the management table so to speak. So there is always the chance that the value of science will be diminished. So if you are a field biologist, do your best to not let that happen. Keep recommendations within the rails of the scientific data. If you are a manager or an administrator, value your black bear professionals, and respect the work they do, as well as the data they collect and publish. We can be as inclusive as we need to be, but our job is not only to educate about the value of science, but keep the management options within a scientific framework. That is something we never want to lose focus of. Thank you everyone. Enjoy the conference and engage with other professionals while you are here.

JURISDICTION REPORTS

ALBERTA BLACK BEAR STATUS REPORT

Paul Frame, Provincial Carnivore Specialist, Alberta Environment and Parks, 108 St NW, Edmonton, Alberta T5K 2M4, Canada

The Alberta black bear status report was delivered as an oral presentation at the workshop.

OREGON BLACK BEAR STATUS REPORT

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Historical and Current Management

From Euro-American settlement until 1924, no management protections existed for black bears in Oregon. From 1925 through 1940, portions of southern Oregon had regulated hunting seasons but harvest restrictions did not exist elsewhere in the state. During 1941–1942, a one-month statewide hunting season with a bag limit of one bear was implemented. Seasons with unrestricted harvest resumed in 1943 and continued through 1961.

In 1961, the Oregon Legislature granted the Oregon State Game Commission (now the Oregon Department of Fish and Wildlife) authority to declare the black bear a game mammal except in those areas where damage could be expected. Bear were not considered a game mammal in most of the state, which remained open to year-round hunting; a limited season was imposed for the Cascades and the Rogue River Canyon. All lands within one mile of the Rogue River between Grave Creek and Lobster Creek were closed to bear hunting in 1965. Black bears were fully placed under the management jurisdiction of the Oregon State Game Commission in 1970 when declared a game mammal statewide. The use of dogs to hunt or pursue bears (or cougars) and the use of bait to attract or hunt bears for recreational purposes became prohibited with the passage of Measure 18 in 1994. Since then, season structure has remained relatively unchanged, but hunters adapted to use primarily spot-and-stalk techniques and opportunistic harvest of bears while pursuing deer and elk.

Black Bears are managed in accordance to the Oregon Black Bear Management Plan (Plan) and has done so since 1987. The Plan was last updated in 2012 (ODFW 2012) and replaces previous plans (1993). Plan objectives direct ODFW to maintain healthy and optimum bear populations while providing optimum recreational benefits, and considering objectives related to other wildlife species and the level of human-bear conflicts; work to reduce the number of human-bear conflicts that result in the removal (lethal and nonlethal) of bears; develop, refine, and evaluate population abundance estimation through modeling techniques; and continue to improve basic understanding of black bear management and ecology through applied research. The Plan requires rigorous data collection and directs the collection of biological information from all known bear mortalities, detailed complaint reports, and mandatory check-in of harvested bears and mandatory reporting for tag holders.

A number of wildlife laws pertain to bear management in Oregon and provide the department direction on which to base current management decisions. Oregon Revised Statute (ORS) 496.004 classifies the black bear as a game mammal and gives the department responsibility for management of bears. The statute related to Wildlife Policy (ORS 496.012) directs the department to manage wildlife "...to provide the optimum recreational and aesthetic benefits for present and future generations of the citizens of this state...." Goals of this policy state that wildlife will be maintained at optimum levels; utilization of wildlife will be orderly and equitable; and wildlife populations will be regulated in a manner that is compatible with the primary uses of the lands and waters of the state and provide optimum recreational benefits to the public. A third statute, ORS 498.012, pertains to wildlife damaging land, livestock, or agricultural or forest crops and allows a landowner or lawful occupant of the land to take any bear that is causing damage without first obtaining a permit from the department. In 1994, a ballot initiative (Measure 18) passed, resulting in ORS 498.164, which prohibits the use of bait to attract or take black bears, or the use of one or more dogs to hunt or pursue black bears or cougars. However, the department may directly use these methods, or allow an authorized agent to do so, to implement specific management programs of the department (e.g., damage control, research). Hunting seasons for bear and the removal of specific animals in conflict with human interests are two ways the department meets its statutory obligations, including to provide recreational opportunities (e.g., hunting), address public safety, maintain bear populations at levels compatible with the primary land use, and to provide optimum benefits for present and future generations.

Distribution and Estimated Abundance

In Oregon, relative densities of bears are highest in the Coast and Cascade Ranges and the Blue Mountain region in the northeast, and lowest in the arid southeastern region. During 1930–1933, the bear population in Oregon was estimated to be 9,000 animals (Bailey 1936). A 1980 planning update by the department identified 21,700 mi^2 (56,203 km^2) of bear habitat in Oregon with an estimated population of 18,000 black bears (ODFW 1987). During the early 1990s, the estimated statewide black bear population was nearer to 25,000 animals occupying approximately 40,000 mi^2 (103,600 km^2) of habitat (ODFW 1993, Van Dyke 1993). This was based on estimates of 0.9 bears/mi^2 (0.35 bears/km^2) in western Oregon and 0.3 bears/mi^2 (0.12 bears/km^2) in eastern Oregon. Akenson et al. (2001) used dogs to estimate abundance of black bears in the Blue Mountains of eastern Oregon and estimated annual bear densities of 0.7 bears/mi2 (0.3 bears/km^2) in 1996 and 0.5 bears/mi^2 (0.2 bears/km^2) in 1997. Current estimates of black bear habitat in Oregon include about 17,080 mi^2 (44,236 km^2) of fair habitat and 26,807 mi^2 (69,429 km^2) of good habitat, a cumulative amount of about 46% of the state. Although methods used to estimate relative density and habitat quality were different, there is general agreement between these sets of information. Similarly, there is not always a direct relationship between animal density and habitat quality. During 2003–2004, the department implemented a study on two sites in southwestern Oregon using baited hair-snares to assess their use in collecting data for population estimation purposes (Immell and Anthony 2008). Based on DNA analysis of hair samples, bear densities during the study averaged 0.5 bears/mi^2 (0.2 bears/km^2) and 0.6 bears/mi^2 (0.2 bears/km^2) on the two sites.

HUNTING

Hunting Methods

Measure 18 in 1994 resulted in ORS 498.164, which prohibits the use of bait to attract or take black bears, or the use of one or more dogs to hunt or pursue black bears or cougars, for recreational purposes in Oregon. Prior to 1994, the use of dogs and bait accounted for 31% and 14% respectively of the bear harvest in Oregon (ODFW 1993). Much (40–50%) of the harvest was (and currently is) through incidental take by hunters in pursuit of other species, primarily during deer and elk seasons. The remainder of the pre-1994 harvest was through spot-and-stalk techniques, accounting for 15% of the total harvest. Since 1994, hunters have continued to use opportunistic encounters to harvest bears, expanded the use of spot-and-stalk techniques, and expanded or developed alternative methods.

Season Structure

For black bears, Oregon currently implements controlled hunts during spring (early or mid-April to late May), and a general season during fall (August to November in eastern Oregon and August to December in western Oregon). The spring controlled hunt generally involves an application process whereby a limited number of tags are randomly assigned to applicants to limit the number of hunters. Southwest Oregon is an exception to this process, with hunts based on a limited number of tags offered on a first-come, first-served basis. Controlled hunts are based on an allocation of tags by wildlife management unit or for an area comprised of multiple units.

The general fall season involves an unlimited number of tags available to hunters, but overall hunter success is typically very low, particularly since 1994 when the use of dogs and bait became prohibited. Successful general season hunters may purchase a SW Additional bear tag that allows them to continue to hunt bear but is limited to 11 wildlife management units in southwest Oregon. The most recent version of the Oregon Big Game Regulations contains the most current information on season structures and other regulatory details discussed in the plan. Regardless of season, in Oregon it is illegal for hunters to harvest cubs less than one year old or females with cubs less than one year old. All black bear tag holders are required to report on their activities and any harvested bears are required to be checked-in for data collection and tagging within 10 days of harvest.

License and Harvest Trends

2017 Spring Bear Harvest

A total of 8,480 spring bear tags were sold during 2017 (up 3% from 2016). Of these, 4,082 were for controlled spring hunts and 4,398 were sold first-come, first-served for the Limited SW Oregon hunt. Mandatory harvest surveys indicate 306 bears were taken during the spring controlled hunts and 300 bears were taken during the Limited SW Oregon hunt for a total of 607 spring bear taken by 4,543 hunters during 2017. The average success rate of Controlled Spring Bear hunters and SW Oregon Limited hunters was about 11%. Most of the bears harvested were males (71%).

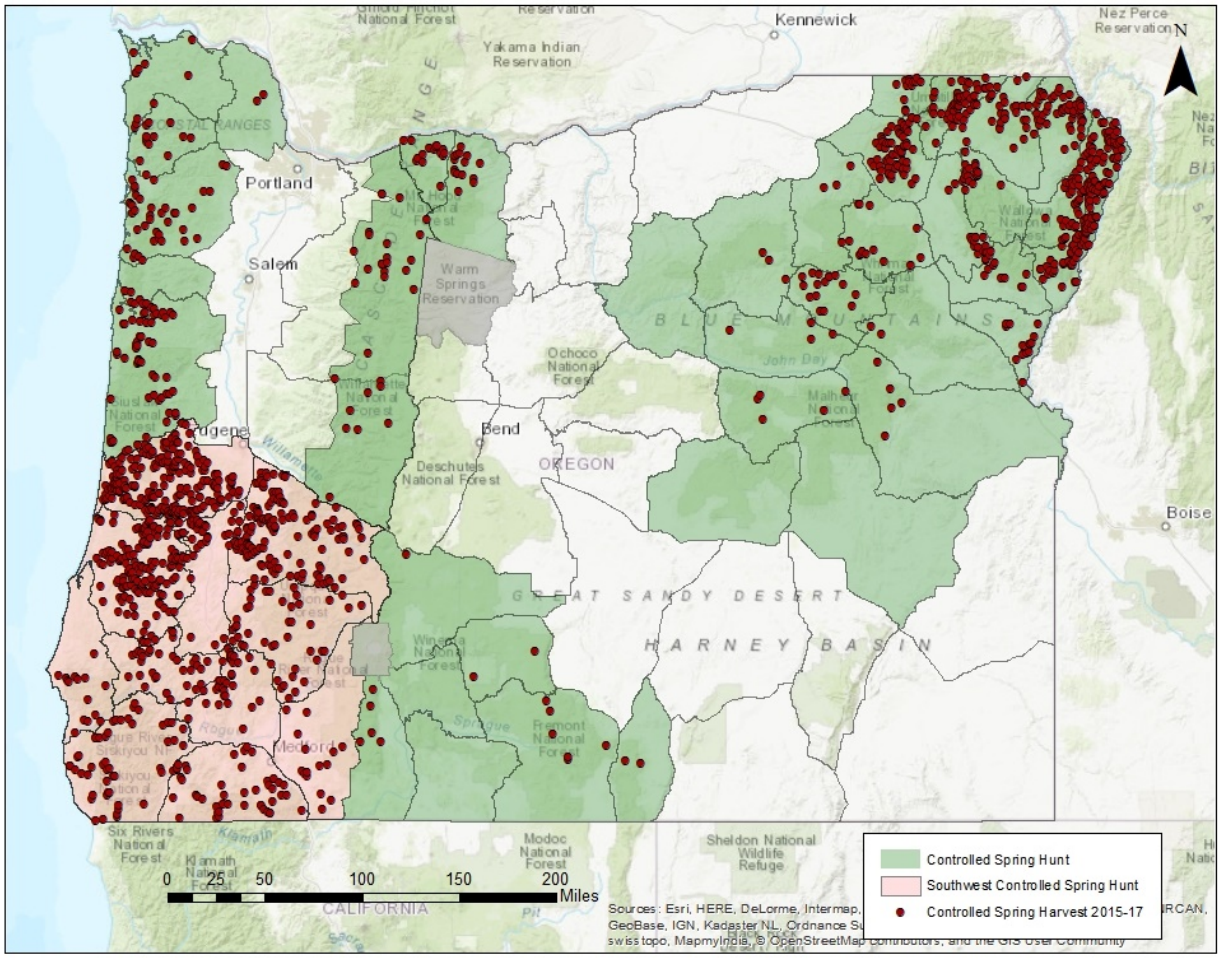

Figure 1. Oregon controlled spring season black bear mortalities for 2015–2017.

2017 General Bear Season Harvest

The number of general season black bear tags issued remained the same from 53,114 (52,568 General Season tags, 546 SW Additional tags) in 2016 to 53,113 (52,525 General Season tags, 588 SW Additional tags) in 2017 (Table 1). Mandatory harvest surveys suggested 35% of General Season tag holders hunted taking 1,134 bears. Of those 1,134, 40 were harvested with an Additional Fall Bear Tag. The general season bear harvest was slightly higher in western Oregon (54% of harvest). In 2017, 69% of the bears taken by hunters (spring + fall) were males.

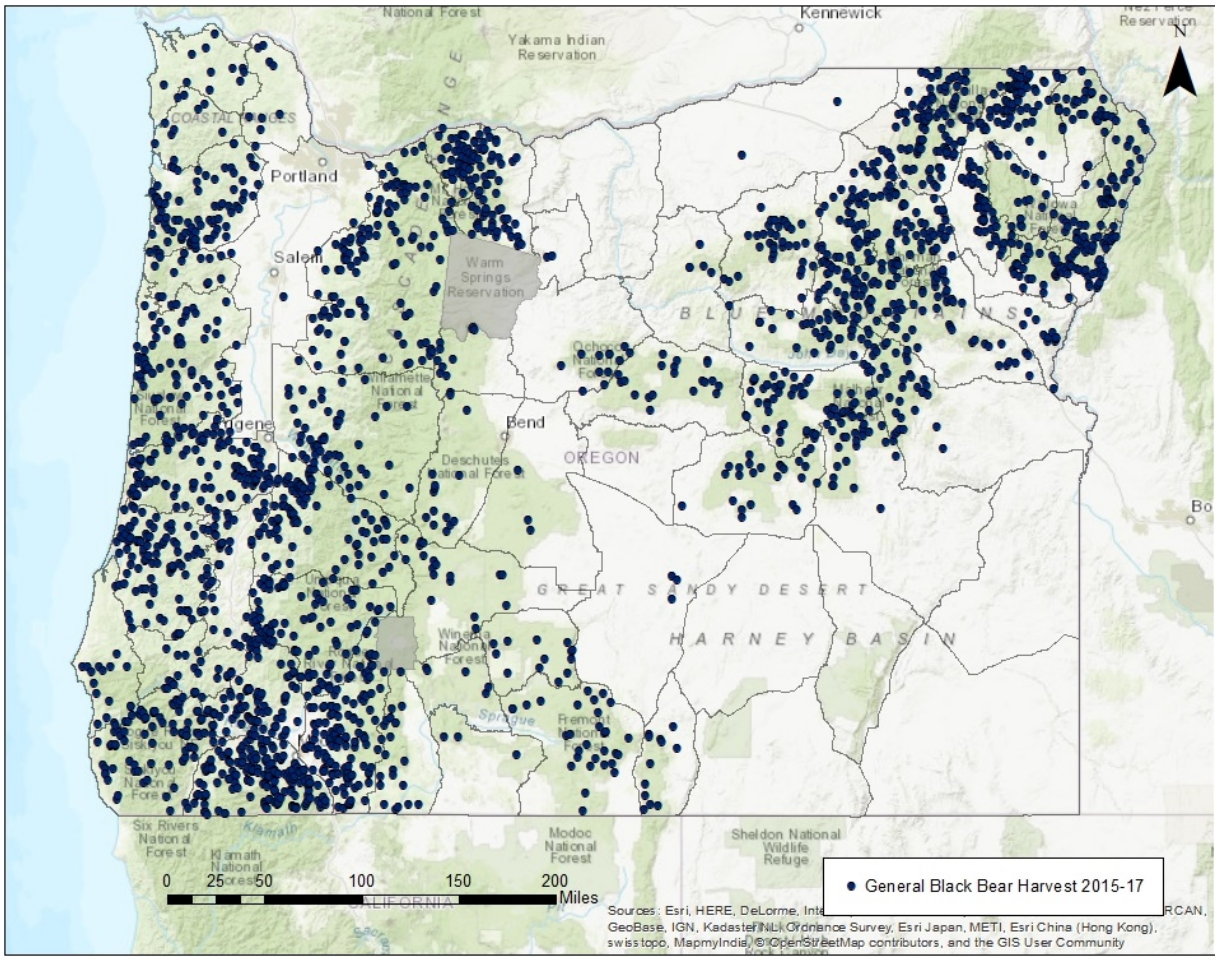

Figure 2. Oregon general season black bear mortalities for 2015–2017.

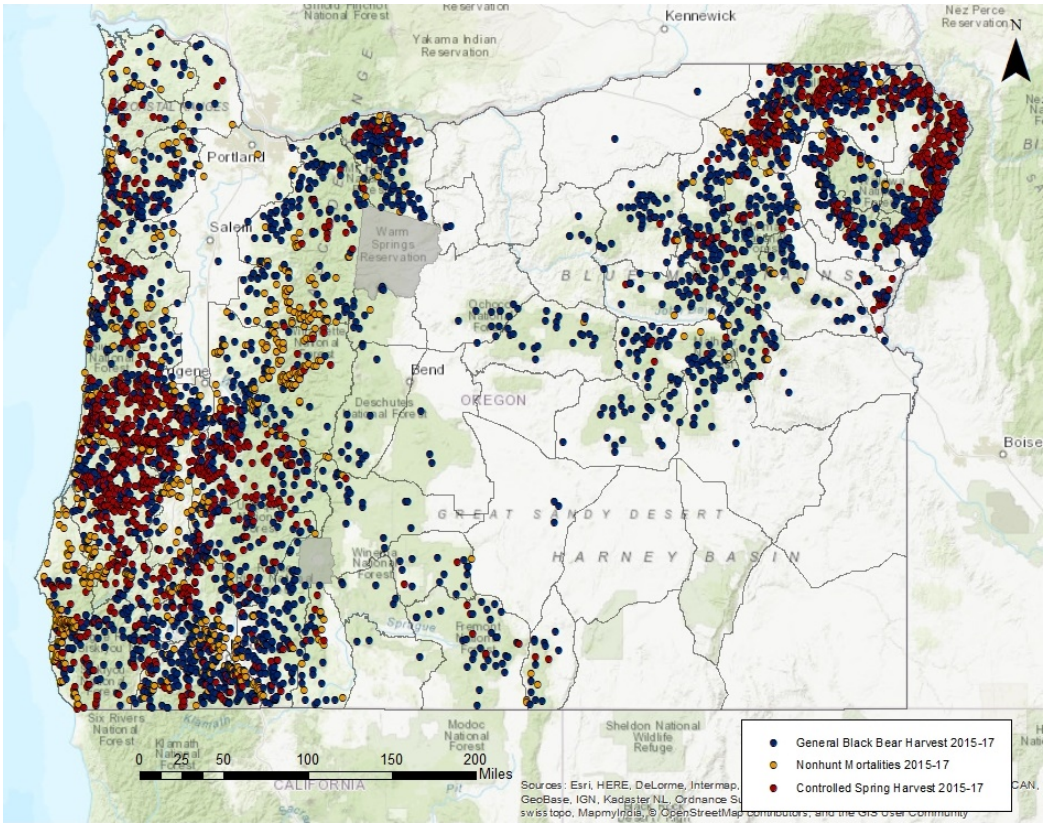

Figure 3. General season, control spring season, and non-hunting mortalities for Oregon black bears 2015–2017

Bear Population Monitoring

Continued monitoring of harvested bear ages as directed by the Bear Plan suggests bear populations are not being over-harvested. According to these criteria a bear population is considered over harvested when the median age of all bears is ≤ 3.0, the median age for males is ≤ 3.0, and the median age of females is ≤ 4.0. In 2017, the median age for all harvested bears was 4.0, the median age for harvested males was 4.0, and the median age for females was 5.0 (Figure 4).

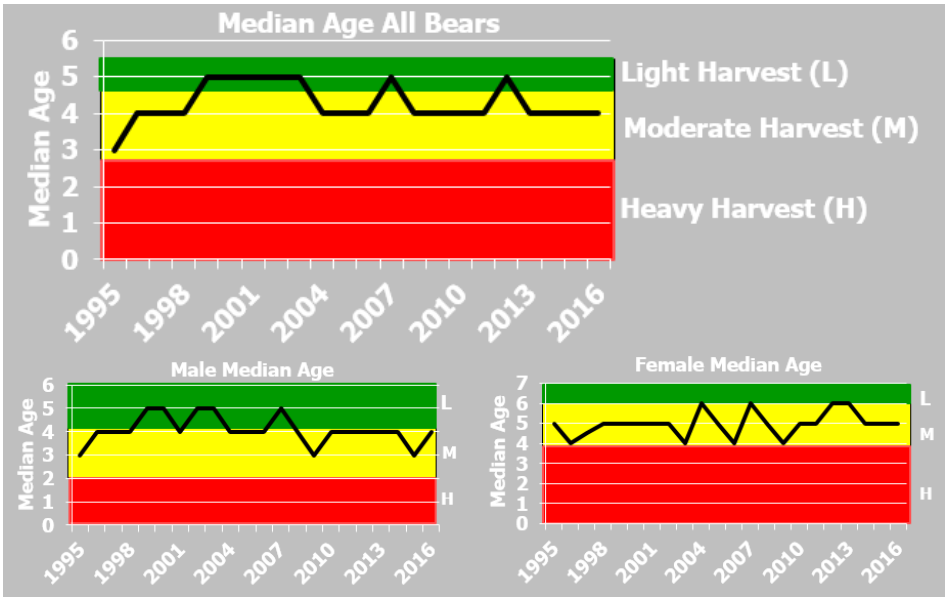

Figure 4. Median ages of all bears, males, and females in Oregon 1995–2016.

Table 1. Trends in black bear complaints, damage, harvest, and other mortality in Oregon during 1992–2017. Complaint and mortality data are current through 8/9/18. Numbers may change as late data are added.

			Number of Mortalities by Source				
Year	Number of Complaintsa	Number of Tags Soldb	Hunter-Harvestc	Damaged	Human Safetye	Otherf	Total
1992	291	17,838	960	215	0	9	1,184
1993	436	18,355	1,346	135	0	4	1,485
1994	327	18,412	1,450	154	3	2	1,609
1995	537	14,685	686	200	5	4	895
1996	561	23,364	1,007	226	12	9	1,254
1997	599	25,893	812	241	8	8	1,069
1998	828	29,743	1,053	271	21	10	1,355
1999	904	34,723	1,037	268	24	19	1,348
2000	322	41,060	1,223	225	14	9	1,471
2001	461	44,661	888	210	35	24	1,157
2002	479	46,980	1,196	181	39	18	1,434
2003	326	48,130	1,167	190	24	18	1,399
2004	326	43,716	.	221	15	20	.
2005	298	44,785	1,087	274	19	19	1,399
2006	275	46,482	1,296	199	18	15	1,528
2007	323	51,720	1,225	207	10	18	1,460
2008	602	53,847	1,188	272	49	55	1,564
2009	365	50,387	1,236	222	22	54	1,534
2010	921	57,711	1,647	394	30	86	2,157
2011	465	55,305	1,350	372	23	48	1,793
2012	382	56,243	1,320	283	17	36	1,656
2013	337	57,850	1,244	317	11	37	1,609
2014	457	58,334	1,345	322	13	54	1,734
2015	371	58,324	1,366	245	7	52	1,668
2016	335	61,357	1,372	280	15	45	1,712
2017	464	61,593	1,488	263	33	44	1,828

[a]Number of complaints received during the calendar year. Sightings not associated with damage or a public safety concern are included as complaints prior to 2000.
[b]Includes controlled spring, general fall, and additional tags (including Sports Pac licenses).
[c]No harvest survey conducted during 2004. Hunter-harvest data based on mandatory check-in during 2008–present. Additional bear tags not surveyed 2005–2007.
[d]Number of animals killed as a result of damage during a calendar year.
[e]Animals killed as a result of real or perceived threat to humans or pets.
[f]Includes roadkill, accidental, found dead, nuisance, or illegal kill.

In addition to assessing level of harvest based on median ages, the Plan directs the Department to monitor the 3-year average percent of adult males (greater than or equal to 5 years old) of known mortalities and percent of all females in known mortalities to help ascertain take levels (light, moderate, or high based on Plan criteria). The 2015–2017 average for adult males in documented mortalities was 26% and is indicative of a moderate take levels (light >35%, moderate 25–35%, heavy <25%) (Figure 5). For females (greater than or equal to 1 years old), the 2014–2016 average percent of the harvest was 31%. These values are indicative of moderate take levels (light <30%, moderate 30–40%, heavy >40%) (Figure 6).

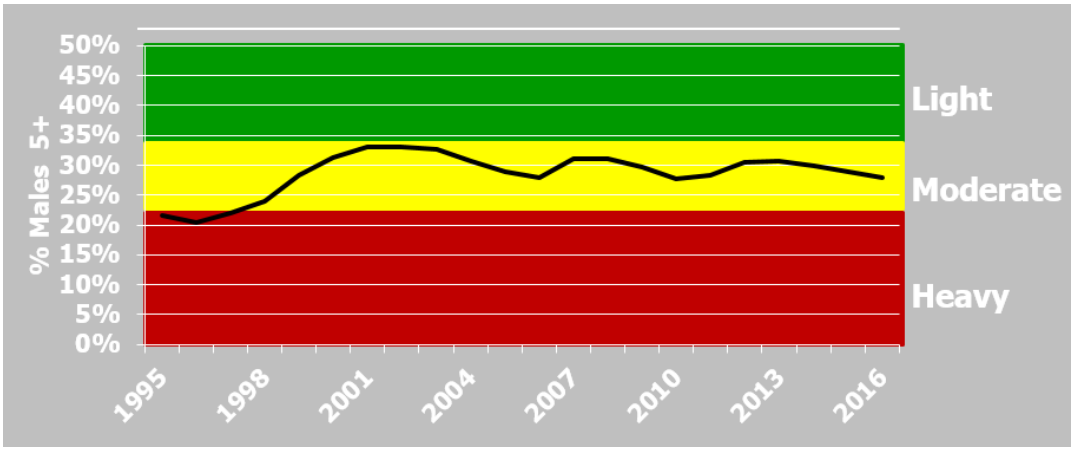

Figure 5. Three year average percent of adult males (greater than or equal to 5 years old) in all known mortalities

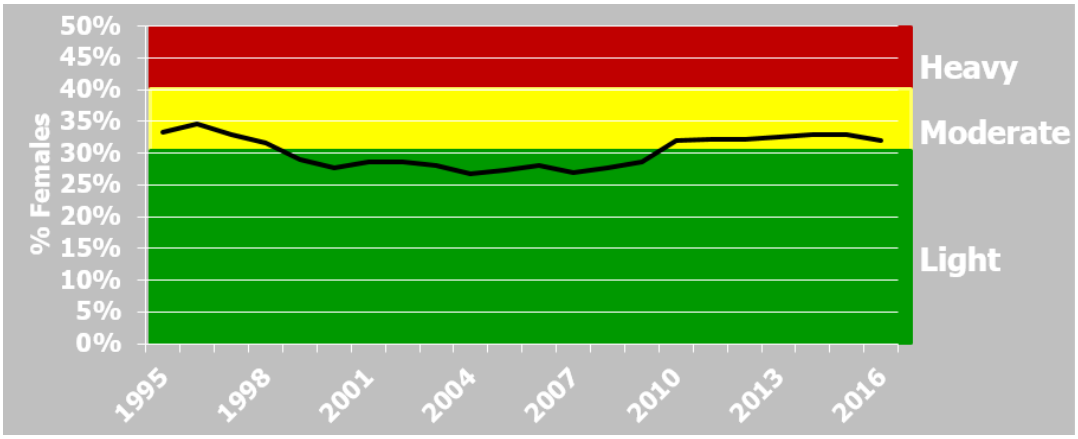

Figure 6. Three year average percent of all females in all known mortalities

Because of previous low black bear tooth return rates the Department implemented a mandatory check-in of bear skulls beginning in 2008 as directed by the Bear Plan. Specifically, successful hunters are required to bring the unfrozen skull of any bear they harvest to a Department office or a designated check-in site within 10 days of harvesting their bear. Biologists or trained volunteers collect a premolar tooth for aging. This information is important for monitoring population structure, and when combined with statewide tetracycline marking, for estimating black bear populations. A total of 1,488 teeth were submitted by bear hunters in 2017 (Table 2). Tooth return rates were high again for 2017 (85%).

Table 2. Trend in estimated bear harvest from mandatory reporting and bear tooth samples from mandatory carcass check-in, 2005–2017.

Year	Spring		Fall		Total	
	Estimated Harvest	Teeth	Estimated Harvest	Teeth	Estimated Harvest	Teeth
2005	371	127	716	185	1,087	312
2006	307	112	989	237	1,296	349
2007	477	138	748	246	1,225	384
2008	363	357	911	826	1,274	1,183
2009	461	386	698	841	1,159	1,227
2010	448	464	1,235	1183	1,683	1,647
2011	488	444	931	906	1,419	1,350
2012	464	426	1,155	894	1,619	1,320
2013	460	420	1,081	824	1,541	1,244
2014	553	510	1,088	836	1,641	1,346
2015	577	533	1,028	833	1,605	1,366
2016	580	549	1,003	825	1,583	1,374
2017	607	545	1,134	943	1,741	1,488

During 1999–2004, the department tested the feasibility of using tetracycline-laced baits to mark black bears in southwestern Oregon using a mark-recapture approach to estimate densities. Following this effort, the department implemented the technique statewide in bear habitat in 2005.

In 2009, bait spacing was increased from 3 to 5 mile intervals to reduce the occurrence of double marking and bait deployment changed from every 1 to every 2 years. The technique was recently evaluated and it was determined that current efforts are not adequate in providing reliable estimates due to large confidence intervals. This technique will no longer be implemented and other techniques to monitor bear populations are being considered in replacement.

Complaints and Other Mortalities

The total number of complaints recorded for black bear increased from 335 in 2016 to 464 in 2017, but remains near the previous 10 year average (464, Table 1). Of the total number of complaints, garbage or nuisance-related complaints accounted for 52%, 28% of the complaints were associated with human or pet safety, conflicts with livestock accounted for about 12%, agricultural damage accounted for 7%, and timber damage accounted for 1%. The number of bears killed as a result of damage to timber, livestock, or property decreased from 280 in 2016 to 263 in 2017. Most conflict-related mortality (94%) continues to occur in western Oregon, where human and bear populations are highest, resulting in damage, human safety concerns, and nuisance problems.

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WASHINGTON BLACK BEAR STATUS REPORT

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Introduction

Black bears (*Ursus americanus*) occupy all forested areas throughout Washington. Only the northern island counties within the Puget Sound archipelago and the shrub-steppe habitat of the Columbia Basin do not support resident black bear populations. For management purposes, the state is divided into 9 black bear management units (BBMUs, Figure 1) consisting of the Olympic Peninsula or Coastal (1), Puget Sound (2), North Cascades (3), South Cascades (4), Okanogan (5), East Cascades (6), Northeast (7), Blue Mountains (8) and Columbia Basin (9) units.

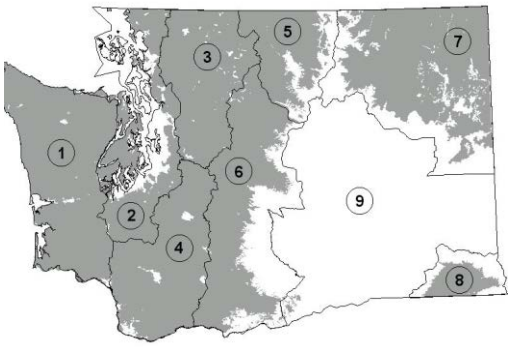

Figure 1. Black bear distribution (in gray) and 9 black bear management units in Washington 2017.

Management Guidelines and Objectives

Black bears are an important game species in Washington and agency objectives include managing for a variety of recreational, educational, and aesthetic purposes (WDFW 2015). Management to preserve, protect, and perpetuate black bears and their habitats to ensure healthy productive populations, while minimizing conflict with people, are goals outlined in WDFW's Game Management Plan (WDFW 2015). Currently, the highest management priority is to acquire a better understanding of bear abundance, density, and growth rate, which will provide a scientifically-based population estimate and an improved foundation for harvest management.

Population Surveys

No formal population estimate for black bears in Washington exists at this time (see Research section below). Like some other agencies, the Department collects hunt statistics and relies on age and sex ratios from hunter harvest to infer population size and trend (Garshelis 1991, Beecham and Rohlman 1994, Folta 2011). There is no mandatory agency inspection for hunter-killed bears but hunters are required to report hunt activity and submit a tooth. The Department developed a mandatory tooth submission process whereby all successful black bear hunters statewide must submit a premolar tooth per WAC 220-415-090 which allows the agency to age harvested animals. Unfortunately, since this rule was established in 1982, submission rates have been low, with the most recent 5-and 10- year averages being 24 and 23%, respectively (Table 1). Age structure of harvested bears is used for population reconstruction and trend indices using sex ratios and median ages.

Table 1. Tooth submission results, by sex, of all known black bear mortalities in Washington, 2007–2016[a].

Year	Total Mortality	# Male Teeth Aged	# Female Teeth Aged	% Male Teeth Aged	% Female Teeth Aged	Total % Teeth Aged
2007	1831	256	120	21	21	21
2008	2384	277	169	18	20	19
2009	1607	216	164	21	30	24
2010	2228	342	211	24	26	25
2011	1817	283	136	N/A	N/A	22
2012	1811	282	183	23	31	26
2013	1378	185	107	20	24	21
2014	1592	231	142	22	26	23
2015	1742	254	168	22	27	23
2016	1621	275	135	25	24	25
	18011	2601	1535	22	25	23

[a]does not include tribal hunting mortality

Hunting Seasons and Recreational Harvest

The Department provides fall hunting opportunity for black bears and an additional special permit spring hunt opportunity for timber damage and density reductions. Hunters have up to 167 days of hunting annually. Over the past 10 years Washington's average annual black bear harvest is the 2nd highest in the western U.S. at 1,801, behind Idaho at 2,234, and followed by California at 1,730, Montana at 1,372, and Oregon at 1,292. Fall hunts occur in all 9 BBMUs and spring hunts take place in 5 BBMUs. The highest percentage of bear harvest in both the spring and fall hunts takes place in the Northeast BBMU and the least from Blue Mountains BBMU (excluding the Columbia Basin BBMU). When viewed by mortality type at a statewide level over the past 10 years, most bear mortality occurs in fall hunting season (85%), followed by timber removals (8%) and spring special permit hunts (4%) (Table 2). Since 1991, the Department has urged hunters not to shoot cubs or a female with cubs but it is not currently prohibited by law. The use of dogs and bait to hunt bears has been prohibited in Washington for over two decades (RCW 77.15.245) but the use of dogs is allowed for special damage permits on commercial timber lands in the spring.

Survival and Mortality

Hunter harvest is the primary source of mortality for radio-collared bears from the 3 research projects (Koehler and Pierce 2005, Beausoleil et al. 2012, WDFW, unpublished information) and nearly all mortality is human related; 77% from hunting, 8% wounding loss, 5% human-conflict, 3% vehicle collisions, 3% poaching, and 2% unknown. Male survival is typically lower than female, but female survival is the most important factor in determining population growth; Department research projects estimate average female survival ranges from 0.56 (Capitol Forest) to 0.95 (Okanogan) with the Copalis, Snoqualmie, and Lake Wenatchee regions falling in between depending on hunting pressure and human access

Table 2. Black bear mortality, by type and year, in Washington, 2007–2017[a].

Year	Total Fall Hunt	Total Spring Hunt	Total Timber Hunt	Total[b] Other	Total Mortality
2007	1524	61	194	36	1815
2008	2116	69	157	42	2384
2009	1309	78	183	37	1607
2010	1900	62	175	91	2228
2011	1503	61	182	71	1817
2012	1557	75	135	44	1811
2013	1148	85	117	28	1378
2014	1389	85	90	28	1592
2015	1488	94	92	68	1742
2016	1376	124	86	35	1621
	15310	794	1411	480	17995

[a]Does not include tribal harvest

[b]Other includes unknown mortality type (35%), human conflict (33%), and roadkill (32%)

Human-Wildlife Interactions

Human-bear conflict occurs statewide given the distribution of people and bears in Washington and the prevalence of high calorie attractants like garbage, bird feeders, and fruit trees. Over the past 10 years, Washington has averaged 489 documented human-bear interactions annually and average of 462 in the past 5 years (WDFW 2016), a decrease of 6%. The human population in Washington is currently estimated at 7.4 million and most human-bear interactions take place in King County; Washington's most densely human populated area with 2.2 million people. Human-bear conflict activity reflects the variability of environmental conditions and the availability of attractants and is therefore not a good indicator of population status (Spencer et al. 2007). For example, in 2010 human-bear complaints were at an all-time high at 890, the same year Washington experienced a late spring with poor natural forage conditions for black bear, followed by a poor fall huckleberry crop. Managers agree that garbage management and the removal of attractants is the single best way to reduce bear-human interactions.

Research

Black bear management in Washington began in the mid- to late-1960s when basic demographic information was collected and used to establish black bear management guidelines (Poelker and Hartwell 1973). In the 40+ years since, relatively few black bear studies have taken place but most have occurred in the Olympic peninsula region. These include an investigation of population response pre-and post-timber harvest (Lindzey et al. 1986) in the 1970s and survival, habitat use, home range size, and cause specific mortality in three ecoregions (peninsula, Snoqualmie, and Okanogan) in Washington in the mid-1990s (Koehler et al. 2001; Koehler and Pierce 2003; Koehler and Pierce 2005). In the late 1990s, the Department conducted bait station surveys as a population index of bear abundance (Rice et al. 2001) but analysis indicated the technique was an

unreliable way to detect a change in population trajectory. This decade, home range size and habitat use were evaluated pre-removal of the Elwha Dam (Sager-Fradkin et al. 2008), and a study of survival and population size took place in Capitol State Forest (Beausoleil et al. 2012). In 2013, the Department launched a research project, in collaboration with Washington State University (WSU), to assess population size and density on both the east and west slopes of the Cascade Mountains using 2 concurrent techniques; capture/collar and DNA collection via barbed-wire hair collection stations. The project includes two wildland study areas, which represent much of the environmental variation and hunting pressure observed in Washington. The first stage of that population estimation effort is currently being analyzed and those data will be available for the next Game Management Plan revision in 2020. Finally, carnivore section staff collaborated on an educational book titled Living with Bears Handbook (Masterson 2016) and published two manuscripts regarding management implications of orphaned and rehabilitated black bears (Beecham et al. 2015, Beecham et al. 2016).

Management Concerns

Collecting teeth is one of the least expensive and time efficient tools managers have available and it facilitates a working relationship with the hunting public. However, the response rate is low and therefore much of the information Washington uses for black bear management, such as median age (Table 3), percent females in the harvest (Table 4), and population reconstruction, is outdated and of limited value. Harvest data can demonstrate both increasing and decreasing population trajectories as each can exhibit the same age structure (Clark 1999) and/or sex ratio (Garshelis 1991) and trends may not be consistent with the true population trajectory (Noyce and Garshelis 1997, Beston and Mace 2012, McLellan et al. 2017). Black bear managers agree that median age is not a reliable technique for management or population estimation. A low median age could be because many of the adults have died or because cub production is high, as both situations can demonstrate a similar age structure. A higher median age may be because hunters are more willing to provide a tooth from older-aged animals and less likely to submit for younger animals, since they already know the age. Generally, median ages can be a reflection of hunting pressure and tend to be lower in areas with greater access (Table 3), but when higher harvest situations are monitored, median age tends to decrease and then remain constant, so it is not sensitive to changes in harvest and likely not useful to managers.

Historically Washington used population reconstruction (Bender 1997) from tooth submissions and extrapolations of density to habitat availability, but currently does not have science-based field estimates of black bear abundance and density, thus making an estimate of a true harvest rate difficult. Reconstruction does not account for non-harvest mortality and the age structure of harvest may not be representative of the larger population (Williams et al. 2002), and if small changes in harvest rates occur, population estimates can become considerably biased over time (Davis et al. 2007). However, harvest data are important and could be used along with other data collection in a more integrated approach to monitor population trend (Skalski 2012). But while tooth collection for ageing harvest mortalities is critically important, mandatory submission rates in Washington have been low (21%) for decades and needs management and hunter attention to emphasize the importance of this data.

Black bear density is not uniform across the landscape and can vary based on habitat quantity and quality, levels of hunting and non-hunt mortality, and local bear population growth rate. To analyze harvest objectives, the Department uses a BBMU-scale approach or simply looks at harvest on a statewide basis. While areas need to be large enough to be meaningful for modeling and other analyses, there is a tradeoff as it relates to female harvest. The larger the management unit, the less sensitive it is to female harvest rate and percent females in the harvest. Finding that balance of the appropriate scale at which to monitor harvest will continue to be a challenge as most biologists agree that female harvest is more of a management concern. Finally, acquiring and implementing a science-based population estimate and basing harvest objectives on the estimate rather than median ages would improve Department's black bear management program significantly.

Table 3. Median ages of 4,136[a] black bear mortalities, by sex and year, submitted in Washington, 2007-2016

	2007		2008		2009		2010		2011		2012		2013		2014		2015		2016	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
BBMU 1	3.5	4	4	5	3	6	4	6	4	7	4	5	3	7	4	4	4	5	4	5
BBMU 2	3	3.5	2.5	3	3	6	3	6	3	8	3	5	3	6	2.5	2	2	4	2	4
BBMU 3	4	6	4	7	5	6	4	6	4	8	5	6	5	6	4	8	5	9	4	6.5
BBMU 4	3	4	3	3	3	4	3	3	4	5	3	5	3	3	3	5	3	7	4	5.5
BBMU 5	2	2	2	7	5	2	3	6	5	3	6	6	3	2.5	3	3	1	4	3	1
BBMU 6	2	12	3	4	4	6.5	3	4.5	3	5	4	4	4	4	2	7	3	5	4	4
BBMU 7	2	5	3	3	3	4	3	4.5	3	2	5	5	4	4	2	3.5	3	5.5	4	7
BBMU 8	4	6	3	4	5	5	2.5	5.5	4.5	3	3.5	4.5	5.5	3	5	7	3	3.5	2.5	4
BBMU 9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
average	3	5	3	5	3	6	3	5	4	5	4	5	4	5	3	4.5	3	5	4	5

[a]Equates to 23% of the 18,011 total mortalities recorded

Table 4. Percent female black bear mortality, by year and BBMU in Washington, 2007–2016. Gray areas show where management objective was exceeded.

	Percent Female Mortality											
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	10-yr Avg	5-yr Avg
BBMU 1	34	36	39	36	N/A	30	32	28	27	29	32	29
BBMU 2	36	39	38	44	N/A	36	42	39	34	43	39	39
BBMU 3	26	40	27	35	N/A	36	32	38	31	42	34	36
BBMU 4	31	33	32	39	N/A	31	31	44	24	37	34	33
BBMU 5	26	24	35	31	N/A	33	27	32	27	32	30	30
BBMU 6	28	34	37	36	N/A	27	30	34	34	35	33	32
BBMU 7	36	33	33	35	N/A	33	31	33	34	32	33	33
BBMU 8	32	33	38	39	N/A	35	29	29	38	37	34	33
BBMU 9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Management Conclusions

Data analysis by Department staff and WSU is currently underway and will provide a much anticipated population estimate for both slopes of the Cascade Mountains by early 2018. Those results, combined with data from previous research projects will allow staff to generate a more precise statewide population estimate. Over the next year, researchers will also establish a protocol for agency staff to monitor black bear populations annually within each District, much like the agency does for deer or elk survey. Finally results of a stable isotope analysis using hair from captured bears will inform management on ways to reduce human-bear interactions. All of these items are high priority needs and objectives outlined in the 2015 Game Management Plan.

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ALASKA BLACK AND BROWN BEAR STATUS REPORT

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Alaska is the largest state within the United States with a total area of 1,717,856 km^2. Much of Alaska is extremely remote due to a limited road system and rugged terrain making access difficult to much of the state. Several outlying villages do not have access to grocery stores or other amenities, which results in the reliance on subsistence of local flora and fauna for survival.

Both black (*Ursus americanus*) and brown bears (*Ursus arctos*) occupy their historical range and populations are viable statewide with significant intact habitat. Bears are an important subsistence and cultural species within Alaska but are also popular for resident and non-resident sport hunting. Management strategies for bear harvest vary across the state for both species and include bear baiting and liberal bag limits without the need for permits or sealing requirements, conservative harvest up to every 4 years for brown bear, limited draw hunts through a lottery system, and annual harvest quotas in areas targeted for trophy hunting. Alaska Department of Fish and Game (ADF&G) biologists concentrate on designing and conducting applied research to inform management needs. Across the state, bear viewing is increasing and is important for the Alaskan economy, however state and federal agency presence and monetary systems are largely absent outside of large populated areas. Bear managers continue to struggle statewide with human-bear conflicts and how to get the public to take responsibility for their actions and attractants, which is time consuming for ADF&G management biologists. Managers can gain compliance from the public by working with other agencies, refuse companies, and local assemblies to have the regulations and city ordinances in place to effectively enforce. The goal of our education and outreach programs are to reduce human-bear conflicts by promoting bear safety and awareness. These programs work best when done proactively and in combination with timely enforcement for non-compliance.

IDAHO BLACK BEAR STATUS REPORT

Jim Hayden, Staff Biologist, Idaho Fish and Game, 600 S Walnut St, Boise, ID 83712, USA

The Idaho black bear status report was delivered as an oral presentation at the workshop.

COLORADO BLACK BEAR STATUS REPORT

Mark Vieira, Carnivore Program Manager, Colorado Parks and Wildlife, 317 West Prospect, Fort Collins, CO 80525, USA

The following report is designed to provide updates on Colorado's black bear management and research efforts since the 2015 Western Black Bear Workshop.

Management Background

From Colorado statehood in 1876 through the early 1930's, black bear (*Ursus americanus*) received no legal protection from hunting exploitation even though attempts were made to classify them as a regulated game species, first in 1899 and later in 1926. The earliest statutory reference to black bear came in 1933, which authorized landowners to kill bears of either species, black or grizzly bear (*Ursus arctos*), found on grazing lands provided landowners report the bear's death within 30 days. Basically, the legislature codified what had been informal "law" since initial territorial settlement with a form of this provision remaining in Colorado statutes to this day. In 1944, black bear were classified as big game, and have remained in this classification since. In 1996, the Colorado Department of Agriculture (CDA) was granted "exclusive jurisdiction over the control of depredating animals that pose a threat to an agricultural product or resource". Thus, CDA has exclusive authority to determine the disposition of an individual bear if it is depredating on livestock, while Colorado Parks and Wildlife (CPW) retains authority to manage black bear populations and all forms of recreational or scientific use.

Current Management

Long-term season structure and license systems for black bear have been highly variable since hunting seasons were first established in the 1940s. More recently, bear season structure has remained broadly unchanged since 1999, offering hunters a September rifle, fall archery, fall muzzleloader and rifle season that runs concurrently with the October/November deer and elk seasons. In 1992, a citizen-initiated ballot measure (Initiative 10) was approved by voters, which changed state statue regarding bear hunting. The measure prohibited black bear hunting using bait or hounds and further prohibited bear hunting between March 1 and September 1, thereby ending spring bear seasons in the state.

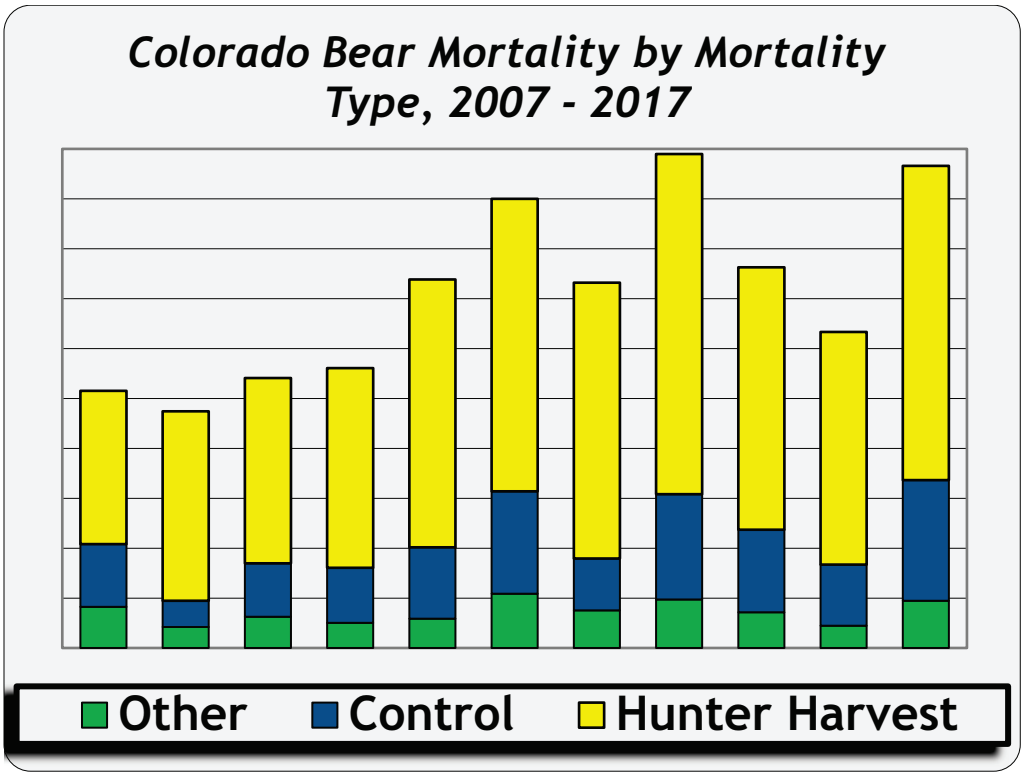
The state is presently divided into 18 black bear management units, each with its own management plan and explicit management objectives. Hunter harvest, non-hunting mortality, harvest age and sex composition, game damage conflicts, forage abundance and human-bear conflicts are monitored annually for general indications of population change and performance against objectives. Hunter harvest rates are evaluated against these metrics and this analysis generates annual bear license recommendations. Bear mortality is documented through mandatory checks of hunter kills and mandatory reports for non-hunting mortality.

2017–2018 Harvest and Mortality

In 2018, Colorado's statewide harvest objective was about 1,200 bears and the statewide total mortality objective was approximately 1,700 bears. In 2018, a total of 28,600 black bear licenses for all seasons and methods of take were available for purchase, an increase of 2,400 licenses (9%) over the previous year.

Harvest mortality in 2017 was 1,264 bears (Figure 1); this was the second highest harvest on record due in large part to a food failure in 75% of the state. Reduced natural food availability generally increases the vulnerability of bears during the September hunting seasons, which increases harvest success. As one would expect, human-bear conflicts observed by agency staff in 2017 were also at high levels. Non-harvest mortality in Colorado in 2017 was 673 bears (484 control mortalities, 189 from other sources).

Figure 1. Colorado Black Bear mortality 2007–2017



Developments since the last workshop

Legislative

Colorado Parks and Wildlife produced a December 2015 report to the legislature as required by House Bill 15-1304 on Human-Bear Conflicts. The focus of the report was to "*gather information about, consider, and evaluate all available management tools to enhance the Division's ability to properly manage black bear populations year round to address bear-human conflicts and public safety.*"
The report reviewed background and management history of black bears in the state and provided analysis and alternatives for reducing conflicts in the future. A suite of options organized under three types of strategies for potentially reducing conflicts were presented. The 3 strategies were legislative avenues, changes CPW could enact independently, and management steps that would require participation from external entities including municipalities. Specific management options highlighted in the report included changing season dates, changing method of take for bears, greater assistance and enforcement with municipal trash issues, funding and improving existing agency information, education programs and bear-specific management positions, improving statewide data collection applications/software to track conflicts, partnering with communities for urban/public area hunts, and improving enforcement capabilities in pursuing illegal feeding. To date, there haven't been any legislative changes enacted, but CPW has begun initial evaluations at local or statewide scales on several of the other options.

Inclusion of social metrics in bear management

Traditional bear management plans have focused on mortality and harvest composition as primary metrics to assess against population trajectory objectives. However, a new metric being considered more formally in current bear planning is human-bear conflict numbers. Human-bear conflict rates in Colorado have increased significantly over the last 10–20 years and become a major management issue. Non-hunt mortality regularly accounts for 30–35% of all bear mortality in recent years. Residential damage by bears, for which CPW is not responsible, has increased. Agricultural damage claims, for which CPW is financially responsible, have not dropped in proportion to the large reduction in livestock numbers on the landscape. Finally, particularly in

natural food failure years, CPW staff (officers, clerical support staff, public information officers, and biologists) can spend as much as 60–70% of their summer/early fall time on human-bear conflict responses. Given these increasing demands to bear management in Colorado, the use of measureable social metrics as additional management objectives is a logical approach. While only currently integrated into a few CPW bear management plans, social metrics such as the number of reported human-bear conflicts and the percentage of agency staff hours allocated to bear conflicts have been proposed to be more commonly used in future bear management plans.

Research on human attitudes and behaviors relative to black bears

In 2016, Colorado Parks and Wildlife concluded a 6-year black bear and human attitudes study conducted in the Durango area. This bear population inhabited portions of the wildland/urban interface around Durango and was exposed to significant levels of human food subsidies. Several manuscripts related to changes in human attitudes and persistence of change in human behaviors resulted from this study. A number of publications on the influence of human development on bear behavior, demographic and vital rates were also generated from this work. Citations include:

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Non-invasive hair snag density estimation

In 2015, CPW's statewide black bear density estimation project using non-invasive hair snares concluded. CPW initiated this work to evaluate whether bear populations had grown compared to our historic statewide population projections derived from older density estimates. We employed a genetic mark-recapture design across 9 different habitats (Figure 2) and over 7 years to obtain density estimates. Table 1 provides density estimates in bears per 100 km^2 for all 9 study areas. This project has changed considerably over the years. Our original intention was to conduct a 5-year test of the efficacy of this method to monitor bear population trends. If it worked across multiple habitat types and temporal changes in natural foods we planned to consider having "sentinel" monitoring areas in diverse habitats across the state for long-term monitoring. Varying use of the same landscape between years (food conditions) and study design considerations led to questions about the range and usefulness of results.

Figure 2. Locations of hair snag sites in western and central Colorado

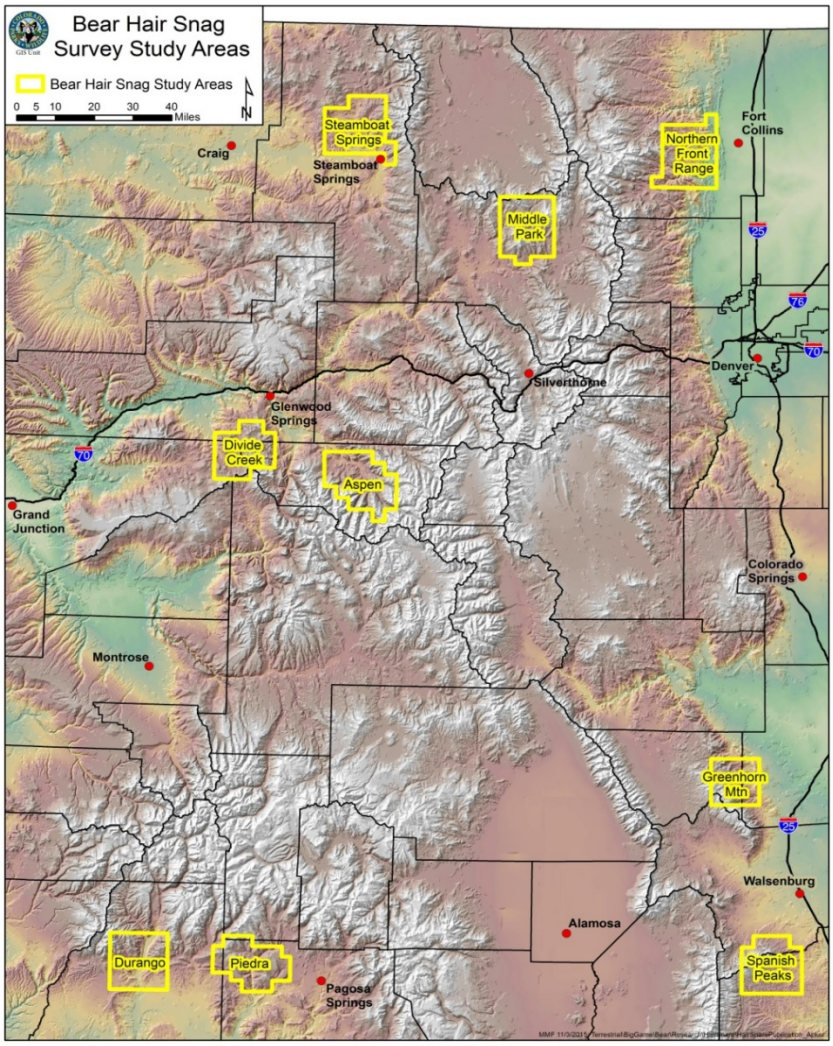


Table 1. Estimated black bear density (*D*) per 100 km² in 9 study sites in Colorado

Survey Area Name	*2009*		*2010*		*2011*		*2012*		*2013*		*2014*		*2015*	
	D	***lcl-ucl***	***D***	***lcl-ucl***	***D***	***lcl-ucl***	***D***	***lcl-ucl***	***D***	***lcl-ucl***	***D***	***lcl-ucl***	***D***	***lcl-ucl***
Divide Creek	47	*35-62*	40	*30-53*	-		-		-		-		-	
Aspen	-		26	*20-34*	21	*16-25*	-		-		-		-	
Spanish Peaks	44	*34-57*	21	*16-27*	11[a]	*9-23*	26	*21-33*	-		-		-	
Greenhorn Mtn	-		-		-		33	*25-43*	26	*19-35*	-		-	
Northern Front Range	-		-		7	*4-11*	9	*6-14*	14	*9-20*	-		-	
Durango	-		-		34	*25-42*	38	*27-55*	21	*16-28*	23	*16-32*	-	
Piedra	-		-		-		60	*43-82*	46	*35-60*	32	*25-42*	-	
Steamboat Springs	-		-		-		10	*7-15*	10	*6-15*	-		-	
Middle Park	-		-		-		-		-		11	*7-18*	14	*10-20*

Notes: a. Spanish Peaks 2011 used the maximum likelihood estimator because SECR results were highly incongruent due to extraordinarily low bear movement.

Immobilization drug evaluation for use on bears

Updates are available for two CPW immobilization drug evaluations studies. Agency researchers have shown the benefits of providing an effective and safe immobilization drug combination for black bears that requires no Drug Enforcement Agency (DEA) scheduled drugs making it accessible and easily available for managers *(Wolfe et al. 2019. Evaluation of chemical immobilization in captive black bears (Ursus americanus) receiving a combination of nalbuphine, medetomidine, and azaperone. Journal of Wildlife Diseases)*. This combination, known as NalMedA, doses at a simple 1 cc per 100 pounds of mass and became available to state and federal agencies beginning in November of 2018 (*Wolfe et al. 2016. Chemical immobilization in American black bears using a combination of nalbuphine, medetomidine, and azaperone. Ursus)*.

The second line of drug research evaluated a small sample of conflict bears, which were to be euthanized, for butorphal azaparone medetomidine (BAM) residue in various body tissues and at various times post-immobilization. Results from this work will help refine knowledge on when drugged bears fully metabolize BAM and when meat from these animals could be safely consumed.

Evaluation of predation impacts on ungulate populations

As part of the Colorado West Slope Mule Deer Strategy, a research project in the Piceance Basin of northwestern Colorado was initiated to evaluate the role of spring/summer black bear and cougar predation on mule deer fawn recruitment.

Due to concerns over declining trends in elk calf:cow ratios in the southern regions of Colorado, a research project was initiated evaluating elk calf recruitment in two southern herd units and a control northern unit. As part of this work, cause-specific calf mortality information should become available. While this is not designed specifically as a study to assess bear predation on elk, the ability to evaluate and compare bear predation rates on neonates will be possible as this project develops. This project is ongoing.

Conflict management, evaluation of fates of nuisance bears handled by CPW

A journal article published in 2015 (*Alldredge et al. 2015. Evaluation of translocation of black bears involved in*

bear-human conflicts in south-central Colorado. Wildlife Society Bulletin) provided recommendations in terms of how an agency could modulate management of individual conflict bears based on their age/sex, local population objectives and annual natural food conditions. This evaluation included 30 years of basic demographic data on agency-handled bears, pooled by age and sex of individual bears across known and unknown fates categories.

Additionally, a paper evaluating the fate of tagged bears has been submitted for review *(Lewis et al. 2019. Summarizing Colorado's black bear two-strike directive 30 years after inception. In review. Wildlife Society Bulletin).*

Conflict management evaluation – Ouray project

In southwestern Colorado, CPW is initiating a management project in one community looking at Conductive Electrical Weapons (CEWs), also commonly called Tasers, as an aversive conditioning option for conflict bears. The short-term movement and behavioral response to this technique will be compared against other standard techniques employed on bears that are using human food sources in residential areas. This project is ongoing.

Telomere and stable isotope work, collaboration between CPW research and University of Wisconsin

Researchers published a study quantifying black bear telomere length compared to environmental factors at capture and individual characteristics (*Kirby et al. 2017. Environmental, not individual, factors drive markers of biological aging in black bears, Evolutionary Ecology).* No relationship was detected between telomere length and individual characteristics (age, sex, body size). Instead, authors found a broad-scale latitudinal pattern with bears in Northern Colorado having shorter telomeres.

A project collecting stable isotope tissue samples from nearly 300 harvested bears from around the state showed strong regional diet variability with substantial use of human-derived food in certain areas. Sex and age class of the bear and housing density from harvest location were the most influential predictors of the level of carbon-13 (C13) signature. Odds of being a nuisance bear increased 60% for each 1% increase in C13 in tissue. This suggests C13 signature in bear tissue could be used as a good proxy for the level of human food interaction experience by that bear. (*Kirby et al. 2016. The diet of black bears tracks the human footprint across a rapidly developing landscape. Biological Conservation)*. The authors speculated that applications of using carbon and nitrogen (N15) signatures in bear tissue could lead to monitoring of trends in human food use, depredation (domestic sheep) and ungulate predation as each of these food sources have differing carbon-nitrogen signatures. Another advantage to this technique is that samples can be obtained non-invasively using hair snags.

A third paper is being published looking at the relationship between bear hibernation length and the use of human foods and telomere length *(Kirby et al. 2019. The cascading effects of human food on hibernation and cellular aging in free-ranging black bears. In press. Scientific Reports).* The results showed bears with higher human food source signatures hibernated for shorter periods of time while longer-hibernating bears showed lowered telomere attrition.

WYOMING BLACK BEAR STATUS REPORT

Dan Bjornlie, Large Carnivore Biologist, Wyoming Game & Fish Department, 260 Buena Vista Dr., Lander, WY 82520, USA

Black Bear Classification

Prior to 1911, black bears (*Ursus americanus)* and grizzly bears (*Ursus arctos*) were classified as predators throughout Wyoming, meaning they could be taken at anytime, anywhere, and by any means. From 1911 to 1938, both species were classified as game animals on most of the national forests within the state, including the Black Hills, and were classified as predators throughout the remainder of the state. During this time, the majority of bear hunting seasons statewide coincided with those of big game species. In 1938, the first spring seasons were set for most of the state and, the following year, bears were classified as game animals statewide. Game animal classification allowed for the protection of cubs and females with cubs at side, additionally, bears could not be trapped or hunted with dogs without the approval of the local game warden. This lasted until 1957, when bears were once again given predator status in some parts of the state and game animal status in the remainder of the state. In 1967, bears were reclassified as big game animals statewide. In 1968, black bears and grizzly bears were separated and managed as distinct species in order to protect the declining grizzly bear population. Then, in 1976, black bears were given their current status of trophy game animals, which committed the Wyoming Game and Fish Department (WGFD) to reimburse landowners for livestock losses.

Distribution and Abundance

Black bears occupy most of the major mountain ranges within Wyoming, including the Absaroka, Teton, Wyoming, Wind River, Bighorn, Laramie, Sierra Madre, Snowy, and Uinta ranges. Black bears can also be found in low densities in the Black Hills of northeast Wyoming, as well as the Seminoe, Ferris, and Green Mountain areas of central Wyoming (Figure 1). The 9 occupied mountain ranges comprise approximately 112,000 km^2 of suitable black bear habitat and are composed of 4 distinct black bear populations that are geographically isolated from each other by high elevation grasslands and sagebrush dominated deserts. The largest population occurs in the northwest corner of the state, including Yellowstone National Park, and is contiguous with bear populations in Idaho and Montana. The second largest population occurs in the Bighorn relatively low bear densities compared to densities observed in other portions of the western Mountains of north central Wyoming. This population primarily resides within the state and only extends into Montana for a short distance. The third population, extending northeast from the south central region of the state, is contiguous to large tracts of black bear habitat in Colorado. Nonetheless, studies conducted in the Snowy Range Mountains indicate that this area exhibits United States (Grogan 1997). The fourth population exists in the southwest corner of the state and has the smallest distribution and lowest densities of bears found in Wyoming. This region is a small extension of the Uinta Mountains that originates in Utah.

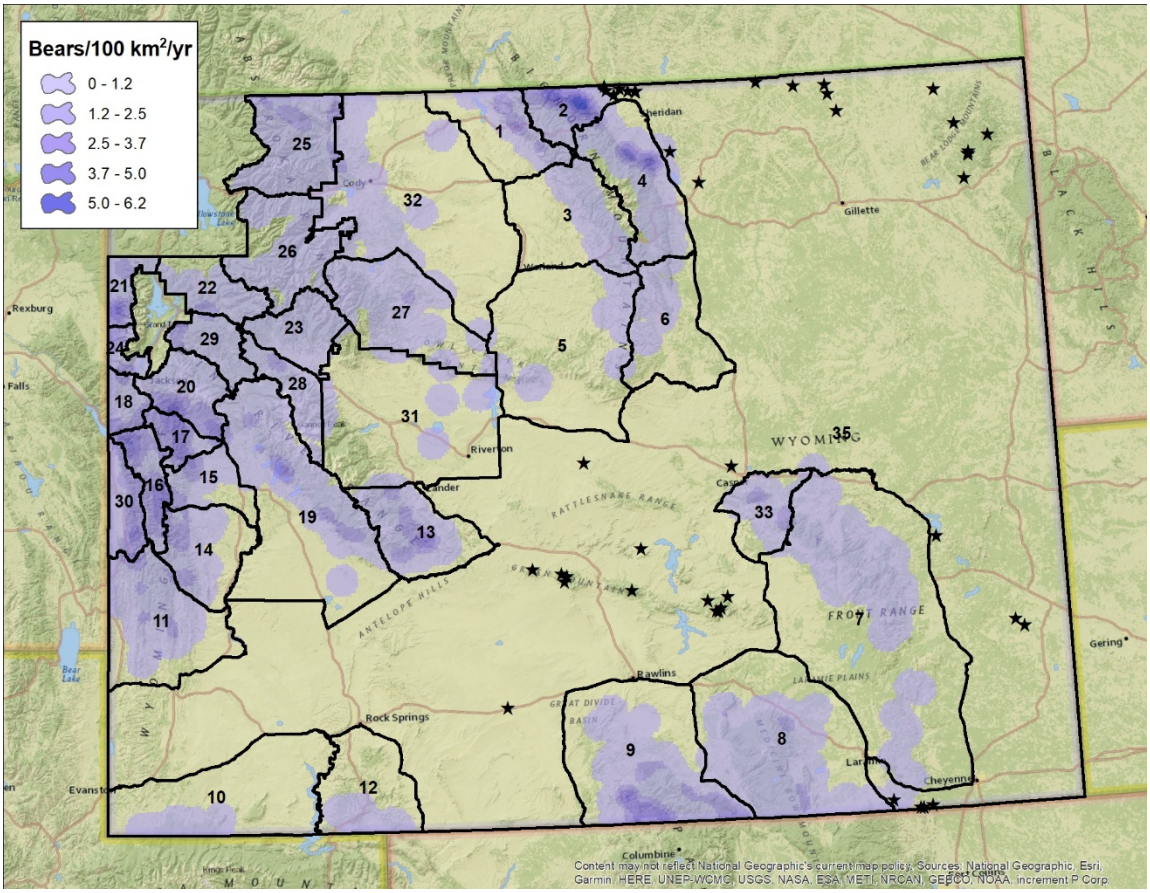


Figure 1. Wyoming black bear hunt areas and harvest density for years 2008–2017. Blue shaded areas represent relative harvest density (bears/100 km^2/year). Black stars indicate black bear mortalities of all causes for remainder of the state.

Management Plan

In 1993, the WGFD formed a committee to develop a statewide management plan for black bears. This plan was finalized in 1994 and, soon after, new regulations for the management of black bears were in place. Three main objectives were set forth to guide bear management in the state of Wyoming: 1) strive to keep harvest within the desired criteria; 2) provide a harvest of 200–275 bears annually; and 3) provide maximum hunting opportunity while maintaining stable bear populations. It became increasingly difficult to maintain the third objective due to early season closures as female harvest limits filled.

In 2007 WGFD completed a rewrite of the statewide black bear management plan. New harvest criteria were developed to better assess long-term trends and objectives of the black bear populations in the state. These criteria provide regional managers the ability to choose objectives for population increase, decrease, or stability. Additionally, annual female harvest limits are now set for three-year cycles in an attempt to better evaluate the impacts of harvest levels on the population and harvest trends. This cycle will also help to mitigate the effects of variation in closing dates due to annual fluctuations in environmental conditions such as early snow melt or drought conditions. The Wyoming Black Bear Management Plan is available on the Wyoming Game & Fish Department website at https://wgfd.wyo.gov/WGFD/media/content/PDF/Wildlife/Large%20Carnivore/BLKBEAR_MGMTPLAN.pdf.

Population Monitoring

Until recently, information collected from harvested bears has been the only source of data presently used to monitor black bear populations in Wyoming. A mandatory reporting system was instituted in 1979. All successful hunters are required to present the skull and pelt of harvested bears to a WGFD employee within 72

hours of harvest. Hunter information, teeth for aging, location of kill, sex, number of days hunted, method of take, and a general description of overall body condition are collected at registration. Skulls and pelts must be presented in an unfrozen condition and proof of sex must remain naturally attached to the pelt for accurate identification.

With the rewriting of the black bear management plan in 2007, new harvest criteria were established to better monitor long-term trends in black bear populations statewide and within each BMU (Table 1). These criteria take advantage of the differing vulnerability to harvest of each sex and age class of black bears to help determine the trend of black bear populations in Wyoming. These criteria are not assessed independently, but viewed collectively in a hierarchical fashion as a composite of the harvest level for a given BMU.

Table 1. Black bear harvest criteria from 2007 Wyoming Black Bear Management Plan.

Criteria	Population Objective		
	Population Reduction	**Stable Population**	**Population Increase**
Percent Adult Males in Total Harvest	< 25%	25–35%	> 35%
Percent Females	> 40%	30–40%	< 30%
Percent Adult Females in Female Harvest	> 55%	45–55%	< 45%

In order to better evaluate harvest data, black bear harvest limits and seasons are set for three-year periods. This process allows for a more complete analysis of the effects of harvest by holding dates and harvest limits the same for each three-year season cycle. In addition, to increase harvest data sample sizes and reduce the influence of abnormally high or low harvest rates due to environmental or other factors, three-year running averages are used in harvest data analyses rather than analyzing annual data independently. While the evaluation of harvest criteria occurs every three years and is analyzed on a three-year average, data from the previous 10 years or longer is analyzed to illustrate longer-term trends in harvest and related population trends.

Beginning in 2015, WGFD began work to more directly assess black bear population status across the state by implementing DNA-based population monitoring. The first phase of this monitoring consisted of radio collaring black bears in the Greys River area of western Wyoming to assess home range size, movements, and other space use data to assist in developing the extent and density of hair snare grids placed in the following year. In 2016, non-invasive barbed-wire hair snare corrals were deployed at 36 sites in a clustered design to cover a large area while also maintaining the ability to check hair snares once per week with available personnel. Spatially explicit capture-recapture models (SECR) were used to estimate total and sex-specific density and abundance. A report of these results will be presented during the winter 2018/2019.

The effort continued in 2017 with trapping and collaring work to deploy global positioning system (GPS) collars in the Sierra Madre Range on the Medicine Bow National Forest in southern Wyoming. Another hair snare effort was conducted during the summer of 2018. Genetic data from hair will be used to estimate population abundance and density to more accurately assess and develop objectives for population management. Data acquired can also help address questions regarding impacts of these large carnivores on ungulate populations by providing information on predator densities.

The long-term goal of this population monitoring project is to use this technique to assess black bear populations throughout Wyoming. This information will be instrumental for evaluating management strategies and developing harvest limits as well as providing a more detailed understanding of black bear population dynamics in statewide.

Harvest Summary

With the implementation of the female harvest limit system in the fall of 1994, a decline in harvest was observed, dropping from 237 in 1993 to 136 in 1996, which was the lowest harvest recorded since 1979 (Figure 2). Since then, harvest has steadily increased, reaching a high of 465 bears in 2017. This trend is correlated strongly with the number of black bear hunting licenses sold in Wyoming (r^2=0.86; Figure 2). Because all black bear licenses in Wyoming are sold over-the-counter, the number of hunters is not limited by license sales. The removal of black bears involved in conflicts, vehicle kills, and other non-harvest mortalities have been variable over the previous 5 years, ranging from 17 in 2014 to 39 in 2015 (Figure 3). Bears that die through non-harvest causes are not counted against the female harvest limit. However, these mortalities are considered when harvest limits are set for each BMU. These bears account for approximately 6% of the total recorded annual mortality.

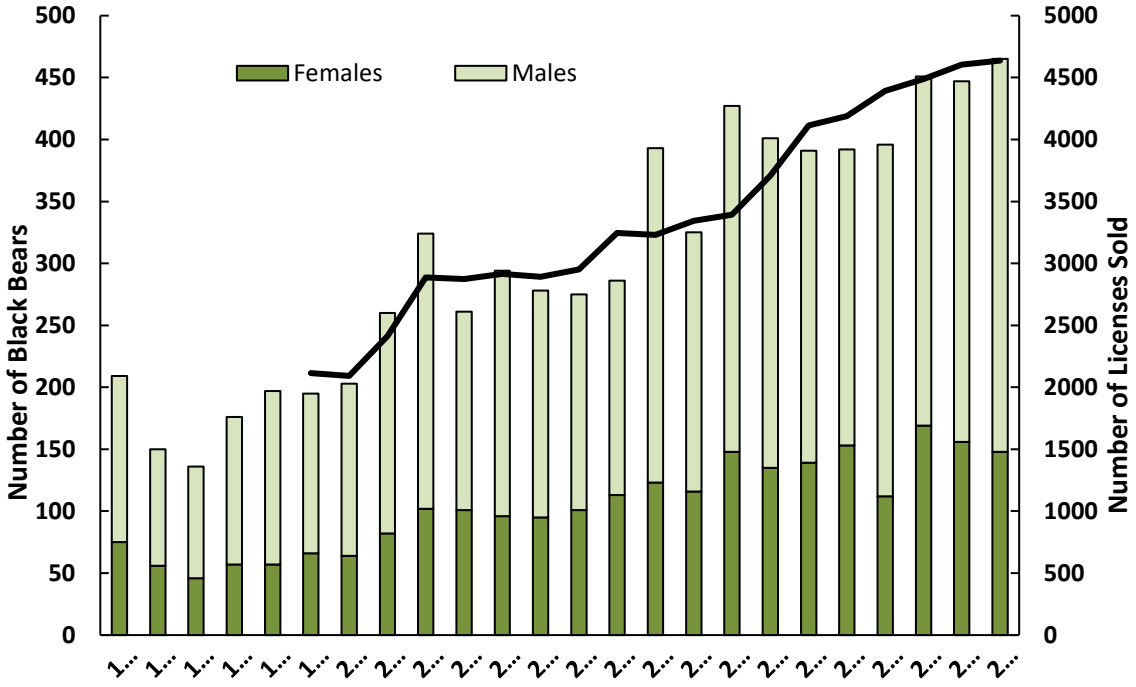


Figure 2. Black bear legal harvest by sex and number of licenses sold in Wyoming, 1994–2017.

From 2008–2017, statewide female harvest has accounted for 34% of all harvested bears. Fifty-seven percent of the annual bear harvest recorded for the period of 2008–2017 occurred during the spring season. Hunter days per harvested bear is also markedly lower during the spring season (spring = 45.5 days/bear; fall = 75.0 days/bear). This is likely due to the influence of baiting and the fact that hunters are only hunting bears in the spring while in the fall most successful hunters incidentally take a bear while pursuing deer and elk. In the spring 83% of all bears harvested since 2007 were killed over bait, compared to 42% in the fall.

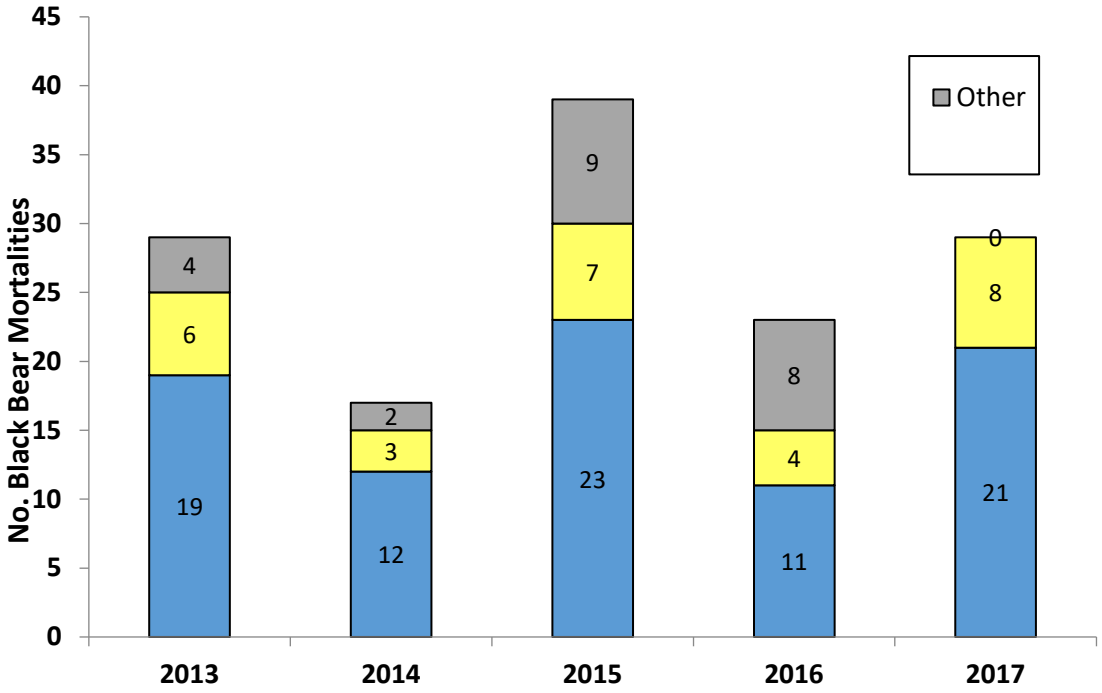


Figure 3. Non-harvest black bear mortalities in Wyoming, 2013–2017.

Hunting Laws and Regulations

Regulations governing black bear female harvest limits were enacted in the fall of 1994. Hunt areas with distinct bear populations were combined to form BMUs and assigned annual female harvest limits, so that once a harvest limit was filled the hunting season in that BMU automatically closed. There are separate harvest limits for spring and fall seasons each calendar year. This assures that a fall season will occur regardless of spring harvest levels. If female harvest limits for the spring hunting season are exceeded, the excess is subtracted from the fall harvest limits. Conversely, if female harvest limits in the spring are not reached, the portion of the harvest limit remaining is added to the fall harvest limit.

Only legal and illegal female black bear mortalities are counted against the female harvest limits. Bears removed because of conflict activity do not count toward annual female harvest limits and there are no limits on the number of damage bears that can be removed annually. The separation of damage mortality from bear harvest management is intended to prevent a high conflict year from influencing annual harvest limits.

Successful black bear hunters must present the skull and pelt from each bear taken to a WGFD employee for inspection within 72 hours of harvest. Legal shooting hours are from one-half hour before sunrise to one-half hour after sunset. The annual bag and possession limit is 1 bear per hunter per calendar year. Cubs and females with cubs at side are protected from harvest and dogs may not be used to hunt, run, or harass bears. Non-resident hunters are not allowed to hunt black bears in any federal or state designated wilderness areas without a professional or resident guide. Hunters are responsible for inquiring about season closures by calling a toll free telephone number prior to going into the field. For the 2018 black bear hunting season, resident and non-resident bear licenses are $47.00 and $373.00, respectively.

Baiting is allowed for black bears in areas outside the grizzly bear Primary Conservation Area (PCA) and some adjacent areas. Baiting is prohibited in all designated Forest Service wilderness areas in Wyoming. Non-processed baits (livestock or livestock parts that have not been processed for human consumption, or wildlife or wildlife parts that are not otherwise prohibited) must be used in most areas where baiting is allowed adjacent to the PCA. Any processed baits may be used elsewhere. Use of game animals or any protected species is prohibited. Regulations dictate size of bait container, amount of bait, density of bait sites, proximity

to water, roads, trails, and developed areas, number of bait sites per hunter, providing coordinates of bait sites, placing a bait at a registered site, and timing of bait placement. If a grizzly bear uses a site it must be reported to WGFD and the hunter must cease hunting at the site and the bait may be removed.

Depredation Trends, Policies, and Programs

Currently, Wyoming uses a statewide protocol for managing trophy game depredations and interactions with humans. Each incident is handled on a case-by-case basis and is dealt with accordingly based on the location of the incident, bear behavior, threats to human safety, the severity of the incident, and the number of incidents the animal has been involved in. Every effort is made to prevent unnecessary escalation of incidents through an ascending order of options and responsibilities:

1. No Management Action Taken (combined with educational efforts)
    a) Educational pamphlets and discussion on how to live safely in bear country are provided

2. Deterrent Methods (combined with educational efforts)
    a) Removal or securing of attractant by the landowner, leasee, or WGFD
    b) Removal of depredated carcass by landowner or leasee
    c) Use of guard dogs (landowner responsibility)
    d) Educational pamphlets and discussion on how to live safely in bear country may be provided

3. Aversive Conditioning (combined with educational efforts)
    a) Use of rubber bullets by the WGFD or designated person/agency
    b) Use of pepper spray by the landowner or WGFD
    c) Noise making devices (e.g., explosives) or flashing lights by the landowner, leasee, or WGFD
    d) Educational pamphlets and discussion on how to live safely in bear country may be provided

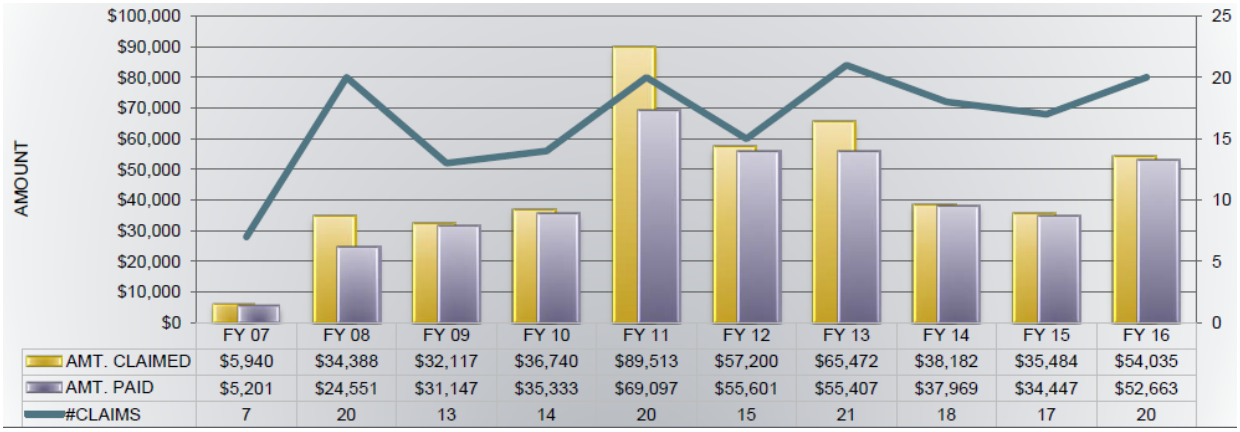
4. Trapping and Relocation (combined with educational efforts)
    a) If the above efforts do not deter the bear from the area, if public safety is compromised, if it is a first offense, or if it has been a lengthy span of time between offenses
    b) Educational pamphlets and discussion on how to live safely in bear country may be provided

5. Lethal Removal of the Animal by the WGFD (combined with educational efforts)
    a) If the above methods do not deter the bear, if public safety is compromised, or if the offending bear has been involved in multiple incidents in a short span of time
    b) Wyoming statute also allows for any black bear damaging property to be killed by the owner, employee, or leasee of the property
    c) Bears that have been removed from the population may be used for educational purposes
    d) Educational pamphlets and discussion on how to live safely in bear country may be provided

The WGFD works closely with hunters, outfitters, recreationalists, livestock operators, and homeowners in an attempt to minimize conflicts with black bears. Every spring, the WGFD hosts large carnivore workshops throughout the state to educate people about large carnivore biology, front and backcountry food storage techniques, what to do in the event of an encounter with a large carnivore, and the morphological characteristics that differentiate a black bear from a grizzly bear. In addition, numerous presentations are given throughout the year to civic, private, and school groups to educate them about bear biology and how to coexist safely with bears. Media outlets are also used to inform and educate members of the general public about bear safety issues. The WGFD has initiated a Bearwise Wyoming program that works with the public to implement ways to reduce conflicts, especially those in areas of high potential for human-bear interactions. The WGFD has also developed a bear identification test that can be taken online by the public. The test aids in differentiating black bears from grizzly bears in an attempt to reduce the take of grizzly bears because of mistaken identification.

The number of black bear conflicts ranged from a low of 68 reported incidents in 2009 to a high of 257

reported incidents in 2012. The WGFD is fiscally responsible for confirmed livestock losses and apiary damage caused by black bears. The number of black bear damage claims for the last 10 years range from 7 to 21, and payments made to claimants range from $5,201 to $69,097 (Figure 3). Sheep accounted for 75% of the total damage payments made in 2016, while apiaries (14%) and cattle (11%) accounted for the remaining 25% (Figure 4).



	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16
AMT. CLAIMED	$5,940	$34,388	$32,117	$36,740	$89,513	$57,200	$65,472	$38,182	$35,484	$54,035
AMT. PAID	$5,201	$24,551	$31,147	$35,333	$69,097	$55,601	$55,407	$37,969	$34,447	$52,663
#CLAIMS	7	20	13	14	20	15	21	18	17	20

Figure 3. Black bear damage claims and payments, 2007–2016.

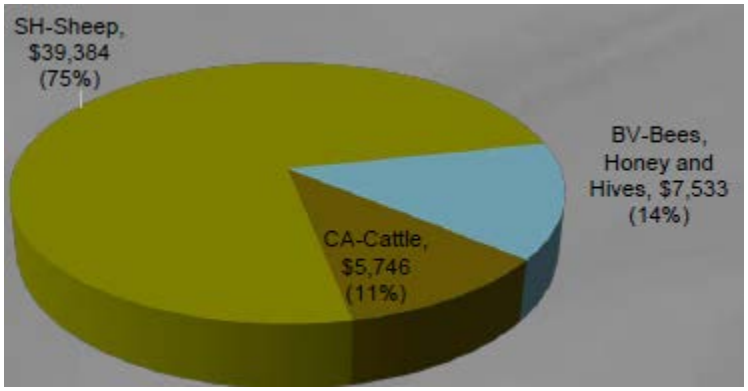


Figure 4. Percent black bear damage payments by type, 2016.

Public Attitudes toward Black Bear Hunting and Management

Hunter satisfaction surveys are conducted as part of regular harvest surveys conducted by WGFD through a contracted agency. Data from the most recent survey in 2017 indicate 57% of Wyoming resident black bear hunters and 71% of nonresident black bear hunters were either Satisfied or Very Satisfied with the quality of their black bear hunt.

Black Bear Research and Publications

Current Research by WGFD

In 2015, WGFD began conducting statewide black bear population monitoring via DNA hair snare projects. This work is relocated to new areas of Wyoming every 2 years (see population monitoring section).

Publications

Grogan, R. 1997. Black bear ecology in southeast Wyoming: the Snowy Range. M.S. Thesis, University of Wyoming, Laramie, WY. 84pp.

Grogan, R., and F. Lindzey. 1999. Estimating population size of a low-density black bear population using capture-resight. *Ursus* 11:117–122.

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UTAH BLACK BEAR STATUS REPORT

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History

American black bears (*Ursus americanus*) were afforded no legal protection in Utah until 1967. The Utah Territorial Legislature authorized a bounty on bears in 1888, and bounties were recorded sporadically through the 1960s. In 1967, at the request of sportsmen, the Utah State Legislature enacted legal protections for black bears, and the Utah Fish and Game Commission declared black bears to be game animals with established hunting seasons. By 1990, hunter numbers were regulated using a limited entry system that used area specific permits to regulate harvest numbers and distribution. Spring and fall hunting seasons were conducted until 1992 when the spring season was discontinued. In 2006 the Utah Wildlife Board reinstated spring hunting seasons.

Management Plan

Utah manages bears using goals and strategies identified in the Utah Black Bear Management Plan. The current plan is in effect from 2011–2023 with reviews occurring every third year. The goal of the plan is to maintain a healthy bear population in existing occupied habitat and expand distribution while considering human safety, economic concerns, and other wildlife species. For the purposes of the plan, a healthy bear population is one that has a proportion of breeding age animals that will maintain population levels consistent with habitat, and that maintains genetic variability.

Utah's management plan is the product of an advisory group of various representatives from stakeholder groups with interests in black bear management. The plan identifies several objectives and strategies in several distinct areas. These objectives and strategies were formulated to address a list of issues and concerns generated by the advisory group. The plan identifies objective and strategies for black bear outreach and education, habitat management, human-bear conflict management, livestock and agricultural depredation, recreation, population management, and research.

Population Management Objectives

Utah manages for healthy bear populations using indices derived from harvest data. Management units are managed in one of three categories based on desired population trajectories. These categories are light harvest, moderate harvest and liberal harvest.

Light harvest units can be selected based on several management criteria including; providing opportunity to harvest adult male bears, a low level of human-bear conflict, low bear population in need of harvest protection or population is acting as a source for adjoining bear management units.

Moderate harvest units are selected based on several management criteria including; moderate levels of human-bear conflict and stable bear populations. At least 50% of the units in the State must be managed under this strategy.

Liberal harvest units can be selected based on several management criteria including; high levels of human-bear conflict, an increasing bear population, source populations in refugia within or adjacent to the unit, chronic livestock issues on private land or when Wildlife Services bear removal has exceeded sport harvest on the unit during two of three years of a recommendation cycle.

Half of the bear management units in the State are managed under the moderate strategy. A quarter of the units in the State are managed as either light or liberal harvest units. Once a unit is categorized by harvest strategy the following performance targets are applied when making population management recommendations. Harvest recommendations are made based on harvest data from the preceding three years. Permit recommendations are made to ensure that a given unit falls within these performance standards.

Performance Target	Light Harvest	Moderate Harvest	Liberal Harvest
Adult Male (≥5 yrs old) in the sport harvest	>35%	25%–35%	<25%
Female in the sport Harvest	<30%	30%–40%	40%–45%

Hunt Structure

Utah employs several hunting opportunities and seasons. The following table is a summary of hunting opportunities as they exist for the 2018 seasons.

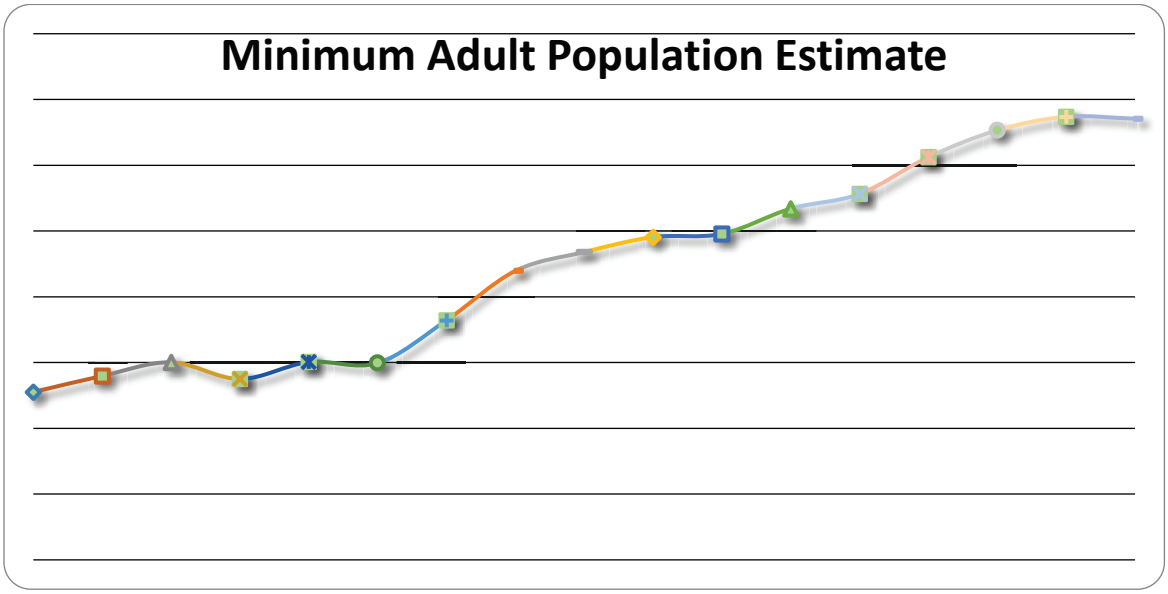
Season	Dates
Spring Limited-entry (no baiting, dogs allowed)	March 31–June 1
Summer Limited-entry (no dogs allowed)	May 26–June29
Fall Limited-entry	Aug 18–Sept 24 Nov 3–Nov 15

In addition to these seasons, archery only and spot-and-stalk as well as limited harvest objective seasons are available on selected units at different times of the year. These hunt strategies are used to address conflicts between hunters at certain times of year, and in areas were livestock depredation is a particular concern.

Each animal taken either by hunters or by Wildlife Services is assessed for age using cementum annuli from a premolar. Wildlife Services submits teeth to the Division of Wildlife and hunters are required to check in their bear within 48 hours of harvest for data collection and tooth removal. Each animal is affixed with a permanent seal at the time of inspection. During this check in, other data are collected including sex, nipple condition (to assess nursing status on females). In addition to data collected during check in, an annual hunter survey is conducted and harvest data is published in an annual report.

Population Estimate

Although population estimates aren't used as management parameters in Utah, we have used a modified virtual population analysis (VPA) to ascertain trends for black bears Statewide. Because harvest results are likely biased toward older male bears, we use the VPA to estimate numbers of adult male bears in a given year. Using ratios of adult females to males both from the literature and from hunter survey information, we estimate the adult female portion of the population. These data are used primarily to estimate trend and provide a good estimate of minimum adult bear population in Utah. This estimate does not account for natural mortality and is likely low in terms of actual numbers of adult bears.



Stakeholder Issues

Utah has established a public process for recommendations to the State Wildlife Board who has management authority for protected species of wildlife including black bears. Each of the five management regions in the State has a Regional Advisory Council (RAC) which is established with a diverse group of stakeholders including livestock producers, federal land managers, hunters and non-consumptive members. Management recommendations are made to each of these RACs and they advise the Board by voting on the recommendations. Each RAC chair attends the Board meeting and to provide input. The general public may attend all of these meeting to provide input to the RACs and Board and comment on the Division's recommendations.

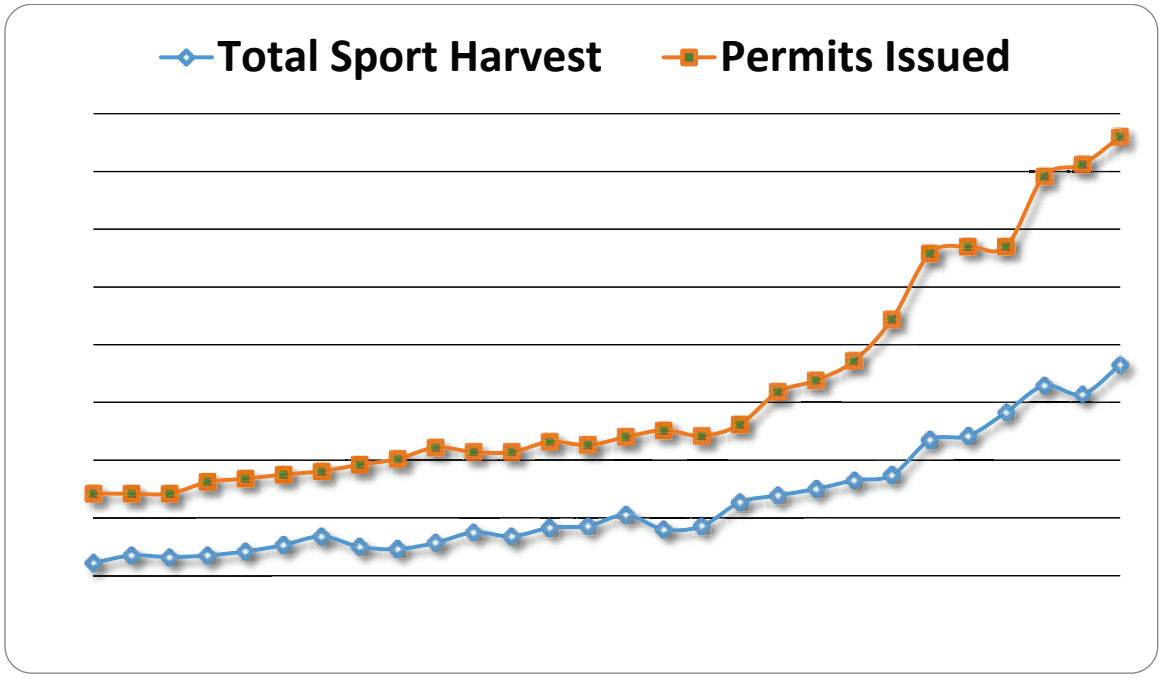
Discussions during this process can be passionate and cover many different issues related to bear population management. As of this writing, we aren't aware of any pending legislation or ballot initiatives related to bear management in Utah. Common stakeholder issues include use of dogs to hunt, season structure and population estimates.

Harvest

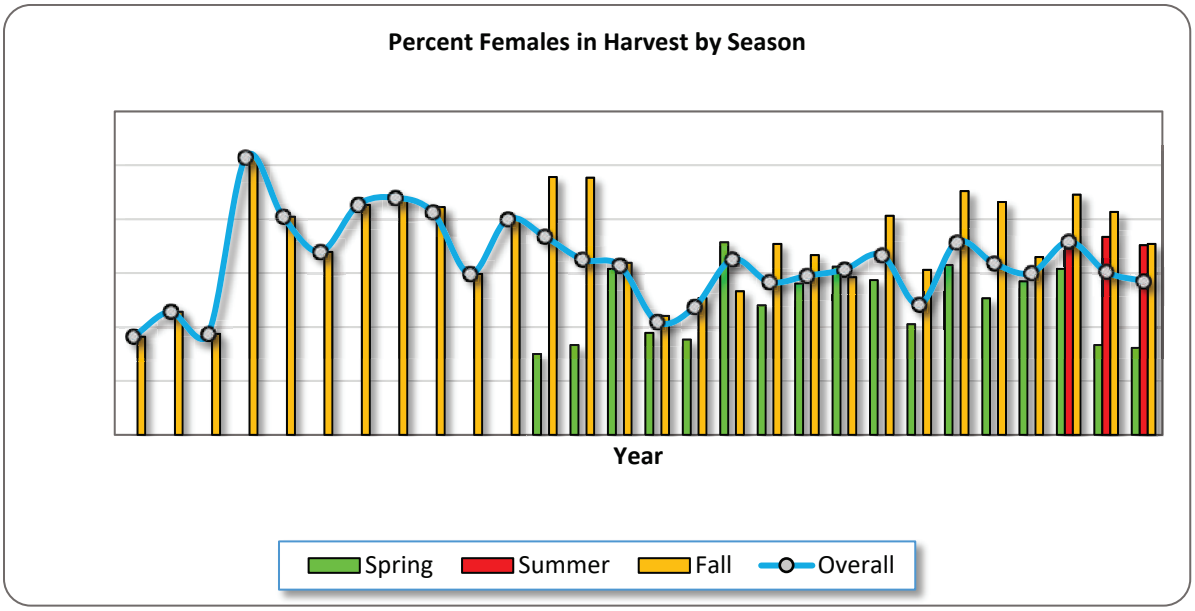
Utah employs a series of hunting opportunities and methods. The majority of permits are issued through a limited entry system. A limited number of management units have harvest objective seasons. In addition to harvest seasons, we offer pursuit only seasons where bears can be pursued with dogs but not harvested. Hunting with dogs is allowed during a spring season, and during the fall. Hunting over bait is allowed during an early summer season and in the fall. Other seasons offered on specific units include archery only seasons and spot and stalk seasons where dogs and bait are prohibited (Specific season dates and units can be found at https://wildlife.utah.gov/hunting-in-utah/hunting-information/black-bears.html). Hunters must complete an annual orientation course online before they can apply for bear permits. This course is intended to improve the ability of bear hunters to differentiate between male and female bears, to encourage hunters to select male bears for harvest, and to educate hunters about bear management in Utah.

A summary of hunt data are contained in the following graphs.

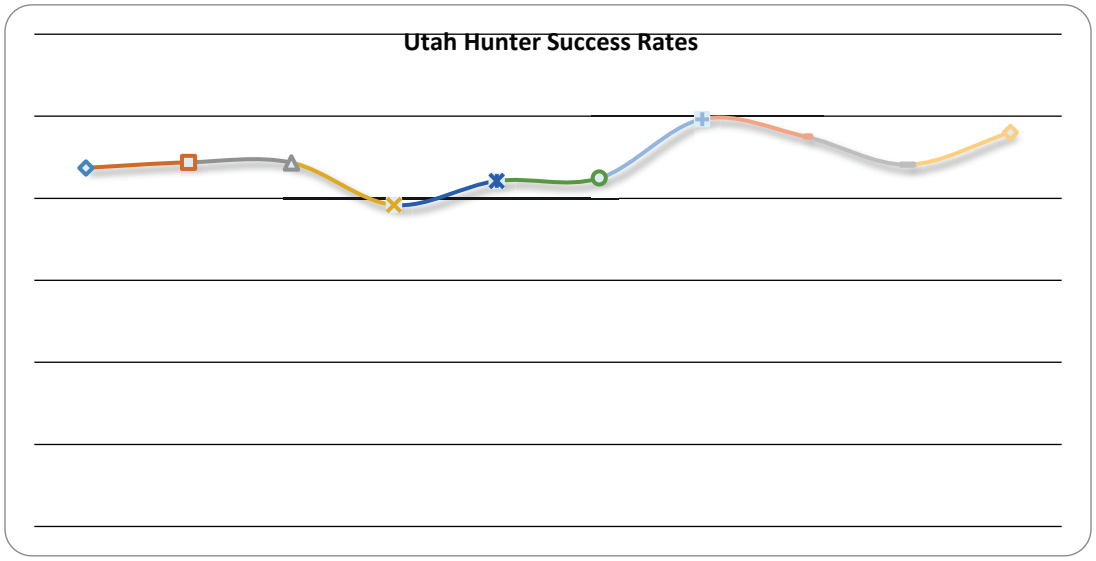
Summary of historic black bear harvest and permits issued



Percent of female bear in the harvest



Annual bear hunter success rates



Black Bear Conflict and Damage

Black bear conflict with people in Utah can be generally classified three ways; First nuisance incidences, second agricultural damage, and third livestock depredation.

Nuisance

Nuisance incidences include bears causing public safety concerns, creating a nuisance by causing private property damage, and sick or injured bears. Utah has drafted a policy to aid employees when responding to these types of situations. The policy is intended to balance the interests of bear populations, public use and public safety. Managers intend to increase public tolerance of bears by promoting preventative measures that reduce human/bear conflicts. Educating the public on ways to prevent bear incidences is a major part of our approach to addressing human/bear conflicts. Once encounters occur, incidents are classified by bear behavior into three levels, and managers make decisions on how to respond to the incident based on the particular details of a given incident. Generally, the level that an incident is classified into is determined by threat to the public, and damage to property. Responses can include educating the public on ways to eliminate food sources, relocating bears to areas where conflict is less likely, or lethal removal of the bear involved. The following chart summarizes nuisance incidences by year. Encounters include all human interactions with bears while afield ranging from sightings reported to Utah Division of Wildlife Resources (UDWR), to aggressive encounters that did not result in actual attacks on a person.

Year	Encounters	Property Nuisance	Agricultural Damage	Attack
2008	63	13	0	0
2009	78	18	2	2
2010	38	21	2	0
2011	78	11	2	0
2012	28	3	2	0
2013	52	7	0	0
2014	57	17	10	1
2015	36	7	2	0
2016	19	3	0	0
2017	35	9	2	2

Agricultural Damage

In Utah bears can cause significant damage to agricultural crops like melons and sunflowers. Usually offending bears are relocated if they pose no risk to human safety. Agricultural growers may also obtain permits to lethally remove offending animals.

Livestock Depredation

Utah has instituted a payment program for livestock losses to black bears. Payments are made for losses that are verified by USDA Wildlife Services personnel. If the value of losses in a given year exceeds the funding available for payments, compensation is pro-rated. Livestock depredation complaints and investigations are conducted by USDA Wildlife Services.

Fiscal Year	Number of Incidents	Confirmed Losses						Total		Bear taken by WS
		Ewes	Lambs	Bucks	Calves	Goat	Cow	Confirmed Losses	Value Losses	
2001	69	310	333	0	10	0		653	$89,270.00	22
2002	84	215	226	0	26	0	3	470	$60,538.72	30
2003	99	192	372	0	15	0	4	583	$56,315.00	23
2004	61	186	281	0	13	0	0	480	$69,013.25	21
2005	96	205	286	0	28	0	8	527	$97,530.00	45
2006	66	197	325	0	15	0	0	537	$51,506.00	23
2007	78	198	298	0	19	0	0	515	$79,825.00	26
2008	108	317	343	2	18	0	0	680	$101,304.00	51
2009	66	130	189	0	3	0	0	322	$52,187.50	17
2010	101	215	378	0	20	0	2	615	$115,822.00	46
2011	105	221	299	0	12	0	1	533	$120,147.00	43
2012	95	145	363	0	12	0	4	524	$135,632.50	39
2013	108	258	419	0	23	0	1	701	$108,443.50	27
2014	73	142	318	0	14	0	0	474	$102,700.00	30
2015	78	172	253	0	10	3	0	438	$101,608.00	44
2016	81	155	238	0	4	0	1	398	$80,445.00	38
2017	102	227	370	3	6	0	1	607	$142,155.00	51
TOTAL	**1470**	**3485**	**5291**	**5**	**248**	**3**	**25**	**9057**	**$1,564,442.47**	**576**

Control efforts to address livestock and agricultural damage are addressed generally with more liberal hunting strategies on units with high levels of conflict. On management units with lower levels incidences are addressed on a case by case basis. Usually individual bears are removed either by capture and relocation or with lethal removal. Bears that cause livestock losses are lethally removed, usually by Wildlife Services.

All bear incidences are recorded using a standard reporting form. Data from the form is entered into a central database. Wildlife Services actions are tracked using a reporting form that is submitted to UDWR and entered into a central database. Livestock loss data from Wildlife Services is used to calculate compensation payment each fiscal year.

Outreach efforts in Utah to address human/bear conflicts include signage to inform people that they are in bear country and encouraged to keep campsites clean and web based information about being safe in bear country at www.wildawareutah.org. Wild Aware Utah is a partnership between UDWR, Utah's Hogle Zoo, and Utah State University which provides information to the public on minimizing conflict with wildlife including black bears.

Current Research Programs

Research currently going on in Utah includes a project in Southern Utah looking at bear landscape use in and around Bryce National Park. Utah continues to collar and monitor female bears across the State to monitor reproductive rates.

Human Dimension Surveys

Utah has not conducted any human dimension surveys recently.

OKLAHOMA BLACK BEAR STATUS REPORT

Jeff Ford, Senior Biologist, Oklahoma Dept. of Wildlife Conservation, 49077 Fish Hatchery Rd, Hodgen, OK 74939, USA

The Oklahoma black bear status report was delivered as an oral presentation at the workshop.

ARIZONA BLACK BEAR STATUS REPORT

April L. Howard, Predator, Furbearer and Large Carnivore Biologist, 5000 West Carefree Highway, Phoenix, AZ 85086, USA

Introduction

Black bears in Arizona are found in a variety of habitats, including subalpine and montane conifer forests, riparian forests, evergreen woodlands, chaparral, and oak savannah habitats. In Arizona, black bears occupy approximately 10,000 mi^2 of non-tribal lands, most of which is in the north-central and eastern half of the state (Figure 1). Relative densities of black bears are highest along the Mogollon Rim in the Mazatzal Mountains in central Arizona and the White and Pinaleno Mountains in eastern Arizona.

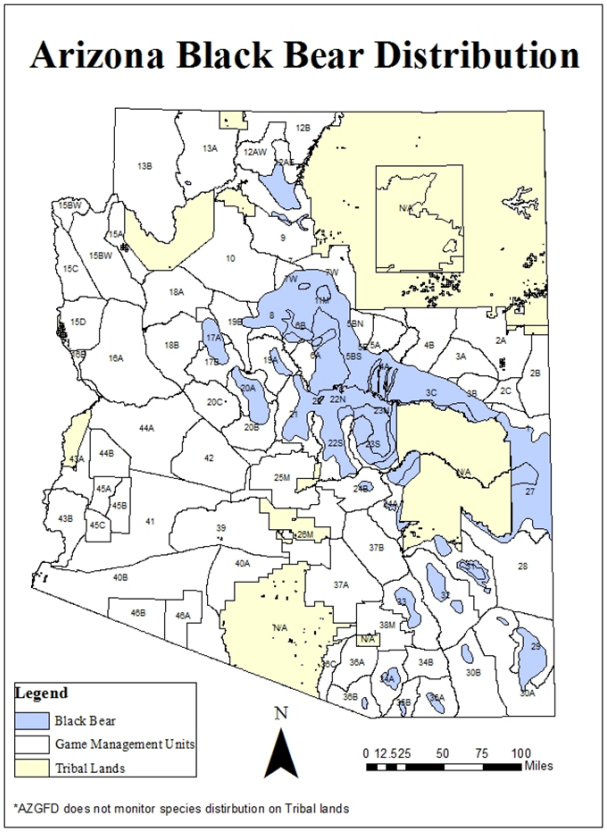


Figure 1. Black bear distribution and game management units in Arizona (2015).

Population Monitoring

In Arizona, wildlife managers roughly estimate black bear population size in each Game Management Unit (GMU) by applying density estimates from research conducted within the state to the amount of presumed high, medium, and low quality black bear habitat likely available in each GMU. These population estimates are used to establish annual female harvest limits in each GMU (10% of the estimated female population). Population trend is monitored using sex ratios and median ages (Table 1). More recently, statistical population reconstruction has been explored to estimate annual statewide population abundance. This method uses age-

at-harvest data already collected at mandatory agency inspections along with hunter effort and survival data.

Table 1. Black bear sex and age harvest composition in Arizona, 2008–2017.

	Percent	Average Age			Median Age		
Year	Male	Males	Females	Total	Males	Females	Total
2008	68	4.6	5.3	4.8	3	3	5
2009	67	5.5	6.5	5.8	3.5	4	4
2010	58	5.2	7.1	6	4	6	5
2011	62	5.3	6.9	5.9	4	6	5
2012	66	6	7	6	4	6	5
2013	63	6	8	7	5	5	5
2014	55	6	8	7	5	7	5
2015	55	5	7	6	5	6	5
2016	57	5.4	6	5.7	5	5	5
2017	63	5	5	5	3	4	3

Management

While there is no formal management plan for black bear, a variety of guidelines, resources, and/or policies are used to manage the species. The department's strategic plan, species management guidelines, hunt guidelines, hunt recommendations, predation management policy, human-wildlife conflicts policy and the 2009 Conservation Strategies Report all serve as guidance and direction for black bear management.

Arizona offers spring and fall black bear hunting seasons. Most hunts are over the counter with some limited draw hunts available in spring. Dogs can only be used during the fall hunts. Sows with cubs have been protected during all spring hunts and some fall hunts since 1992, and in all hunts starting in 1995. In 2019, further protection to females and cubs was adopted by adding the language "cubs with sows" to the legal bear description in all hunts. Successful hunters must report their harvest within 48 hours and have it physically inspected by the department within 10 days, at which time a tooth is removed for aging, and DNA and hunter effort data are collected. Individual hunt and annual female harvest limits are established for each GMU. When the number of harvested female bears equaling the female harvest limit for a particular hunt has been reported, the unit will close at sundown the Wednesday immediately following.

From 2008–2017, hunter harvest averaged 250 black bears annually (Table 2). In addition, on average 2 black bears were removed annually for livestock depredation and 23 from other mortalities such as conflicts with humans, collisions with vehicles, and illegal harvest.

Table 2. Arizona black bear mortality, 2008–2017 (not including Tribal lands).

Year	# Tags	Hunter Harvest	Depredation	Other	Total
2008	5925	179	1	13	193
2009	5371	239	1	23	263
2010	5266	235	2	16	253
2011	5239	291	4	26	321
2012	5053	303	4	36	343
2013	5463	239	3	4	246
2014	5371	217	2	28	247
2015	4513	242	1	13	256
2016	4994	266	0	32	298
2017	4894	288	2	35	325

Research

From 2005–2011, the department studied the effects of completed forest thinning treatments on black bear habitat use and selection. The specific objectives of the study were 1) to determine the relative influence of forest thinning treatments on black bear habitat selection and describe black bear habitat use at a landscape scale; 2) examine black bear habitat selection in relation to micro-site characteristics, and 3) compare micro-site habitat characteristics of treated sites and black bear use sites to understand mechanisms driving bear habitat selection relative to forest thinning. The goal was to contribute a greater understanding of black bear ecology in managed forests and inform future forestry activities to minimize negative impacts on wildlife.

At the landscape level, topographic features such as slope and ruggedness had a greater influence on black bear habitat use intensity than did forest thinning treatments. Habitat analyses at finer spatial and temporal scales demonstrated that bears used habitats that were structurally different from those that had been treated for fuels reduction.

In 2008, a study was implemented in the Sky Islands in southeastern Arizona to assess black bear habitat connectivity and population structure. The goal was to evaluate the use of genetic data collected from hair snag samples combined with samples from harvested black bears to generate an estimate of abundance and examine the importance of, and threats to, habitat connectivity among mountain ranges. The objectives were to develop a cost-effective protocol to sample black bears in Arizona and a strategy that is feasible to implement regularly to provide accurate estimates of abundance on which to establish harvest limits. Also, to generate data-based management recommendations to guide decisions related to the maintenance or restoration of movement corridors in the Sky Islands region, which is one of the most biologically diverse regions in the U.S. but is threatened by urban development and border security issues likely impacting wildlife movement patterns.

Human-Bear Conflicts

The department must balance public safety concerns and private property rights with animal welfare and

science-based conservation policies. The department's human-wildlife conflicts policy, updated in 2015, is intended to provide guidance for employees who are responsible for responding to human-wildlife conflicts. The policy classifies reported conflicts into 4 categories based on the behaviors of the wildlife relative to humans and a threat analysis based on those behaviors and location of the reported wildlife: Category 1 – Immediate Threat, Category II – Potential Threat, Category III – Nuisance Wildlife, and Category IV – Observation. The actions that wildlife managers take in response to the human-wildlife conflict report is based on how it is classified but the policy recognizes that not every human-wildlife conflict will fit into one of the categories. Each incident is evaluated on all of the circumstances for that particular incident and the policy allows some flexibility in response and handling, when appropriate.

Every Category 1 report requires an immediate department on-site response. All wildlife posing an immediate threat to human health and safety (Category I) are euthanized. Category II reports involving a bear require an on-site visit and investigation. Category II bears may be captured and translocated with the exception of adult male bears, bears that have previously been involved in conflicts and marked with ear tags, and bears that appear to be ill, which are euthanized. Category III and IV responses may not require an on-site response but depends on the nature and location of the report.

The number of human-bear conflict complaints, translocations and removals reflects an increasing trend over the past 10 years. An average of 18 bears were removed annually due to human conflicts from 2008–2017, with a low of 5 in 2008 and a high of 27 in 2017.

NEVADA BLACK BEAR STATUS REPORT

Pat Jackson, Nevada Department of Wildlife, 6980 Sierra Center Parkway, Suite 120, Reno NV 89511, USA

Adhering to the 12th Western Black Bear state status report format, this report contains information from 2009–2015, since the 11th WBBW. Additional information can be found on the Nevada Department of Wildlife's (NDOW) web site at www.ndow.org.

Black Bear Hunt

Bear management in Nevada changed considerably with initiation of the state's first managed black bear sport hunt in 2011. The hunt followed a year of public meetings and presentations. A small and vocal group opposed to the hunting of bears filed suit in district court in June 2011 claiming the Nevada Board of Wildlife Commissioners failed to follow the legal process in establishing the hunt. This petition was denied allowing the hunt to commence on August 20, 2011.

The hunt was approved based on NDOWs analysis from 12 years of mark-recapture data from a sample of 420 bears. Using the same analysis, the statewide population is currently estimated to be 500–700 bears across western Nevada. During the 2018 season, 45 resident and 5 nonresident tags were issued. Unique harvest limits and female harvest limits were set based on Unit Groups:

Unit Group	2017 Season	Unit Harvest	Unit Female Harvest
Hunt units 192*, 194*, 195, 196 are open to bear hunting except those portions of 192 and 194 described below in Special Regulations.	Sept 15 - Dec 1 (or until harvest limits are met)	6	3
Hunt units 201, 202, 204 and 206 are open to bear hunting	Sept 15 - Dec 1 (or until harvest limits are met)	6	2
Hunt unit 291 is open to bear hunting	Sept 15 - Dec 1 (or until harvest limits are met)	8	3

It is important to note the season change from December 31 to December 1. The Nevada Board of Wildlife Commissioners required all successful tag holders to attend a black bear indoctrination class before going afield.

Conflict Management

NDOW continues to respond mostly reactively to human-bear conflicts since removal of public education funding by the Nevada Legislature in 2007. An average of 85 bears is handled each year with most of these being released on-site with aversive conditioning, including the use of Karelian Bear Dogs (KBD). The agency is evaluating this program and seeking supplementary funding for a KBD program, including more dogs. An additional full-time game biologist, with responsibilities focusing on black bear management has been added to NDOW game division staff since the last black bear workshop.

Current Research NDOW is involved in various black bear research projects with different cooperators. A collaboration with Wildlife Conservation Society looking at black bears and mountain lions, with a focus on black bears outcompeting lions at their own kill sites, is about to be completed. Michigan State University and the University of Montana are collaborating with NDOW to passively estimate the state's black bear population. Methods will include hair snares and trail cameras. This project is paid for with $3 predator fee and Pittman-Robertson funds.

Publications

Lackey, C. W., S. W. Breck, B. F. Wakeling, and B. White. 2018. Human-Black Bear Conflicts: A review of common management practices. Human-Wildlife Interactions Monograph 2:1–68.

Malaney, J. L., C. W. Lackey, J. P. Beckmann, and M. D. Matocq. 2017. Natural rewilding of the Great Basin: Genetic consequences of recolonization by black bears (Ursus americanus). Diversity and Distributions.

Animal Attack Response

Employees from NDOWs Game, Law Enforcement, Conservation Education, Divisions and one Deputy Director attended a Wildlife Human Attack Response Team. This training was hosted by NDOW and the Association of Fish and Wildlife Agencies, held in Reno, NV, instructed by Canadian wildlife law enforcement officers, and attended by a plethora of wildlife and law enforcement officials from across North America. NDOW is developing its own Animal Attack Incident Response (AAIR) team. A response plan has been drafted. Three enclosed trailers have been purchased, and will be stocked with necessary AAIR equipment and stored in the Eastern, Western, and Southern regions, allow for quick animal attack responses.

NEW MEXICO BLACK BEAR STATUS REPORT

Rick Winslow, Bear and Cougar Biologist, New Mexico Department of Game and Fish, PO Box 25112, Santa Fe, NM 87504, USA

1. Estimates/Goals/Trends (last 10–15 years):

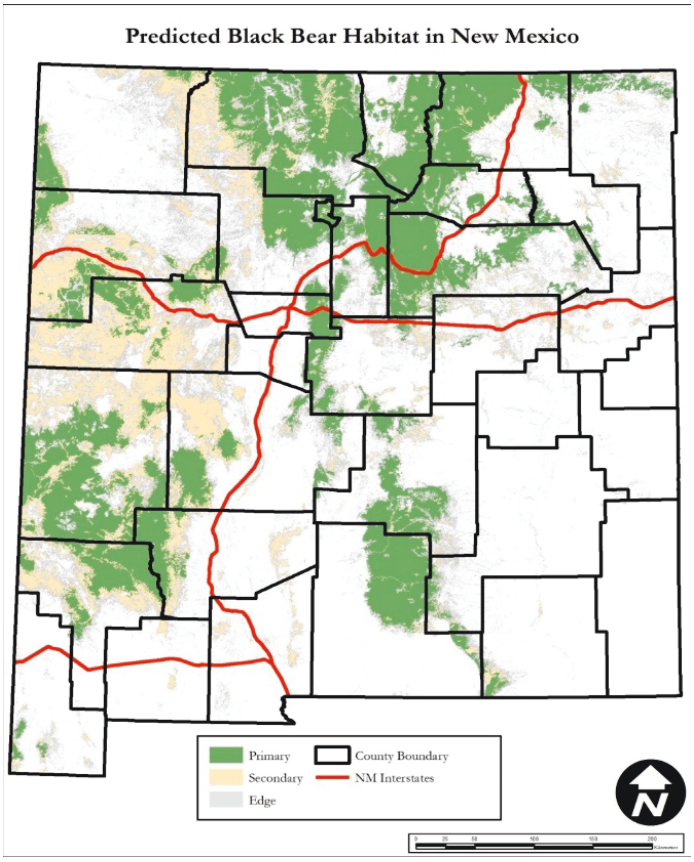
History/Background

- 2004 – Zone Management started
- 2004 – Harvest Limits with female sub-limits started
- 2004 – Telephone and Internet harvest limit checks available for hunters
- 2006 – Improved pelt tag reporting
- 2006–07 – Internet based pelt tag reporting
- 2007–08 – Mandatory harvest reporting for all species, does not affect bear/cougar harvest as there are mandatory check-ins.
- 2012 – Conflict guidelines revised.
- 2015 – New habitat model adapted.
- 2018 – Conflict guidelines revised to suggest no rehabilitation for cubs after June.

Presence/absence of a formal management plan:

We use the Bear Population and Harvest Management Matrix as an action plan (Appendix 2). It does not account for non-sport mortality. Population estimates are based on habitat estimates (based on remote sensing vegetation analysis – LANDFIRE) (Figure 1).

Figure 1.



Bear management structure and strategies:

See Appendix 1.

State-wide black bear numbers and population trend:

- Population estimates based on Costello et al. (2001) and/or Gould et al. (2016).
- Population estimates were extrapolated for areas not directly censused in the above studies using densities from those studies applied across the amount of available primary bear habitat.
- Known breeding populations occur in habitat segments that do not meet the entire criterion for primary habitat.
- Estimated populations are reported in Appendix 1 and predicted habitat is delineated in Figure 1 above.

How bear harvest objectives and numbers are derived, e.g., harvest success, harvest composition, mortality density, mast surveys, etc.

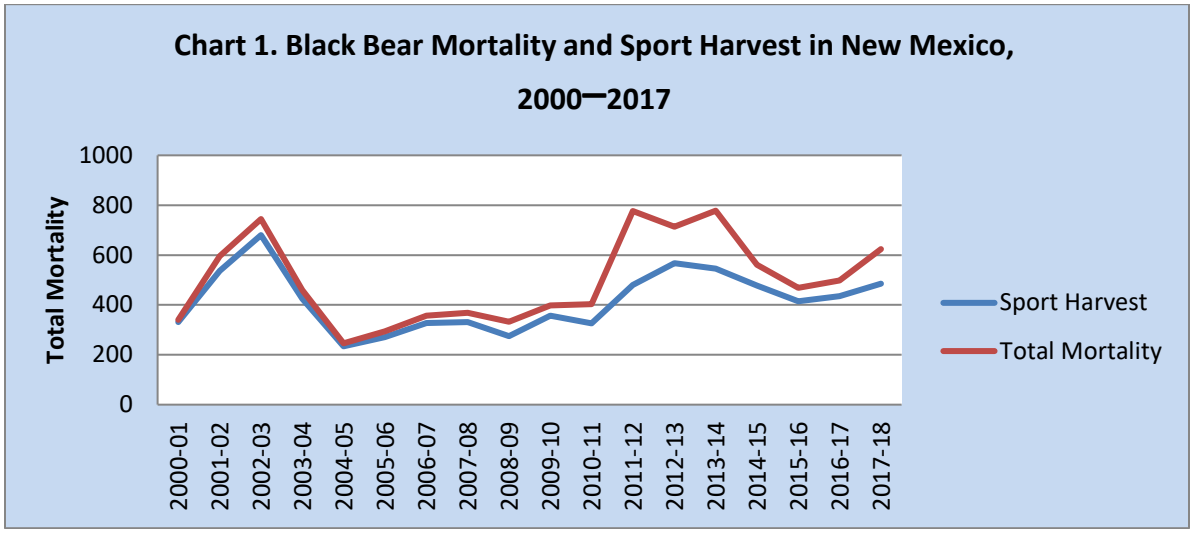
- Bear quotas are set by Bear Management Zone to be 10% of a zone's estimated population. Each zone has a harvest sub-limit for females not to exceed 40% of the total harvest quota for that zone.
- Some portions of the state, BMZs, are managed slightly differently than the rest based on scientific rationale, professional judgement, examples from the literature and social issues. Management differences include different season dates and lengths, generally due to public perception of high mortality due to either depredation or high hunting pressure.
- Harvest compositions, age at harvest, mast surveys, etc. are all utilized to determine appropriate harvest levels.

Legislation, ballot initiatives, pending stakeholder issues:

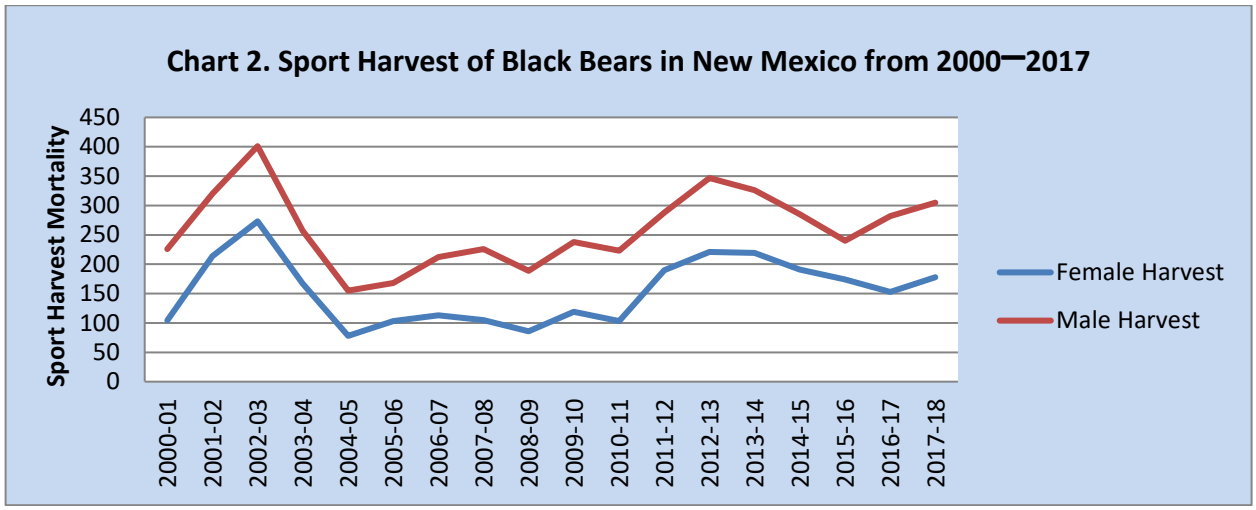
- The only legislation we currently have regarding bears is an un-utilized law requiring bear resistant trash containers in areas identified by the State Game Commission. The law is weak and does not confer authority for enforcement on any particular agency which means it would fall on NMDGF. It has not been applied.
- Wildlife feeding laws specific to bears are needed.

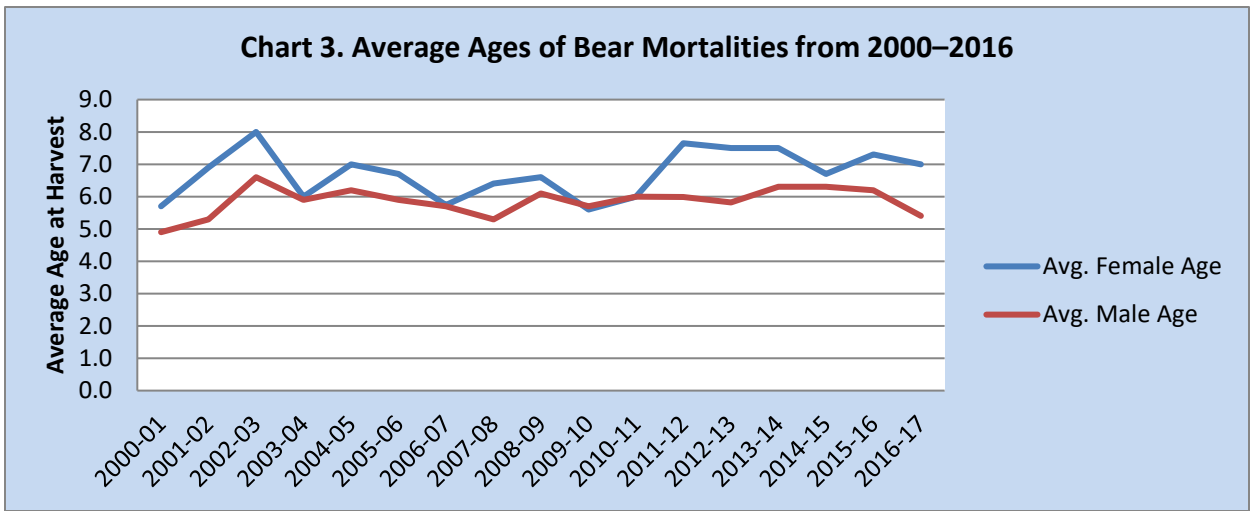
1. Historical & current bear harvest (with tables & graphs covering 10–15 years):

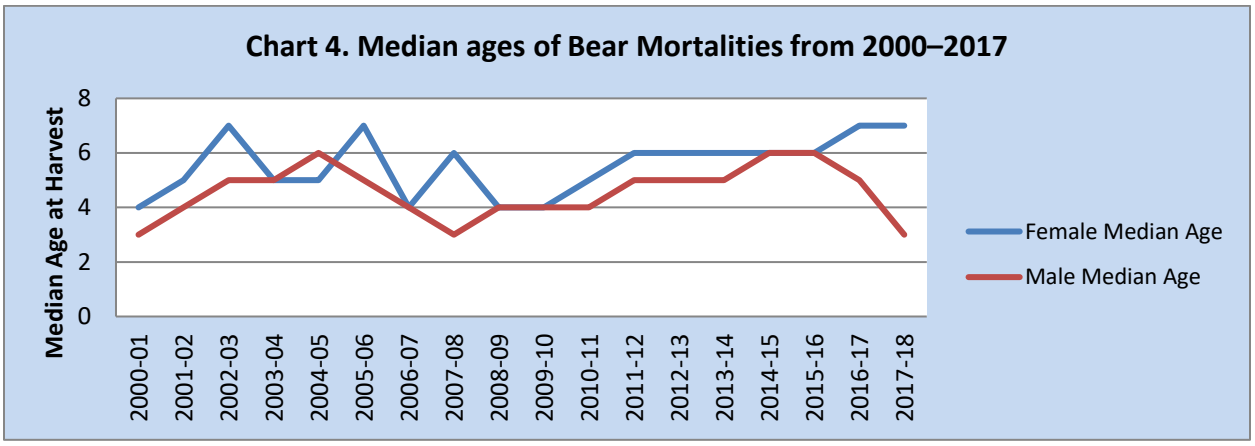
Historical bear harvest:



Categorize by sex and age (class) if available:







Hunting methods available and restrictions to methods/seasons:

- See Appendix 1 and Figure 3.
- Some Bear Management Zones have shorter seasons (no August season for instance) to limit harvest or shorter seasons generally for human demographic reasons.

Number of hunters actively hunting annually (by seasons type) if available:

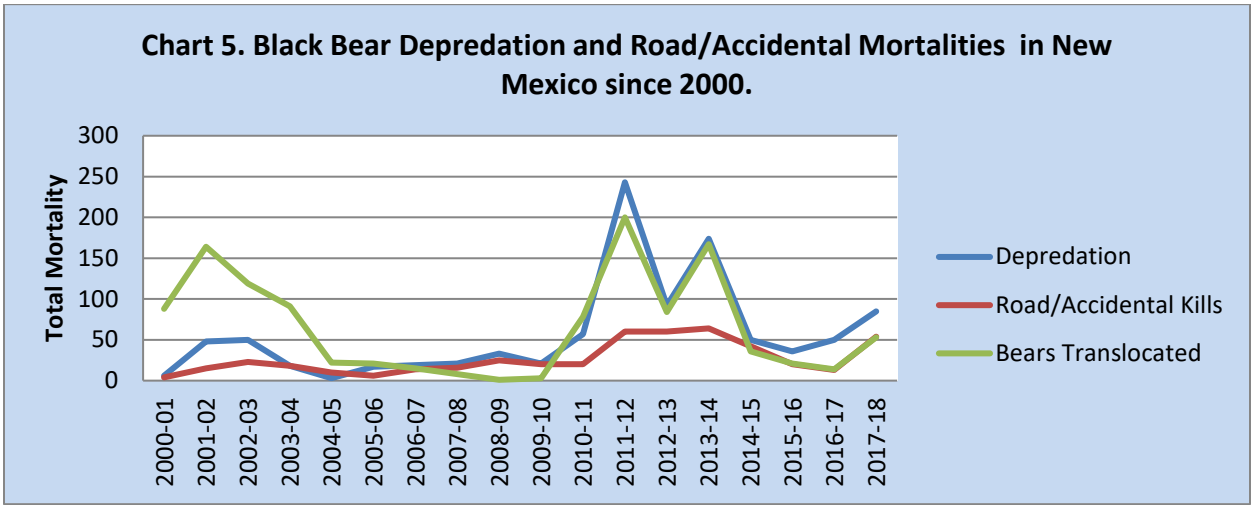
- 3,244 resident licenses sold on average over the last five license years.
- 1,075 non-resident licenses sold on average over the last five license years.
- Hunter success rate has averaged 11.0% over the last five license years.
- Average days hunted/bear harvested has been 2.91 days over the last five years.
- There is no data on time hunted by unsuccessful hunters.
- Lack of effort measure by unsuccessful hunters does not allow accurate measurements of effort.
- License sales trend is increasing over time.

2. Black bear conflicts and damage (with tables & graphs covering recent 10–15 years):

Black bear created injuries since 2000 (Appendix 3).

Policy and protocols for handling human conflicts (non-agricultural).

1. Bears or cougars that exhibit aggressive, dominant, or unacceptable behavior shall be killed. Animals may be killed on-site provided staff actions do not threaten public safety.
2. Female bears and cougars, particularly females with dependent offspring, should generally be treated with more leniency than males.
3. Yearlings, sub-adults, and adults without ear tag evidence of prior offending record should be aversely conditioned via on-site hazing (e.g., rubber slugs or buck shot, pepper spray, paint balls, etc.) if they do not exhibit the aggressive, dominant, or unacceptable behaviors outlined above. These techniques should be used in combination with the elimination/securing of attractants. Consider the following if not feasible for social or technical reasons:
   a. Bears: If captured, release yearlings and cubs after June within the zone captured;
   b. Bears and cougars trapped and relocated in the same zone should be hazed aggressively; Translocation into a different zone may be considered when releasing into the same zone is impractical or could lead to additional conflict.



Number and type of losses annually for depredation/agricultural/property. – Chart 5. New Mexico does not differentiate the typed of conflict activity into depredation/agricultural/property and monetary losses are not tracked.
Number of bears killed, captured and translocated. – Chart 5.
Financial costs if available, reimbursement program (if applied). – Not available

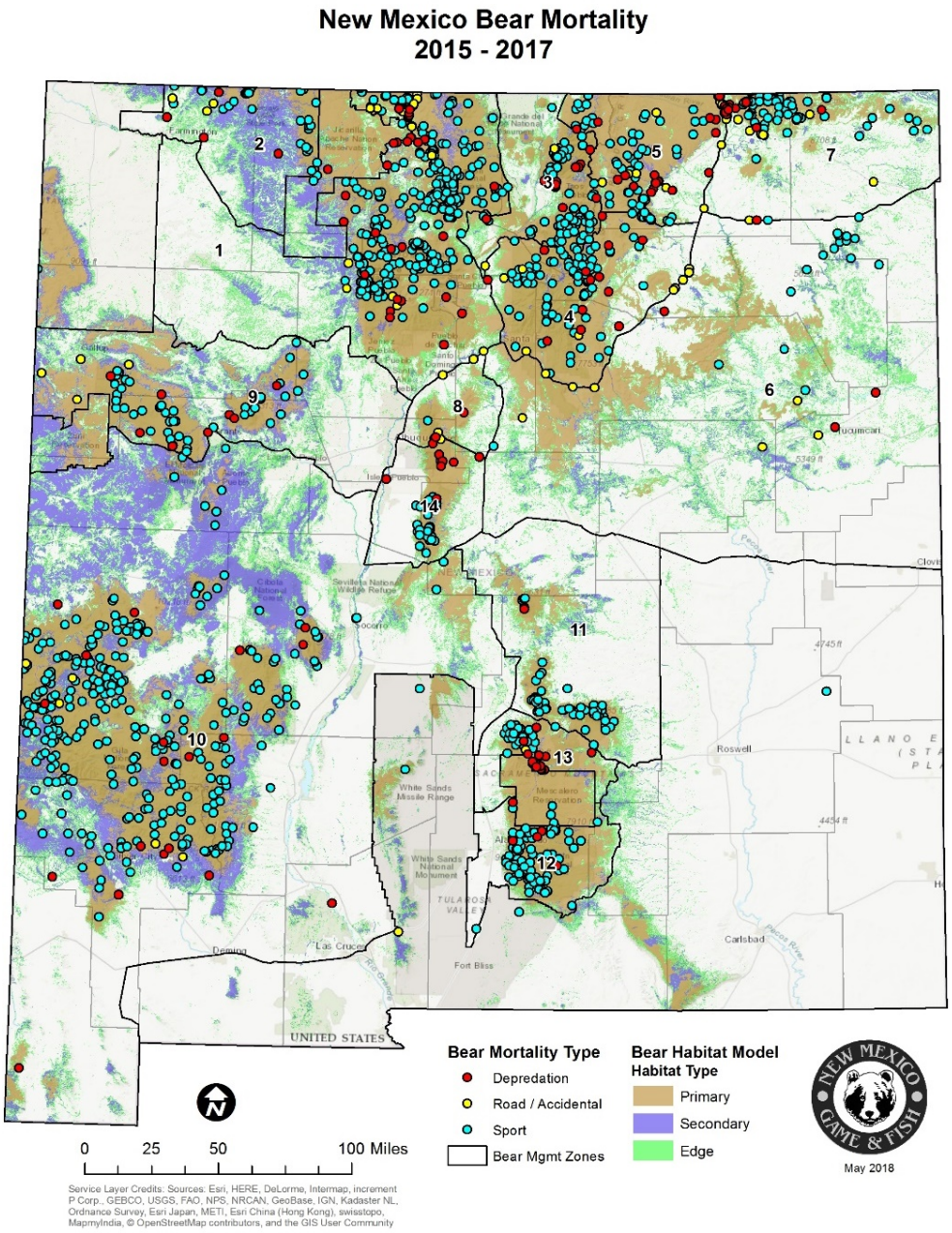
Control efforts, e.g., broad-scale, focused, offending animal.

- Generally based on offending animal and/or community focused.
- Broad-scale efforts consist of spreading brochures and holding informational meetings at the request of communities.

Methods & results of monitoring effectiveness of management actions.

- Track ear tag returns from translocated bears – 75% effectiveness for cubs and yearlings.
- Only 25% effectiveness for sub-adults and older animals.
- Mapping mortality locations with estimated habitat – 95% overlap between predicted habitat and bear mortality locations. Bear conflict locations overlap human dominated areas and/or occur in secondary and edge habitats more than in primary habitat. Figure 2.

Figure 2.



Methods and format for recording and summarizing conflicts of all kinds.

All Area Offices will maintain a database or spreadsheet recording all bear and cougar calls and complaints, including those not requiring a WC. This will continue until a centralized database is created for general use (in progress). All bears and cougars that are killed or translocated must be reported to **WMD within 24 hours** through the harvest hotline. The Santa Fe office and wildlife complaint system (WC system) is the repository for conflict, depredation, and moved/killed data, and where humans are at risk, we must have timely and accurate information to make decisions and provide this information to media and affected communities.

Information and education programs.

- Brochures, trailhead posters, etc. are useful.
- Utility has not been measured.
- Public meetings in 'focus' areas are useful and appreciated.
- Honesty will carry a long ways, as will appeals for community involvement.

3. **Current research programs** – summary with approaches, goals and objectives for each.
    - SECR and bear hair snagging for genetic material are planned in all areas of the state where the population is harvested and there is no recent data (Southern San Juans, Gila, Manzanos, Zuni/Mt. Taylor). SECR based estimates of population and abundance have recently been completed in the Sangre de Cristos, Sandias and Sacramento Mountains.

4. **Human dimensions surveys** – summary. – Not utilized at this time.

Appendix 1. Bear Regulations for 2018–19 License Year for New Mexico

Bear Draw Permits and Over-the-Counter (OTC) Licenses
While in The Field You Must Have All of the Following (page 20).
All Bear Harvests Must Be Tagged (pages 20–21).
License Fees (pages 7, 9): Before purchasing an Over-the-Counter Bear License, hunters must purchase or possess a Game-hunting License or Game-hunting & Fishing License. A Habitat Stamp is required for hunting on Forest Service and BLM lands. A Habitat Management & Access Validation is required (page 10).
Harvest Limits for All Zones (map, page 118): New Mexico is divided into 14 Bear Management Zones, enabling NMDGF to better manage regional bear populations. Each zone has two harvest limits: 1, the total number of bears that may be harvested; and 2, the number of female bears that may be harvested. Harvest limits for each Bear Management Zone are listed in the table on pages 116–117. This table first lists the total limit of bears that may be harvested, followed by the number of female bears that may be harvested ('Total Limit / Female Limit'). Bear Management Zones close when harvests reach 90% of the total limit, 90% of the female sublimit, or when the season has ended—whichever occurs first. This is to maintain bear populations and distribution and to avoid exceeding sustainable harvest mortality.
Zone Closure for All Zones: Before hunting, hunters must verify the zone is open by checking online www.wildlife.state.nm.us/hunting/information-by-animal/big-game/bear/ or telephoning 1-877-950-5466.
Bear Draw Permits
Bear Draw Permits are available for the areas listed in the table on pages 116–117. Only New Mexico residents may apply for WMA Bear Draw Permits. Application must be made by Feb. 7, 2018. Only one hunter may apply on each application. Hunters who successfully draw a Bear Permit also must purchase an Over-the-Counter Bear License with tag and a Game-hunting License or Game-hunting & Fishing License. If planning to hunt within 14 days of online or

telephone purchase, hunters may be required to obtain tags at a license vendor or NMDGF office. Hunters may hunt during the over-the-counter season if they have not taken a bear during their draw hunt. **Bear Licenses must be purchased at least two calendar days before hunting.**

Over-the-Counter Licenses (OTC)

An OTC Bear License may be purchased at license vendors, NMDGF offices, online: www.wildlife.state.nm.us or by telephone: 1-888-248-6866. **Bear Licenses must be purchased at least two calendar days before hunting.**

What You Must Know Before You Hunt

Closed Areas: Rio Grande Wild and Scenic River Area, including Taos Valley Overlook; All Wildlife Management Areas (WMAs are open only to hunters with a valid Bear Draw Permit and Bear Hunting License during draw seasons for that area.); and Subunit 6B (Valles Caldera National Preserve). **Bow Only:** Sandia Ranger District: Zones 8 and 14, and Sugarite Canyon State Park. Licenses, applications, harvest reporting and general information: www.wildlife.state.nm.us

What You Must Know Before You Hunt—continued.

Youth Hunters: Hunters 17 years of age or younger must possess a Hunter Education Certification number. **Blaze-Orange Clothing:** Hunters must wear at least 244 square inches of blaze orange while hunting on military property. **Restricted Areas:** It is unlawful to hunt bears in the Valle Vidal and Greenwood Area (except as noted on page 116). Grapevine Canyon and McGregor Range Buffer area in Unit 34 of Zone 12 are accessible by permit and military permission only. Unit 10 of Zone 9 and Units 13, 18 and 20 of Zone 10 are subject to closure by the Forest Service and/or the military during missile firings. **Zones 8 and portions of 14:** Hunters must use bows only (crossbow may be used by certified mobility-impaired hunters) to hunt bears in the Sandia Ranger District of the Cibola National Forest. **No Electronic Calls:** Electronic calls are not allowed for bear hunting.

Legal Sporting Arms

Centerfire rifle or handgun; shotgun no smaller than 28 gauge, firing a single slug; muzzleloading rifle; bow and arrow or crossbow and bolt. In the Sandia Ranger District of the Cibola National Forest, only bow and crossbow may be used. **Crossbows may not be used during the Sept. 1–24 Bow Only Season,** except by certified mobility-impaired hunters (page 12).

Baiting and Trapping

Baiting and trapping are **not legal methods** for taking bear. If accidentally trapped, the bear must be released. Should assistance be needed to release a bear, contact NMDGF.

Bag Limit

The bag limit is one bear. A hunter may not take any cub younger than one-year old or any female accompanied by a cub(s). New Mexico law does not require bear meat to be taken from the field.

Pelt Tags Required

Harvested bears must be both carcass tagged and pelt tagged. The carcass tag must be properly notched and attached immediately after the animal is harvested. The hunter must present the carcass tag, skull, and hide for pelt tagging to any District Conservation Officer or any NMDGF office **within five days** of killing the bear or before transporting the hide outside New Mexico, whichever occurs first. **Hunters who appoint a designee to transport the harvested bear for pelt tagging are required to contact a conservation officer prior to pelt tagging.** Hunters are required to present to any NMDGF office the **unfrozen skull of any bear killed with the mouth fixed open** for removal of a premolar tooth. The pelt tag must remain attached to the hide until the hide is processed. Improperly tagged hides may be seized by NMDGF.

Proof of Sex

The testicles, penis and/or baculum of a male, or the vulva of a female, must remain naturally attached to the hide and be visible to the NMDGF tagging official. NMDGF will only pelt tag a harvested bear if proof of sex is attached to the hide and readily visible to the tagging official. Bears presented to NMDGF for tagging without proof of sex attached will be seized.

Licenses, applications, harvest reporting and general information: 1-888-248-6866

Use of Dogs

Dog use is not allowed during any bow season. Dog use is **not allowed** on Wildlife Management Areas (WMAs) or to pursue bears during bow seasons. Dog use is **allowed** to hunt bears elsewhere during hunts for any legal sporting arm (see table below). When dogs are used to hunt bears, the licensed hunter that harvests the bear must be present continuously from the time any dog is released. Dogs may only be released during legal hunting hours. There is no "pursuit" or "training" season outside the regular open season.

Valle Vidal and Greenwood Area

It is unlawful to hunt bears on the Valle Vidal and Greenwood Area, except for hunters who successfully draw a Bear Draw Permit and purchase a Game-hunting License or Game-hunting & Fishing License and an Over-the-Counter Bear License. Dogs are allowed during the April 15–May 20 and the Aug. 1–31 hunts.

In addition to the above, elk hunters also may hunt bears in the Valle Vidal and Greenwood Area provided they: 1, Possess a Valle Vidal rifle, muzzleloader or bow elk license; 2, Possess an OTC bear license and tag; 3, Use the sporting arm type specified for their elk hunt; 4, Hunt only during the dates of their elk hunt; and 5, The harvest limit in Bear Zone 5 has not been met and the season is still open.

Livestock Damage

Landowners, lessees or their regular employees do not need a license to kill a bear that has killed domestic livestock or presents an immediate threat to human life or property. Any person taking such action **must report the incident to NMDGF within 24 hours**. Pelts, claws and other parts of depredating animals taken under this provision are the property of the State of New Mexico and must be delivered to NMDGF.

Seasons for Bear Draw Permits—OTC Bear License Required

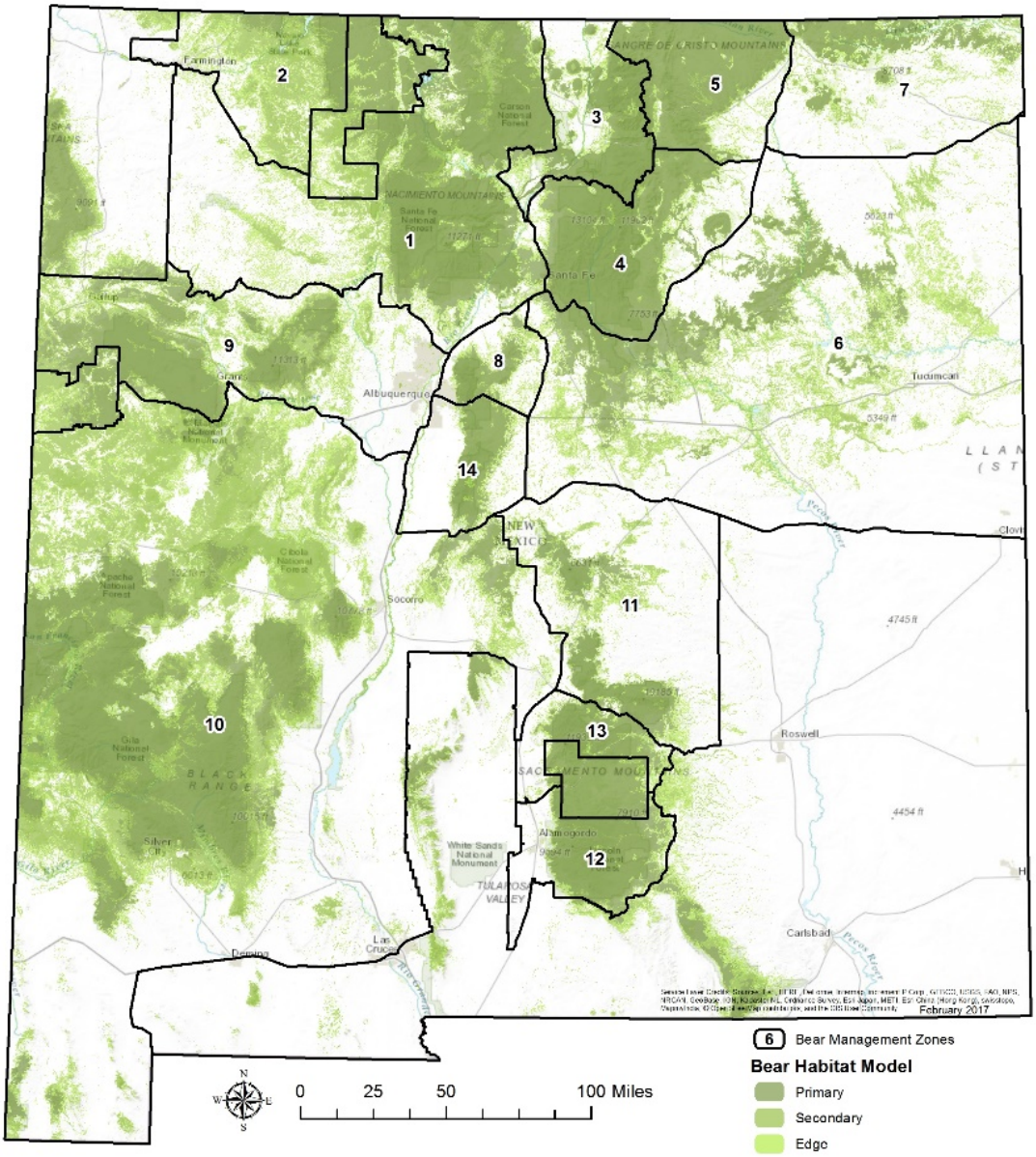
Area Date Hunt Code Permits
Unit 55 Valle Vidal and Greenwood . . . Apr. 15–May 20 . . BER–1–106 . . . 20
Unit 2 - Youth Only . . . . . Aug. 1–31 . . . . BER–1–100 . . . 5
Unit 4 Sargent WMA(1) . . . . . Aug. 1–31 . . . . BER–1–101 . . . 10
- N.M. Residents Only
Unit 4 Humphries WMA (1) . . . . . Aug. 1–31 . . . . BER–1–102 . . . 5
- N.M. Residents Only
Unit 9 Marquez WMA . . . . . Aug. 1–31 . . . . BER–1–103 . . . 5
- N.M. Residents Only
Licenses, applications, harvest reporting and general information: 1-888-248-6866
Licenses, applications, harvest reporting and general information: www.wildlife.state.nm.us

Seasons for Bear Draw Permits—continued.

Area . . . . . Date . . . . . Hunt Code . . . Permits
Units 54/55 Barker and Colin Neblett WMAs Aug. 1–31 . . . . BER–1–104 . . . 12
- N.M. Residents Only
Unit 55 Valle Vidal and Greenwood . . . Aug. 1–31 . . . . BER–1–105 . . 20
Unit 57 Sugarite Canyon State Park (1) . . Aug. 1–31 . . . . BER–2–107 . . 5

(1) Bear hunting in Sargent and Humphries WMAs and Sugarite Canyon State Park is open Aug. 1–31 only through Special Draw Hunts. These WMAs are closed Sept. 1–Nov. 15 during regular bear hunts in Bear Management Zones One and Seven.

Figure 3. Bear Management Zones and Predicted Bear Habitat in New Mexico Statewide.



Appendix 2. Bear Population and Harvest Management Matrix (2016–17 through 2019–20)

Zone	Game Management Units	Estimated Primary black bear habitat[1] (km²)	Bear population point estimate [2]	Population Density (bears/100 km²)	% Harvest	Harvest Limit[3] (Female Harvest Limit)
						2016/17 – 2019/20
1	4, 5, 6, 7, 51, 52	9,296	1,580	17	10%	158 (63)
2	2	880	150	17	10%	15 (6)
3	49, 50, 53	2,109	544	17 + 21.5	12%	65 (26)
4	45, 46, 48	5,778	1,093	18.6 + 23.4	10%	109 (43)
5	54, 55	4,723	919	21.5	10%	92 (37)
6	39, 40, 41, 42, 43, 47, 59	4,689	328	7	10%	33 (13)
7	56, 57, 58	1,645	354	21.5	10%	35 (14)
8	8	719	132	18.4	8%	11 (4)
9	9, 10	2,963	356	13.2	10%	36 (14)
10	12, 13, 15, 16, 17, 18, 20, 21, 22, 23, 24, 26, 27	15,488	1,456	9.4	10%	146 (58)
11	37, 38	1,811	360	19.9	10%	36 (14)
12	34	2,428	325	13.4	10%	33 (13)
13	36	1,184	159	13.4	10%	16 (6)
14	14	1,267	233	18.4	8%	19 (7)
Totals		**54,793**	**7,989**			**804 (318)**

1 Population estimates are based solely on primary habitat and do not include Secondary or Edge habitats.

2 The bear population estimate was derived from the NM Bear Study (Costello et al. 2001) and Gould et al. (2016) and does not include populations on most tribal jurisdictions.

3 All BMZs will close when a number 10% below the harvest limit or female harvest limit is reached, whichever comes first. Only sport harvest is included in the harvest limit.

Appendix 3. Black bear created injuries since 2000.

Summary:

Date	Location	Injury	Cause	Results
Summer, 2000	Philmont Scout Ranch, NM	Severe stitches, 5 kids involved, 2 incidents	Trash in camp, food smells	Bear killed
July 13, 2000	Philmont Scout Ranch, NM	Arm bitten and face scratched	Trash in camp, food smells	Bear killed
Summer, 2001	Philmont Scout Ranch, NM	Severe stitches, 2 kids hurt	Trash in camp, food smells	Bear killed
June 2001	6 miles NE of Questa, NM	Bitten, stitches	Messy camp and food smells	N/A
Aug. 18, 2001	Cleveland, NM	Victim killed and consumed	N/A	Bear killed, autopsied
Summer, 2007	Philmont Scout Ranch, NM	Bitten through tent and sleeping bag	Food smells in tent	2 bears killed
July 10, 2007	Sugarite State Park, NM	Hand bitten through tent	Bear startled?	Bear killed
July 11, 2007	Grapevine Canyon Campground, NM	Buttocks bitten through tent	Bear startled	N/A
Aug. 13, 2007	Shuree Ponds, Valle Vidal, NM	Tent bitten repeatedly over two nights	Food smells?	Bear killed
July 21, 2008	Ring Cabin Valle Vidal	Bear swatted two kids while they were sleeping and entered cabin	Habituated to Philmont Campers	Bear trapped and relocated
July 31,2008	Philmont, Ponil Campground	Bear bit kid in tent (minor puncture wounds to lower leg), bear collapsed 3 other tents nearby	Bears habituated to humans despite good camping practices	2 bears killed, 2nd bear killed was IDd as one which bit kid by canine impressions
June 25, 2010	Cienega Picnic Area, Sandia Mts., NM	Bear attempted to enter trailer/RV	Food smells	Bear killed 2 days later
June 28, 2010	Dry Camp, Sandia Mts., NM	Bear attacked illegal camper in tent, stitches and other injuries	Food in Tent	Bear killed 1 day later
June 30, 2010	Philmont Scout Ranch, NM Carson Meadows Campground	Tent pushed and adult camper scratched through tent, minor injury.	N/A	Bear may have been killed after additional incident
July 7, 2010	Philmont Scout Ranch, NM Zastrow campground near	Tent pushed and young camper scratched and bitten through tent, stitches and significant scalp wound	Predatory attack	Bear was killed on site while collapsing the rest of the camp's tents.

	Rayado			
July 20, 2010	Sufi Institute, Manzano Mts., NM	Tent pushed and adult camper scratched, minor injury	Gum in tent	Bear chased
June 12, 2012	Bandelier National Monument, NM	Tent pushed and young camper scratched.	N/A	N/A
June 5, 2013	Cimarron, NM	Bear entered home and scratched woman in bed.	Food smells?	Bear killed
June ?, 2013	Sugarite State Park, NM	Tent damaged as bear tried to enter	Food smells?	N/A
August 10, 2013	Sandia Heights N. Albuquerque, NM	Bear broke a window entering a home and chewed up a resident's hand.	Food smells?	N/A
May 26, 2015	VCNP, Jemez Mts., NM	Grad Student Susan Bard trapping bears was bite on forearm by sedated bear	Bear sedated, awake momentarily while bear was being moved	Bear was tracked with radio collar. Was not able to locate bear and collar malfunctioned
June 1, 2015	Poncho Canyon, LNF, Capitan Mts.	Shed hunter was attacked by a bear in dense brush. Suffered scratches on chest and deep bite on thigh.	Shed hunter surprised bear, bear attacked and escaped	Scene investigated, bear was never located
June 4, 2015	Tucson Mt, LNF	Shed hunter was charged by bear, man shot and killed bear	Female bear, unlikely bear had cubs	Scene investigation by C. Coburn, head was tested for rabies
July 6, 2015	Raton, NM	Camper bitten through tent in yard	Trash in yard attracted bear	Small bear never located
Sept. 9, 2015	Los Alamos, NM	Jogger attacked by female bear	Female probably defending cub (s)	Not located with hounds
Sept. 10, 2015	Ocate, NM	Hunter bit by bear on foot while trying to escape up a tree	Female probably defending cub	Not located with hounds or trapped
Oct. 15, 2015	Tajique, NM	A USFS timber marking crew member was chased up a juniper tree by an aggressive bear	Unsure	Bear was chased off by other crew members but remained aggressive

June 18, 2016	Valles Caldera National Preserve, NM	A runner in a marathon on the Valles Caldera surprised a mother bear with cubs and was attacked by the bear	Female defending cubs	Bear was radio collared as part of a study and was located and euthanized.
May 27, 2018	Gold Gulch, Burro Mts., Grant Co., NM	A bear entered the tent of a camper and clawed him slightly.	Food and other attractants in tent.	Trap set but no animal captured.
July 20, 2018	Cloudcroft, NM	A bear bit and scratched a resident, injuries were minor.	Resident had been feeding at least 4–12 bears.	7 (4 males, 3 females) were killed by NMDGF in the yard. Additional bears are still visiting.
July 25, 2018	SE of Raton, NM	A houndsman running his dogs was attacked by a bear the dogs were chasing, his leg was *severely* bitten.	Dogs led the bear back to the houndsman.	The houndsman was able to shoot the bear in the head, leaving it attached to his leg.

The following jurisdictions did not present at the workshop but provided written reports for inclusion in the Proceedings.

CALIFORNIA BLACK BEAR STATUS REPORT

Jesse Garcia, Senior Environmental Scientist, California Department of Fish and Wildlife, Wildlife Branch, Game Species Conservation Programs, 1812 9th Street, Sacramento, CA 95811, USA

1. Estimates/Goals/Trends (last 10–15 years):

History/Background

Black bears in California were classified as furbearers in 1917. There were no restrictions on how, when or how many bears could be killed until 1948.

In 1948 bears were classified as game animals, seasons were established, a license was required to hunt and trap bears, and only two bears per year could be taken by an individual.

In 1957, hunters were required to purchase bear tags and those who were successful returned the report card portion of the tag that provided information on locality and date of kill as well as the sex and age (adult or cub) of the bear that was taken. As the information from tags accumulated, the Department began to form a better idea of the state's bear resources as well as areas that were important to bears and bear hunters.

Regulation changes that resulted from our increased knowledge included reducing the bag limit from two bears to one in 1968, prohibiting the killing of cubs or females with cubs in 1972, and prohibiting the practice of training dogs to pursue bears other than during the regular bear season. That information also enabled the Department to identify areas in the state where the use and training of trailing hounds should be restricted.

Mandatory tag validation and tooth collection implemented in 1982.

An in-season closure mechanism cap of 1,250 adult bears became effective in 1990. This limit was increased to 1,500 in 1994. The cap of 1,500 bears caused the season to end before the last Sunday in December in five of the last six years following its implementation. In 2002, the cap was raised to 1,700 bears. Since 2002, the hunting season is closed when there are 1,700 bears reported taken or by the last Sunday in December, whichever occurs first.

Beginning with the 2013 bear season, the use of dogs to hunt bear was prohibited.

Presence/absence of a formal management plan.

Statements of bear management policy, goal and objectives. Current Approved California 1998 Black Bear Management Plan. Revised, updated management plan currently under review.

Section 1801 of the Fish and Game Code establishes state policy regarding wildlife resources. The ultimate goal of this policy is to maintain sufficient wildlife populations (including black bear) to accomplish the following goals:

a) to provide for the beneficial use and enjoyment of wildlife by all citizens of the state;
b) to perpetuate all species for their intrinsic and ecological values;
c) to provide for aesthetic, educational, and non-appropriative uses;
d) to maintain diversified recreational uses of wildlife including sport hunting;
e) to provide for economic contributions to the citizens of the state through the recognition that wildlife is a renewable resource, and;
f) to alleviate economic losses or public health and safety problems caused by wildlife.

The primary goal of the Department's black bear management program is to maintain a viable and healthy black bear population. Within this goal, the BBMP provides the guidance for balancing the needs of this species with the diverse economic and recreational needs of the people of California.

Bear management structure and strategies, including dates, methods, use of special quotas, closed areas, bans. Use of mandatory checks or sampling numbers, sex, age data, hunter effort.

Bear Hunt Areas – (1) Northern California, (2) Central California, (3) Southern Sierra, (4) Southern California, and (5) Southeastern Sierra.

Bear Archery Season – The archery bear season shall open on the third Saturday in August and extend for 23 consecutive days.

Bear General Season –The bear season shall open on the opening day of the general deer season in deer zones A, B, C, D, and X8–X12 and extend until the last Sunday in December in the five bear hunt areas described above. In those areas designated as deer hunting zones X-1 through X-7b, the bear season shall open on the second Saturday in October and extend for 79 consecutive days.

Methods Authorized for Taking Big Game – Big game may only be taken by rifles using centerfire cartridges with softnose or expanding projectiles; bow and arrow; wheellock, matchlock, flintlock or percussion type, including "in-line" muzzleloading rifles using black powder or equivalent black powder substitute, including pellets, with a single projectile loaded from the muzzle and at least .40 caliber in designation; pistols and revolvers using centerfire cartridges with softnose or expanding projectiles.

In season harvest cap/special quota – The bear season shall be closed when the Department determines that 1,700 bears have been taken.

Closed Areas – No open season for bear in the balance of the state not included in bear hunt areas and deer hunt zones described above.

Bans – California Fish and Game Code Section 3960 makes it unlawful to permit or allow any dog to pursue any bear or bobcat at any time.

State-wide black bear numbers and population trend.

The state-wide population estimate is approximately 35,000 with an increasing trend. Population estimates are derived by a method which projects the percent of the population harvested from the sex and age composition of harvested bears (Frasier 1982, 1984).

Fraser,D,, J.F. Gardner, G.B. Kolenosky, and S. Strathearn. 1982. Estimation of harvest rate of black bears from age and sex data. Wildlife Society Bulletin 10:53–57.

Fraser, D. 1984. A simple relationship between removal rate and age-sex composition of removals for certain animal populations. Journal of Applied Ecology 21:97–101.

How bear harvest objectives and numbers are derived, e.g., harvest success, harvest composition, mortality density, mast surveys, etc.

The season harvest cap of 1,700 bears is based upon an administrative limit set by the California Fish and Game Commission. The 1,700 bear harvest cap is not technically a quota. The Department is not specifically targeting a specific number of bears to be killed each hunting season. This harvest cap exists because the Fish and Game Commission has determined that the bear population and the

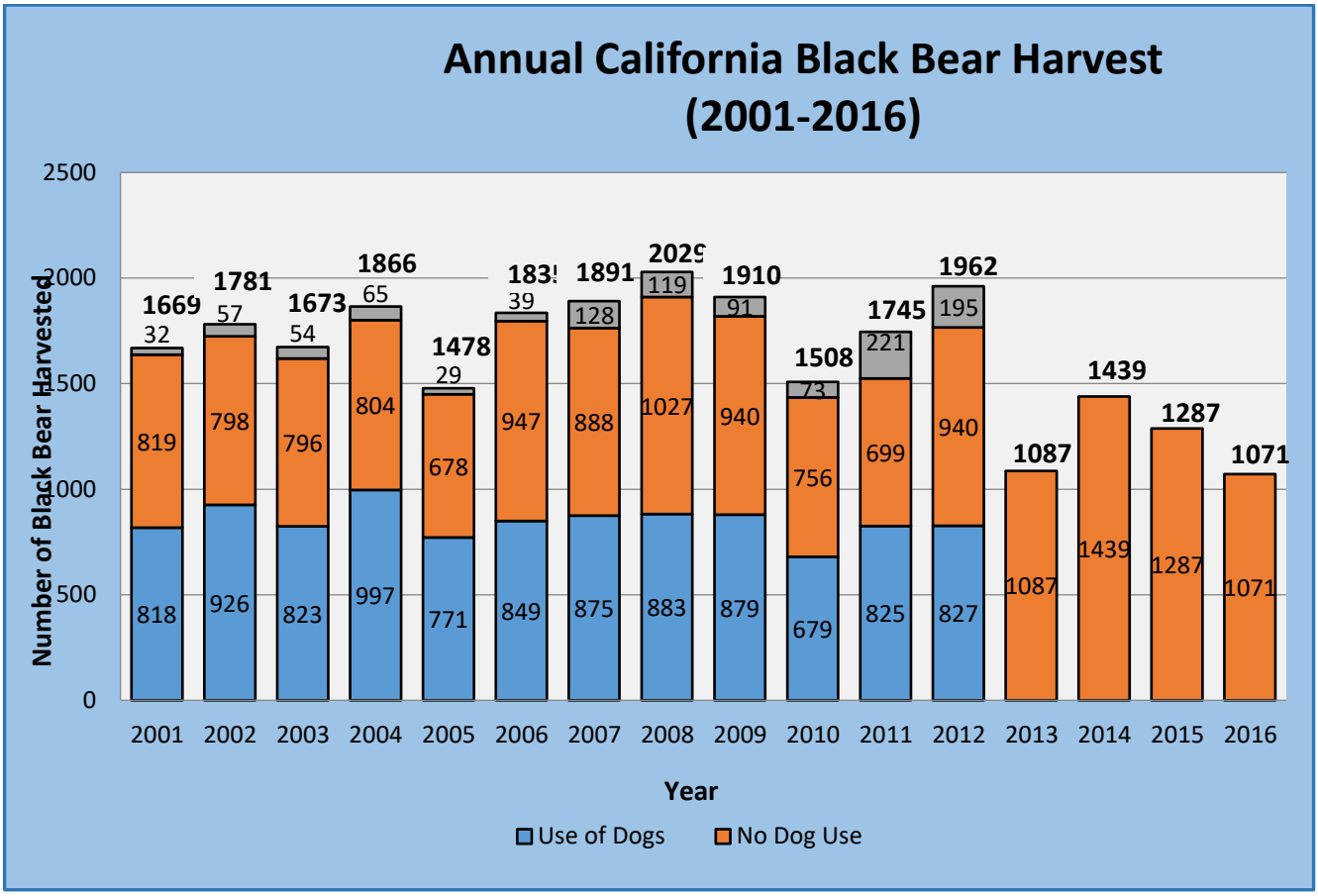
environment will not be negatively affected at this level of take.

Legislation, ballot initiatives, pending stakeholder issues.

Legislation was passed in 2012 which prohibits the pursuit and take of black bears and bobcats at any time with the use of hounds effective January 1, 2013. Since the new law took effect, the harvest cap has not been reached in any of the subsequent seasons.

2. Historical & current bear harvest (with tables & graphs covering 10–15 years):

Historical bear harvest. 2017 harvest was 1,413.



Categorize by sex and age (class) if available.

Hunting methods available and restrictions to methods/seasons.

Methods Authorized for Taking Big Game – Big game may only be taken by rifles using centerfire cartridges with softnose or expanding projectiles; bow and arrow; wheellock, matchlock, flintlock or percussion type, including "in-line" muzzleloading rifles using black powder or equivalent black powder substitute, including pellets, with a single projectile loaded from the muzzle and at least .40 caliber in designation; pistols and revolvers using centerfire cartridges with softnose or expanding projectiles.

Number of black bear hunting licenses sold annually. California sells hunting licenses to authorize hunting various game species. Species-specific big game tags are also required including bear tags.

California sold:

Tags	2010	2011	2012	2013	2014	2015	2016	2017
Resident Bear Tags	24,576	24,954	24,625	23,328	26,481	27,483	27,172	27,752
Non-Resident Bear Tags	268	237	247	69	95	98	81	94
Sub Total – Bear	24,844	25,191	24,872	23,397	26,576	27,581	27,253	27,846

Number of hunters actively hunting annually (by seasons type) if available.

Hunter effort, e.g., days hunting, days to kill.
Hunter success annually if available.
In 2015, of the successful bear hunters who reported effort, approximately 83.7 percent (1,009) indicated they spent 7 days or less in pursuit of bear. Overall hunter success was 4.7 percent. In 2016, of the successful bear hunters who reported effort, approximately 79.3 percent (825) indicated they spent seven days or less in pursuit of bear. Overall hunter success was 3.9 percent. Preliminary information for 2017 indicates a hunter success of 5.0 percent.

Black bear conflicts and damage (with tables & graphs covering recent 10–15 years): The Human-Wildlife Conflict Program Coordinator position is currently vacant, thus information is unavailable to address this question except for part of the first category **Policy and protocols for handling bear conflicts (depredation/ag/property) –** Number of bears killed, captured and translocated and the last category **Information and education programs.** Information from our website was used to inform these two categories.

Policy and protocols for handling bear conflicts (depredation/ag/property).

Number and type of losses annually for depredation/agricultural/property.
Number of bears killed, captured and translocated. – Please see Black Bear Depredation Summary Statistics (2006–2014) (PDF) at http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=112007&inline.

Financial costs if available, reimbursement program (if applied).
Control efforts, e.g., broad-scale, focused, offending animal.
Methods & results of monitoring effectiveness of management actions.
Policy and protocols for handling human conflicts (non-agricultural).
Number and type of incidences, e.g. bear attacks, dangerous behavior, translocations.
Methods and format for recording and summarizing conflicts of all kinds.
Information and education programs. –

Keep Me Wild: Black Bear (https://www.wildlife.ca.gov/Keep-Me-Wild/Bear)

Bear Aware Guide for Homeowners (PDF)
(https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=57522&inline)

Bear Aware Guide for Campers (PDF)
(https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=57519&inline)

Public Service Announcement (MP3)
(https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=62666&inline)

Additional outreach media
(https://www.wildlife.ca.gov/Keep-Me-Wild/Outreach)
New Bear Brochures
Bear Poster
Bear Brochure: English | Spanish | Vietnamese | Khmer
Newspaper Advertisement
(https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=62669&inline)

3. **Current research programs**– summary with approaches, goals and objectives for each.
Current research efforts with established objectives are as follows:

Job 1: Inventory the San Gabriel Mountains Black Bear Population:

1. Use DNA samples from snared hair collections and opportunistic tissue samples from depredation, road kills and hunter-harvested bears to estimate population demographics, abundance, and density of bears via DNA-based Spatially Explicit Capture Recapture (SECR) models. Project staff plan to collect a minimum total of 200 DNA samples.
2. Deploy innovative methodologies recently developed by the Department (Fusaro et al, in prep) for bear hair samples from one hair snare within each 20-square kilometer hexagon within a grid of approximately 84 20-square kilometer hexagons within the Angeles National Forest that are highly utilized by the public.
3. Utilize the results of DNA population analyses to validate and/or refine three, at minimum, habitat suitability models developed for similar habitats throughout California.
4. Provide technical expertise for black bear conservation planning efforts.

Job 2: Inventory the San Bernardino Mountains Black Bear Population:

1. The objective of this job is to estimate the abundance and sex ratios of black bears in the San Bernardino Mountains using non-invasive, DNA Capture Mark-Recapture (CMR) techniques by June 30, 2018. Project staff plan to collect a minimum total of 200 DNA samples (hair follicles) for analysis.

Job 3: Inventory the Warner Mountains Black bear Population:

1. Capture up to 12 adult bears and fit them with iridium GPS collars to assess the effectiveness of hair snares for long-term bear population monitoring and to learn about bear ecology in the Warner Mountains.
2. Establish three to four grids of hair snare stations and camera traps throughout the study area to obtain bear genetic samples to estimate population density and abundance and potentially location of origin.
3. Collect demographic information via 25 camera traps to estimate age class, distribution and recruitment.
4. Conduct a habitat analysis of 12 home ranges identified through the use of GPS collar locations.
5. Provide technical expertise for black bear conservation planning efforts.

Job 4: Inventory the Southern and Central Sierra Nevada Black Bear Population:

1. Deploy remote cameras/hair snare stations to develop SECR and occupancy models for black bears in Mono County.
2. Capture and deploy GPS collars on up to 30 black bears in Mono County.
3. Assess movement patterns and habitat use of black bears in Mono County.
4. Develop or modify regional hunting recommendations for black bear in Mono County.
5. Provide technical expertise for black bear conservation planning efforts in Mono County.

4. Human dimensions surveys– Information unavailable.

MONTANA BLACK BEAR STATUS REPORT

Robert M. Inman, PhD, Carnivore-Furbearer Coordinator, Montana Fish, Wildlife and Parks, 1420 East Sixth Avenue, P.O. Box 200701, Helena, MT 59620-0701, USA

Montana was not able to send a representative to the 2018 Western Black Bear Workshop in Grand Junction, CO. The following is provided as a brief jurisdiction update in response to specific questions.
Montana does not have any ongoing black bear field research. However, Montana is in the process of developing an Integrated Population Model for black bear. This is population reconstruction for trend using tooth-age data. Additional inputs will include previous density estimates, survival rates, fecundity, etx. This tool will allow biologists to gauge effects on population trend from various harvest levels.

Black bear population size in Montana is estimated to be approximately 13,000 bears. Black bear harvest averaged approximately 1,500 bears per year during 2014–2017. During that same period, approximately 70 black bears died and were recorded from other sources including vehicle/train strikes, management removal, or illegal kills. Total mortality from human causes is approximately 12%. This is 3–5% lower than mortality levels that would lead to decline (Mace and Chilton 2011).

Montana does not have any ongoing litigation related to black bear.

Montana does not have any legislative proposals related to black bear for the 2019 legislature.

Montana is continuing to try and emphasize proactive bear conflict prevention work as much as possible. However, this is most often occurring in the context of grizzly bears. We now have 7 FTE in western MT dealing with bear conflict management reactions, and trying to do proactive preventative work too. Several MTFWP/USFS/NGO partnerships focused on bear smart communities too.

NORTH DAKOTA BLACK BEAR STATUS REPORT

Stephanie Tucker, Game Management Section Leader, North Dakota Game and Fish Department, 100 N. Bismarck Expressway, Bismarck, ND 58501, USA

During the 1800s, black bears (*Ursus americanus*) were found throughout North Dakota with the highest densities occurring in the Red River Valley, Turtle Mountains, and Pembina Hills regions (Bailey 1926, Kruckenberg 1973, Seabloom 2011). However, they were considered scarce in western North Dakota (Bailey 1926). A record of a black bear killed near Devils Lake in 1914 is the last confirmed report until 6 decades later. Currently, the presence of a black bear in the state is occasionally documented, but there is no evidence of a breeding population in North Dakota. However, it is suspected that at least one bear may have over-wintered in North Dakota during 2016–2017.

Reports of black bear occurrence (e.g. sightings, tracks, etc.) are recorded by North Dakota Game and Fish Department personnel, and included reports from the general public, deer hunters, fur hunters and trappers, and United States Department of Agriculture-Wildlife Services employees. Reports were classified as

a. Verified – Evidence available, including a carcass or live-captured black bear, photograph or video, DNA analysis results, or tracks or scat confirmed as being that of the reported species by a qualified wildlife professional.
b. Probable Unverified – No evidence available, but the report, animal description, and/or location are plausible.
c. Improbable Unverified – No evidence available and the report, animal description, and/or location are not plausible.
d. Unfounded – Evidence available which disproves the claim that it is a black bear, including carcass or live-captured animal, photograph or video, DNA analysis results, or tracks or scat disproved as being that of the reported species by a qualified wildlife professional.

In addition, we collected and necropsied carcasses of black bears that died as a result of automobile collisions or nuisance removals. We collected morphological measurements, reproductive tracts, stomachs, and DNA samples from those carcasses.

Since 1 July 2004, we recorded 109 reports of black bears (Figure 1). Of those, 61 reports (56%) were classified as Verified (Figures 1–2). The Verified reports consisted of photographs or videos (57%), visual observations (18%), carcasses (13%), and documentation of sign (11%; e.g. tracks). The distribution of Verified black bear reports were scattered throughout the state, but primarily in northern and eastern North Dakota (Figure 2).

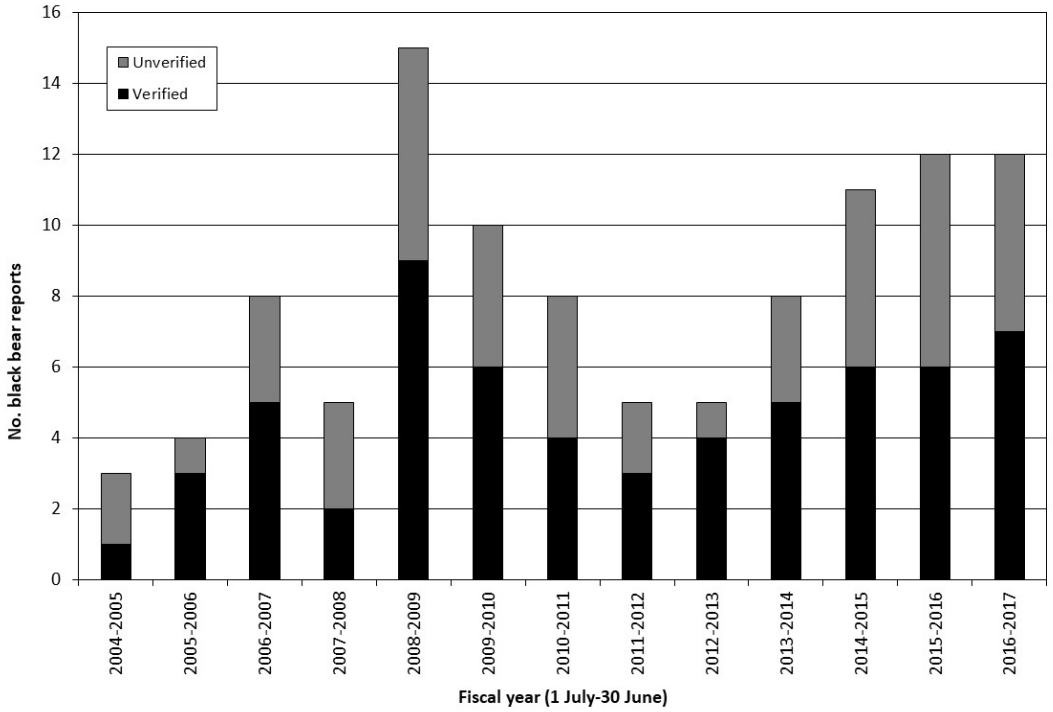


Figure 1. Reports of black bear occurrence in North Dakota from 1 July 2004 to 30 June 2017.

Figure 2. Locations of verified black bear reports in North Dakota from 1 July 2004 to 30 June 2017.

JURISDICTION BLACK BEAR SURVEY RESULTS

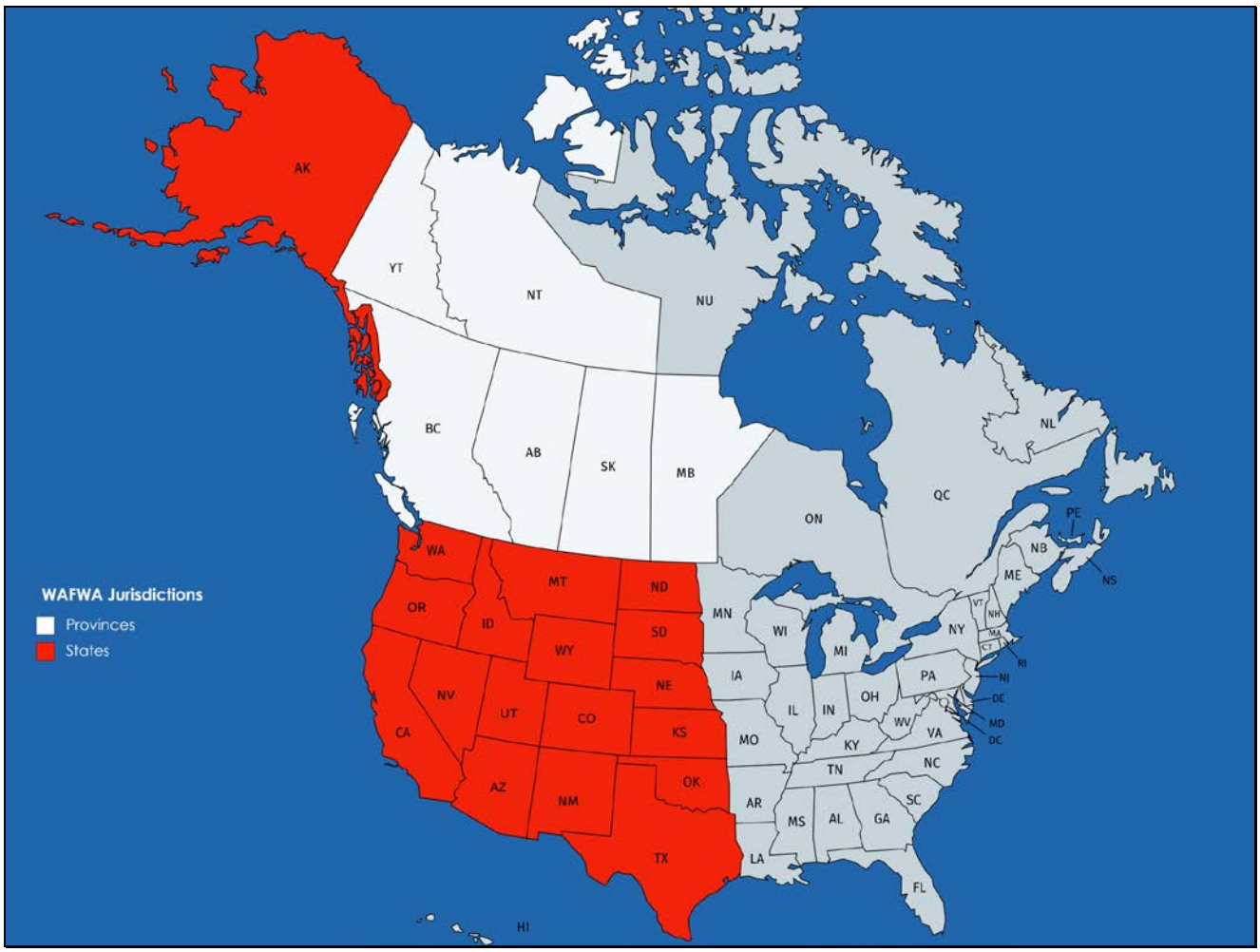
Craig McLaughlin, Terrestrial Section Manager, Colorado Parks and Wildlife, 6060 Broadway Denver, CO, 80216, USA

Program managers for 21 Western Association of Fish and Wildlife Agency (WAFWA) states and provinces were surveyed in the spring of 2018 to document current black bear management efforts in western North American jurisdictions. They were provided a series of standardized questions in spreadsheet format, following a format that began within the Eastern Black Bear Workshop (EBBW) in 2007. This is the second such survey for the Western Black Bear workshop (WBBW); the first took place in 2015, and was documented by Rich Beausoleil. The survey requested information on: black bear population size and amount of habitat, means of monitoring populations, hunting systems and restrictions, human-bear conflicts, law enforcement issues, research, and future direction for the jurisdictions' bear management efforts. Highlights of the survey are presented below, as copies of the slides used during the presentation at the meeting. The Excel spreadsheet containing all jurisdictions' responses can be obtained by contacting the 13th WBBW Chair, Mark Vieira, at mark.vieira@state.co.us.

Slide 1


Overview of Survey
• Current Agency Management Programs
• Bear Populations, Habitat
• Means of Monitoring Populations
• Hunting Systems and Restrictions
• Human-Bear Conflicts
• Law Enforcement Issues
• Research
• Future Direction?

Slide 2


WAFWA Jurisdictions
Provinces
States
AK
YT
NT
NU
BC
AB
SK
MB
ON
QC
NL
PE
NB
NS
ME
WA
OR
CA
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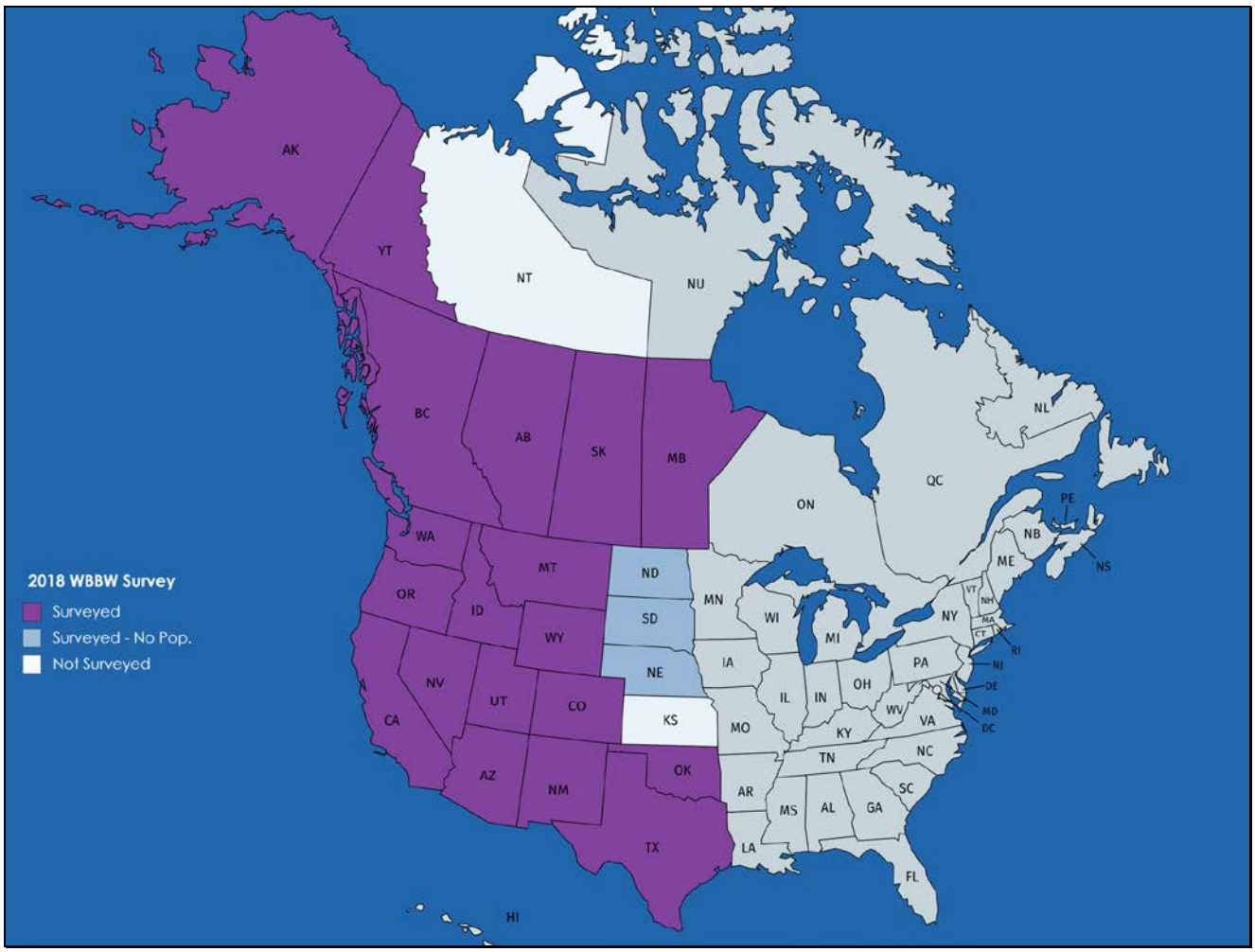
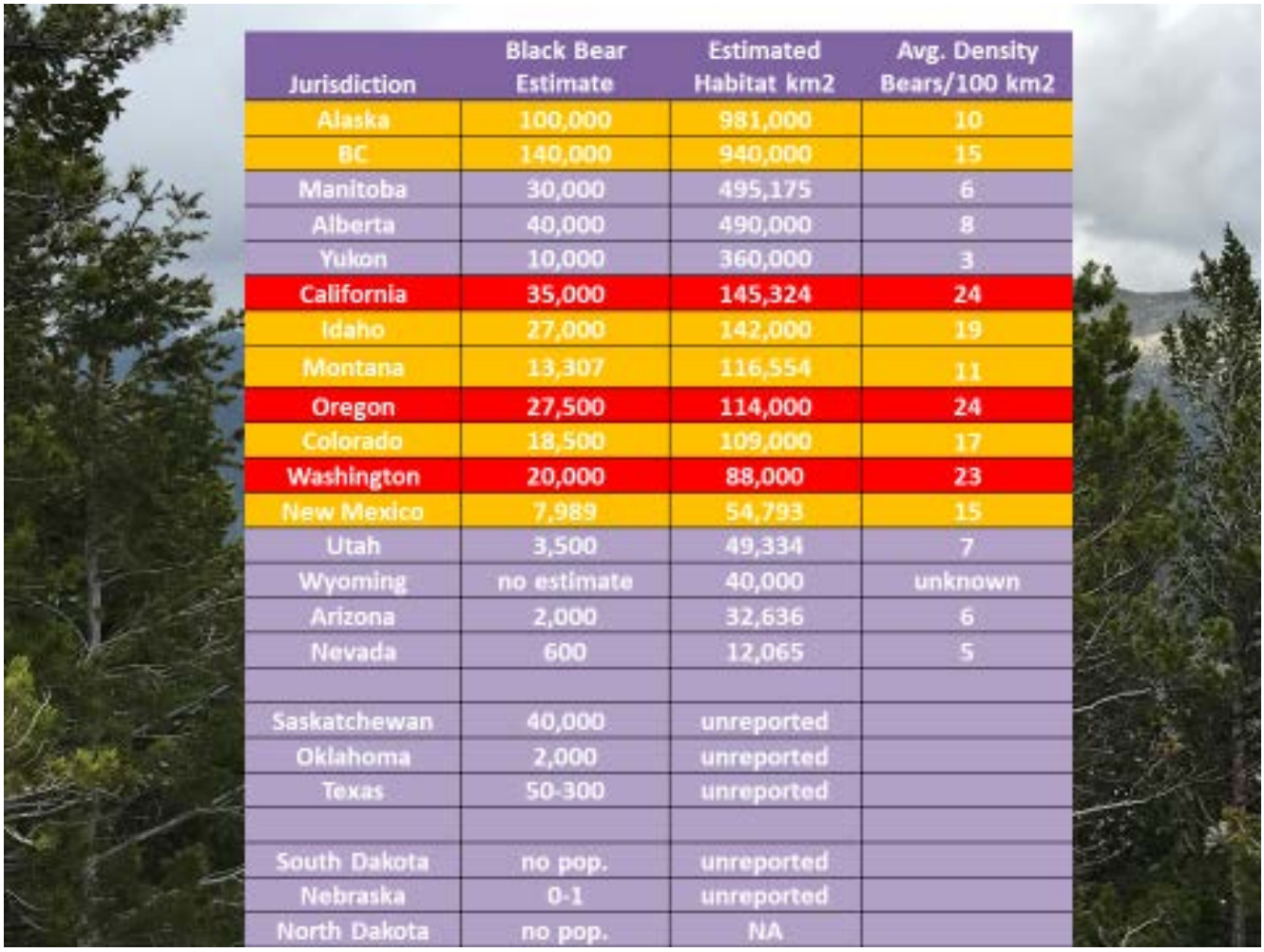
Slide 3



Slide 4

Surveyed 21 of 23 jurisdictions: Alaska, Alberta, Arizona, British Columbia, California, Colorado, Idaho, Manitoba, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, Saskatchewan, South Dakota, Texas, Utah, Washington, Wyoming, Yukon. Missed Kansas; and NWT

[Northwest Territories] just joined WAFWA last month – no contact established yet.



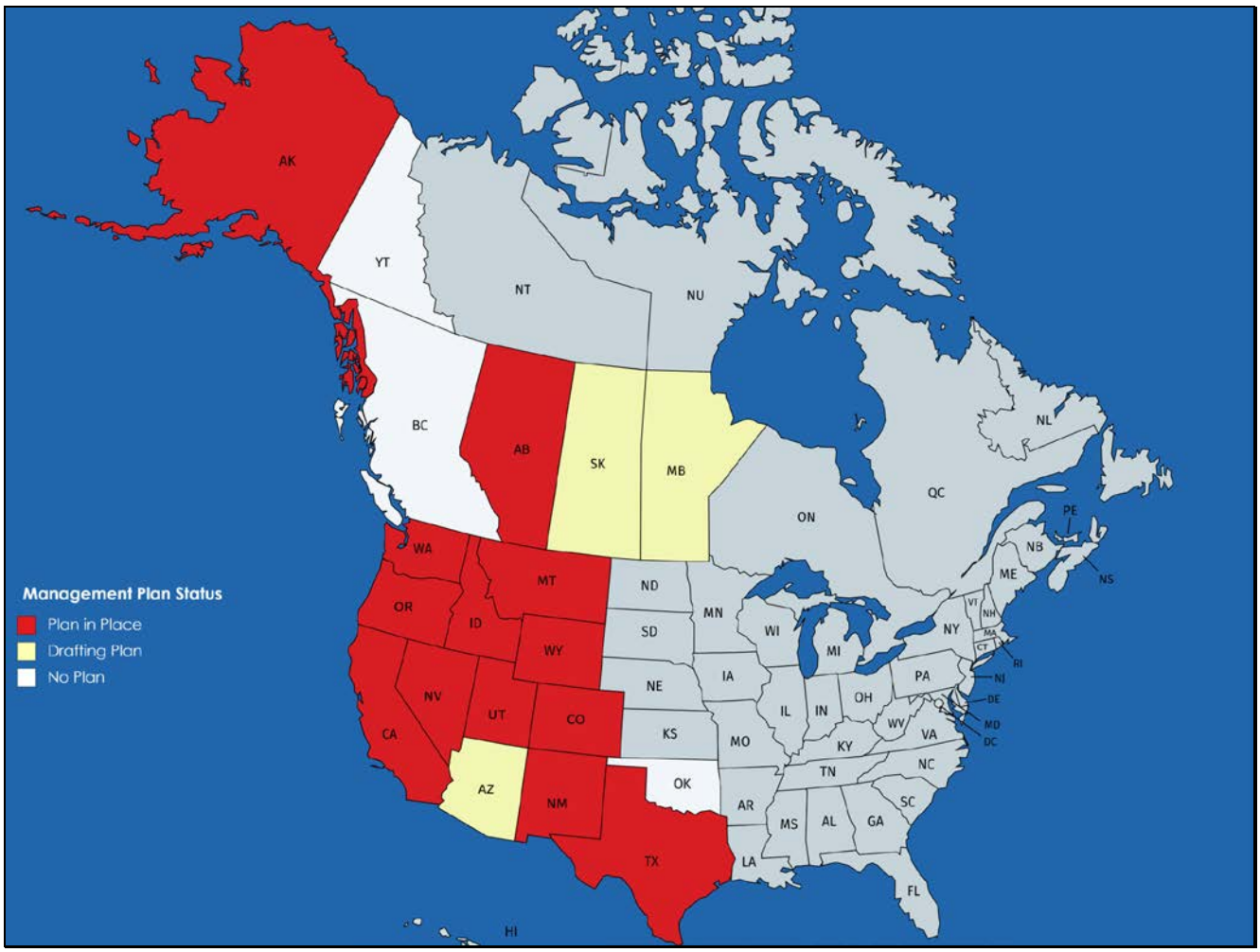
Jurisdiction	Black Bear Estimate	Estimated Habitat km2	Avg. Density Bears/100 km2
Alaska	100,000	981,000	10
BC	140,000	940,000	15
Manitoba	30,000	495,175	6
Alberta	40,000	490,000	8
Yukon	10,000	360,000	3
California	35,000	145,324	24
Idaho	27,000	142,000	19
Montana	13,307	116,554	11
Oregon	27,500	114,000	24
Colorado	18,500	109,000	17
Washington	20,000	88,000	23
New Mexico	7,989	54,793	15
Utah	3,500	49,334	7
Wyoming	no estimate	40,000	unknown
Arizona	2,000	32,636	6
Nevada	600	12,065	5
Saskatchewan	40,000	unreported	
Oklahoma	2,000	unreported	
Texas	50-300	unreported	
South Dakota	no pop.	unreported	
Nebraska	0-1	unreported	
North Dakota	no pop.	NA	

Slide 5

What is the distribution of black bears across WAFWA's geography?

Estimated bear habitat is just over 4 million km^2, which excludes Saskatchewan, OK and Texas.

This table contains a listing of the surveyed jurisdictions, sorted by the estimated amount of habitat within each; note density estimates… the highest (20+; colored red) are located in Pacific Coast states; next tier (10–19/100km^2; colored orange) are Alaska, BC (northwest Coastal) and Rocky Mtn states; lowest densities are estimated in interior northern Provinces and in the desert SW (3–6 bears/100 km^2) Note: to convert density here to bears/100 mi^2, multiply density by 2.59



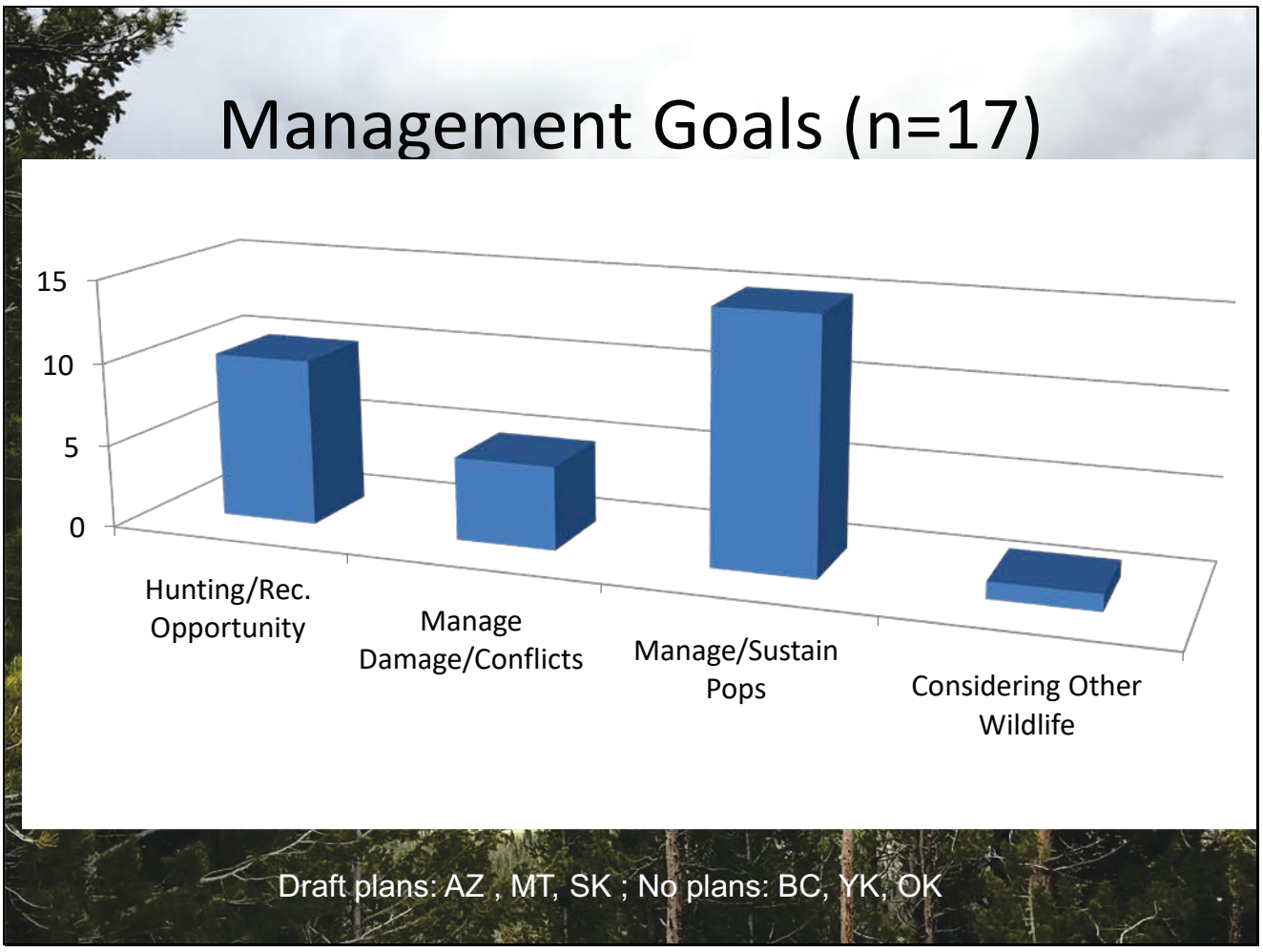
Slide 6

19 Jurisdictions with bear populations; 13 have management plans, 3 are in the process of drafting plans; 3 do not have plans (BC, Yukon Territories and Oklahoma)

Points:

1) Political boundaries are important only for general comparisons; equally so are ecological considerations.

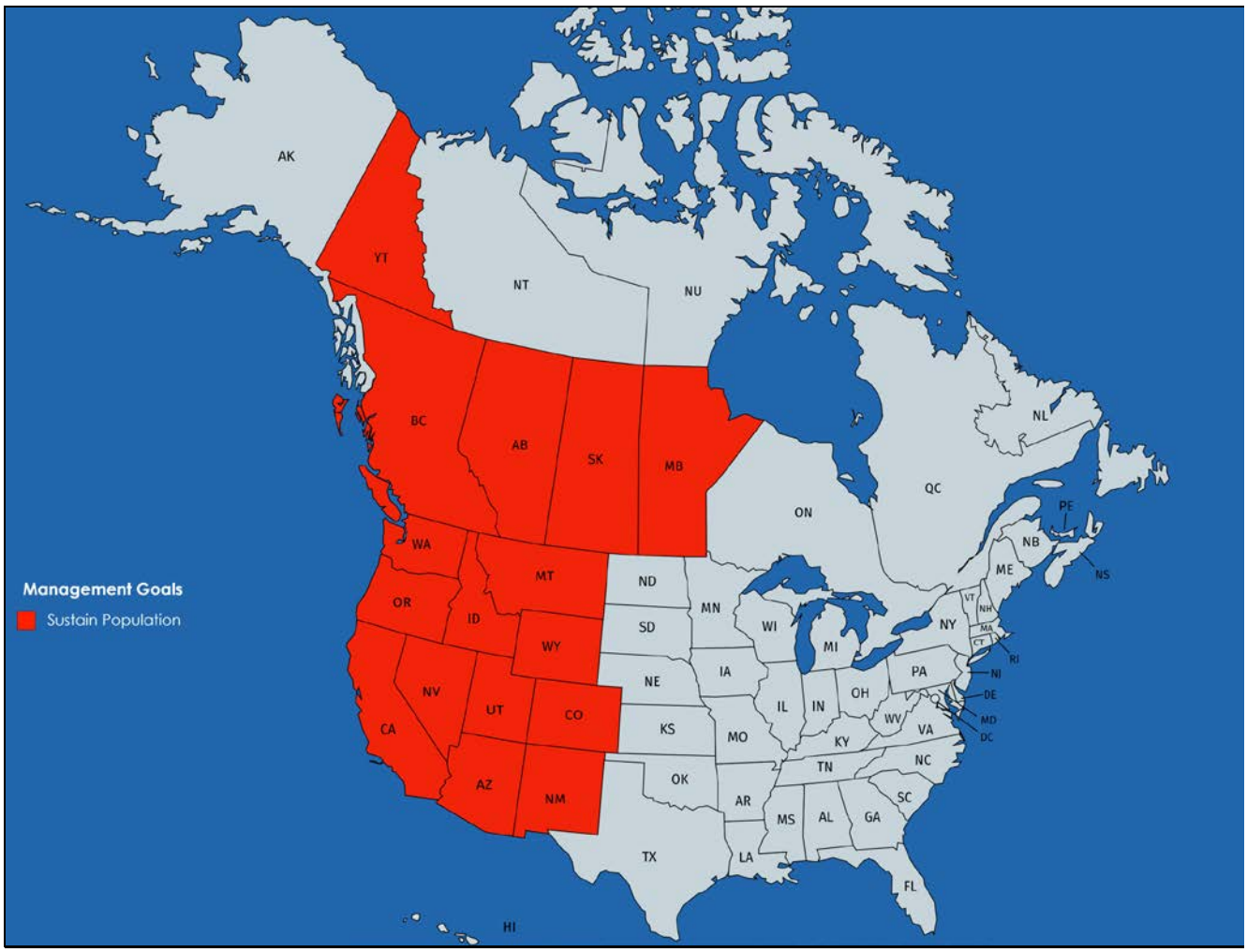
Question for group: What are the factors that have determined which jurisdictions have plans, and when? Financial, socio-political pressures?



Slide 7

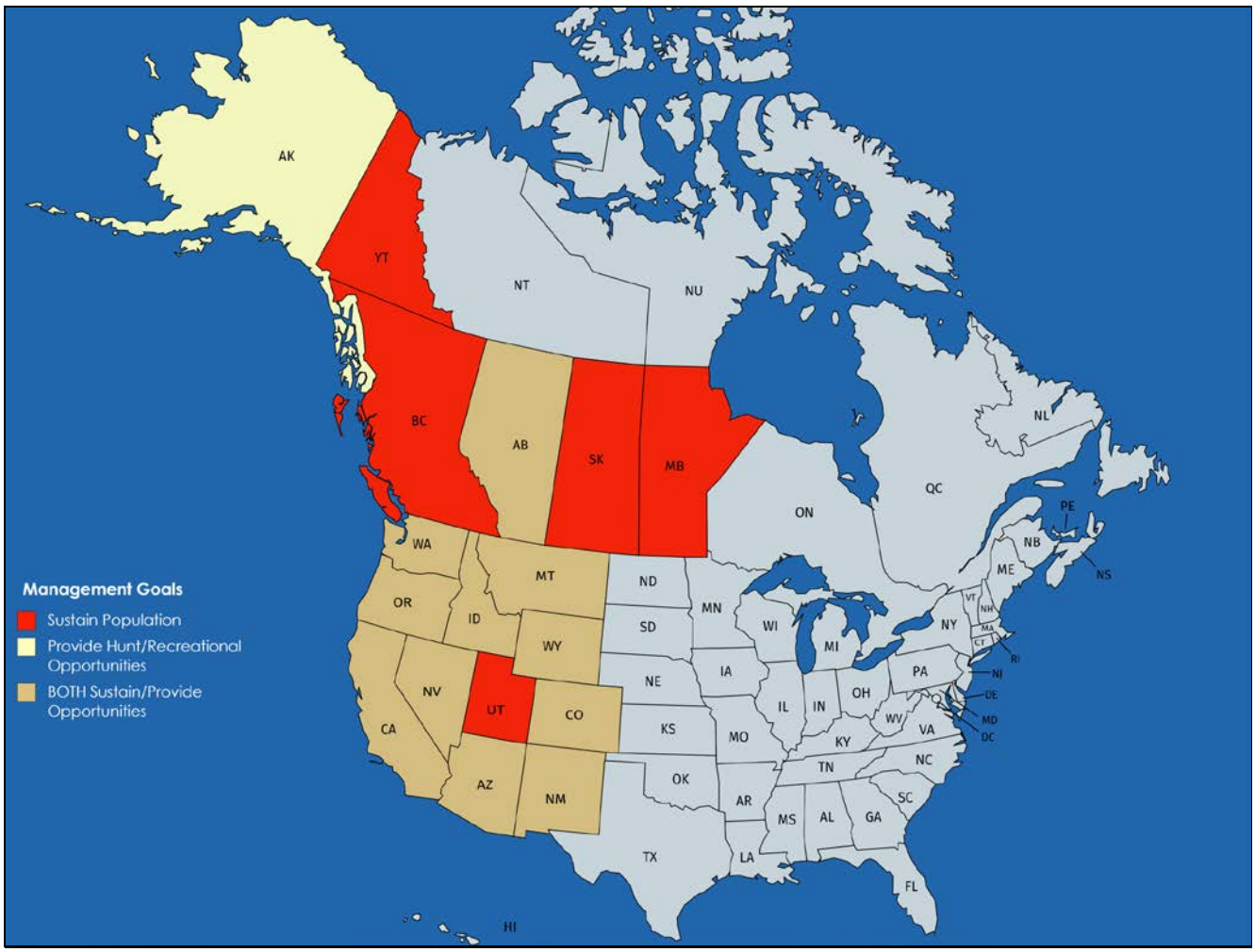
This chart categorizes the major themes of jurisdictional management goals. Most all contained statements that referenced managing for sustainable populations; the majority contained statements regarding managing hunting and/or recreational opportunity. Five jurisdictions elevated management of damage or human-bear conflicts to their management goal level, and only one jurisdiction (Utah) included a statement about considerations for other wildlife.

Only 1 jurisdiction indicated that it has a program to actively reduce bear populations for the benefit of ungulates (Montana is yes; AK none at present, have in past; Alberta is considering for caribou recovery, CO is conducting research to evaluate relationship, New Mexico has used in past in a few areas (experimentally)



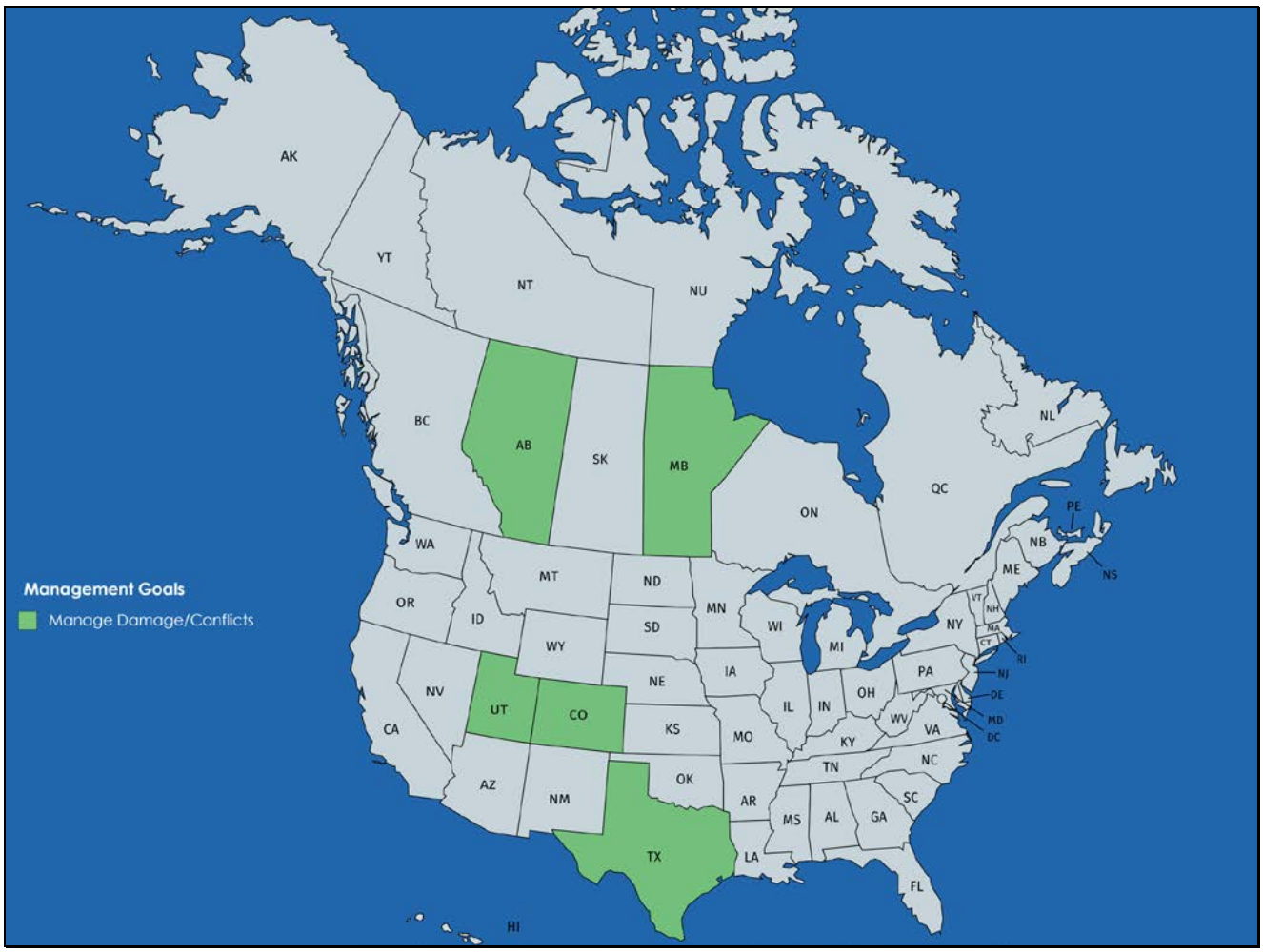
Slide 8

15 of 17 Jurisdictions included “sustaining bear populations” in their statement of bear management goals. This demonstrates an interest in maintaining black bears as valued members of wildlife communities.



Slide 9

Here we note the distribution of jurisdictions' management goals that contain statements to manage black bear resources to "provide hunting and/or recreational opportunities", in addition to the interest in sustaining populations. The majority of jurisdictions (12 of 19 with bear populations) included efforts to manage such "opportunity".



Slide 10

Only 5 jurisdictions have included statements about managing property damage or other human-bear conflicts in their management goals statements.

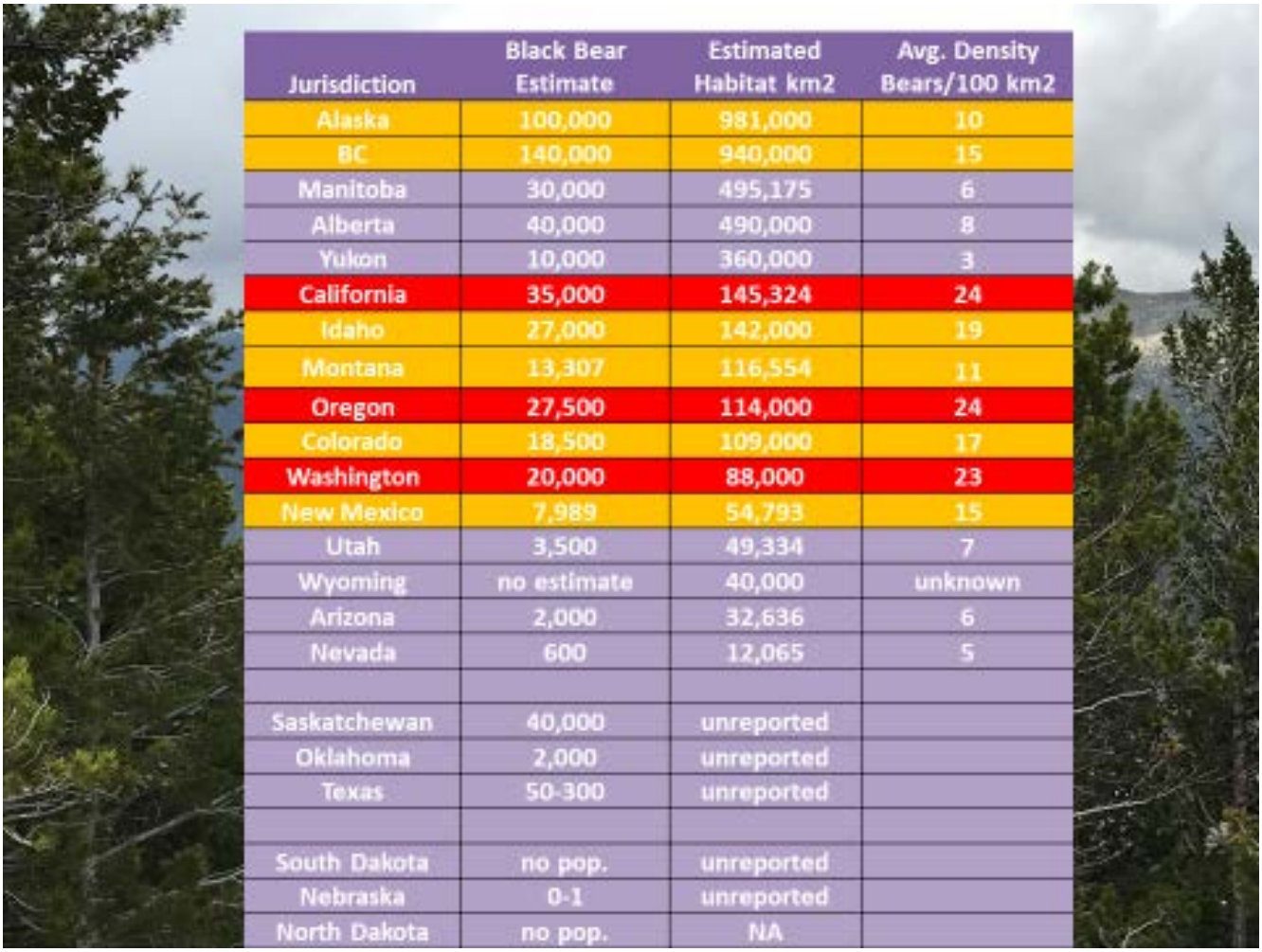
Question: What is the history of human-bear conflict within these jurisdictions that has elevated conflict discussions to the level of management goals?

Population Size and Trend

- Overall population in WAFWA jurisdictions: 487,946 – 547,196 (less Wyoming, NWT)
- No established populations in ND, SD, NE, KS
- Estimates empirically derived? 5 of 19

Slide 11

If we add these population estimates to those recently published for North America, we can estimate approximately 875,000 black bears on the continent.



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Slide 12

What is the distribution of black bears across WAFWA's geography?

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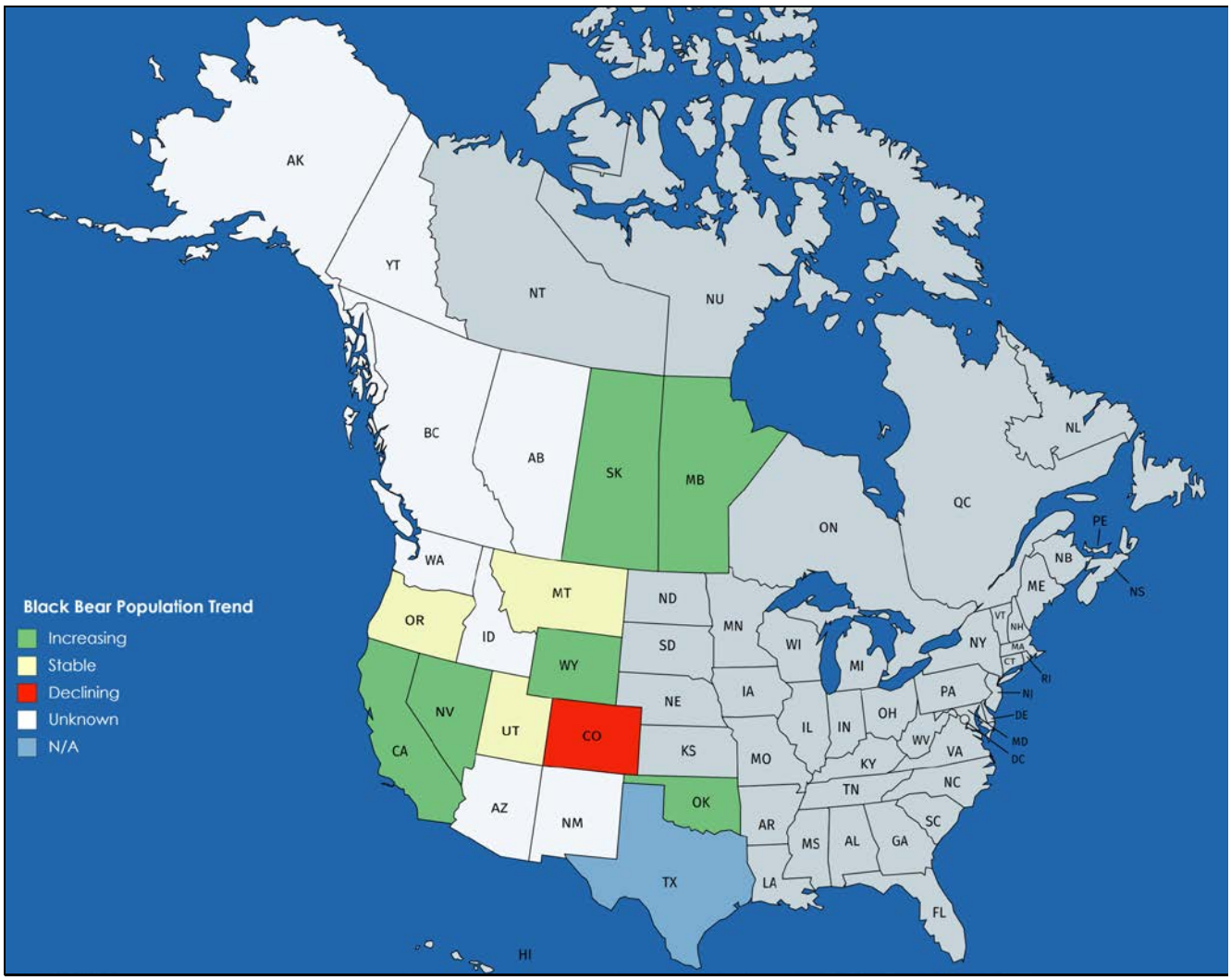


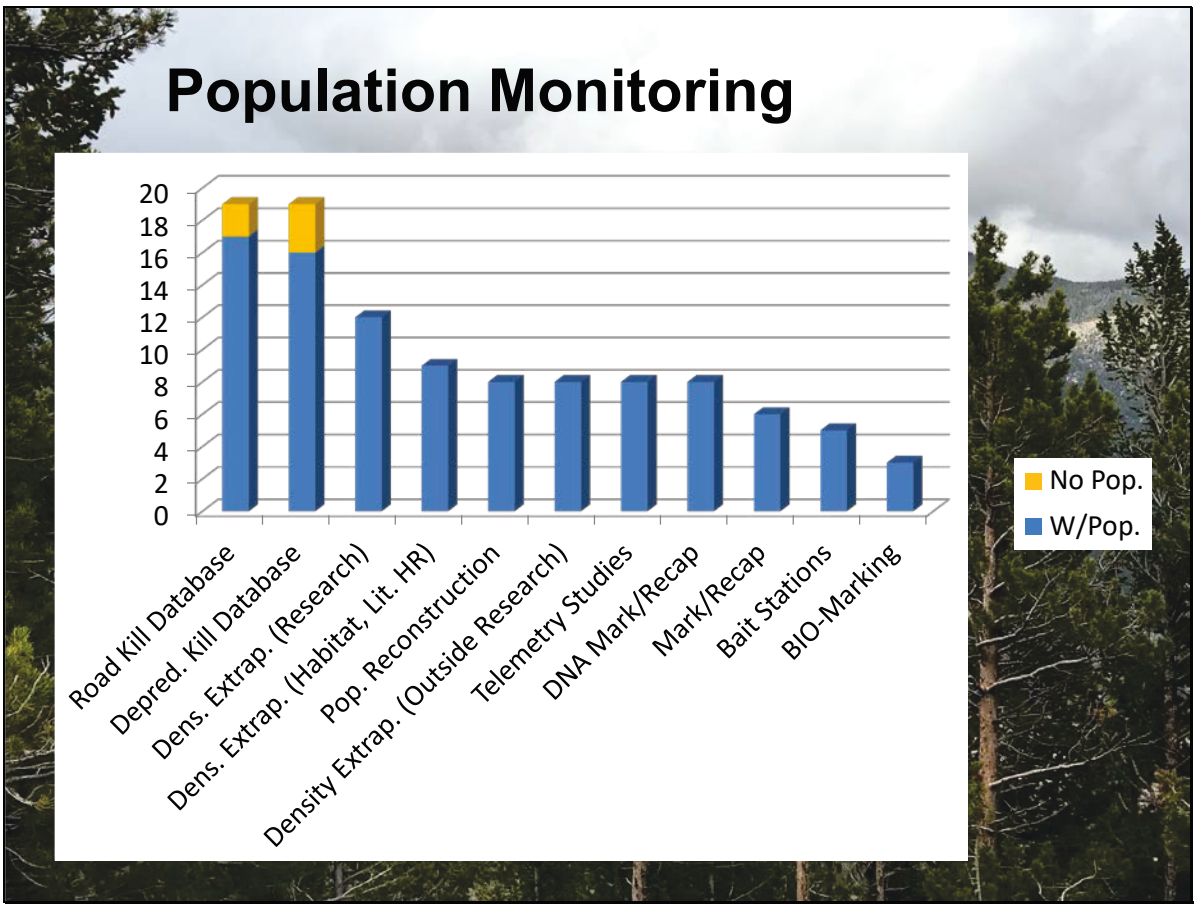
Slide 13

Distribution of jurisdictions by black bear population growth trends. Six jurisdictions report increasing populations in at least a portion of their geography; 3 report stable populations; and 1 (Colorado) reports a stable/declining population. The population decline is a consequence of intentional management actions.

Interestingly, 8 jurisdictions do not know what the population trajectory of their bear population is.

Why not? This question is relevant to our workshop discussions. What are the monitoring methods used here, vs other jurisdictions? It is possible to monitor trend w/o estimating numbers or density (see Wyoming's responses). WA, NM, AK, others have ongoing research?

Are most jurisdictions confident that their management program is achieving desired objectives? Why/why not?



Slide 14

Jurisdictions use a variety of metrics to monitor black bear populations; here is a listing, running to the most widely used to the least common.

Road Kill Database (17 + 2)

Depredation/landowner kill database (16 +3)

Density extrapolation – research w/in jurisdiction (12)

Density extrapolation using habitat, literature, HR size (9)

Pop reconstruction using harvest (8)

Density extrapolation – outside research (8)

Telemetry studies (8)

DNA mark/recapture (8) +

Mark/recapture (6)

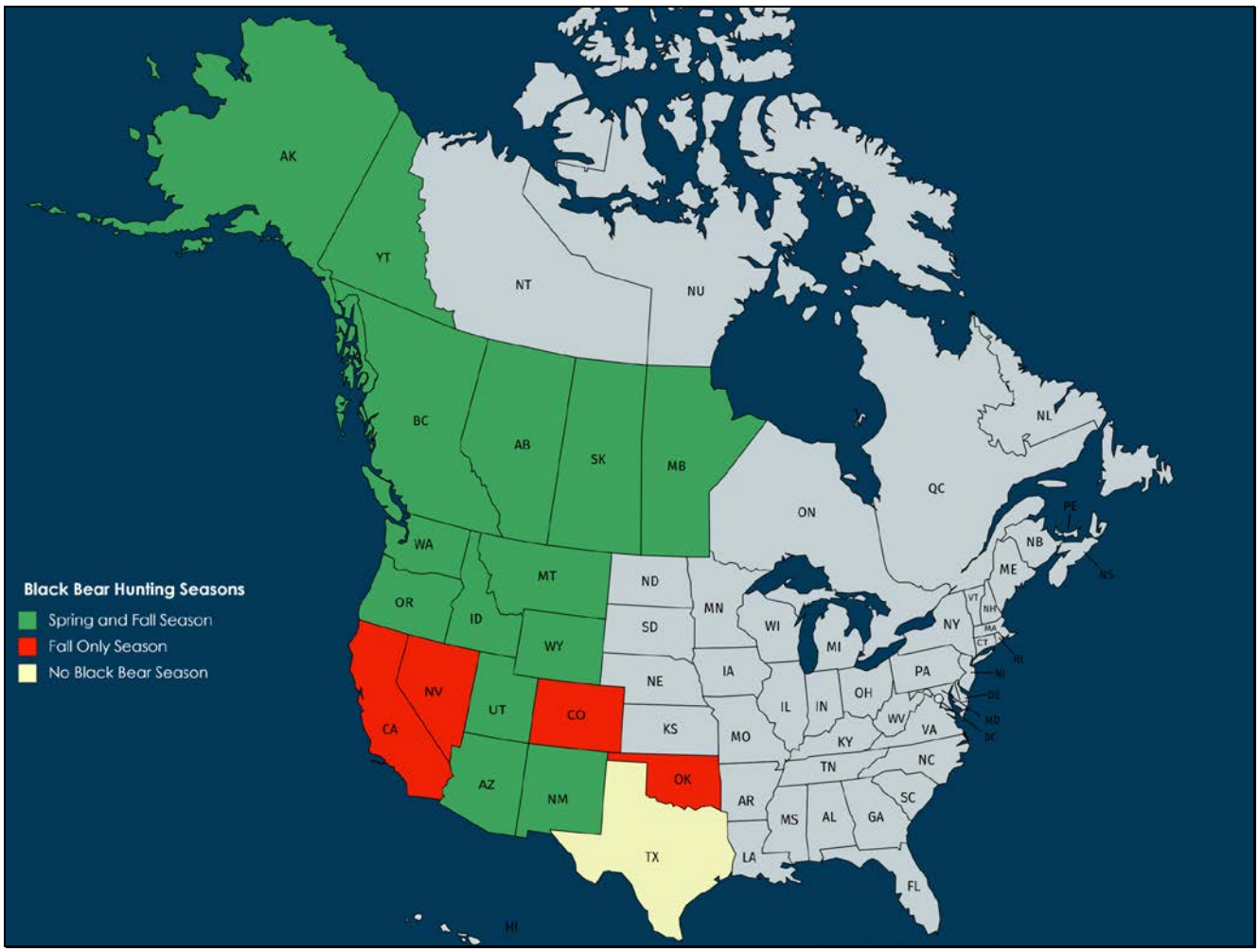
Bait stations (5)

Bio-marking (3)

Hunting Systems

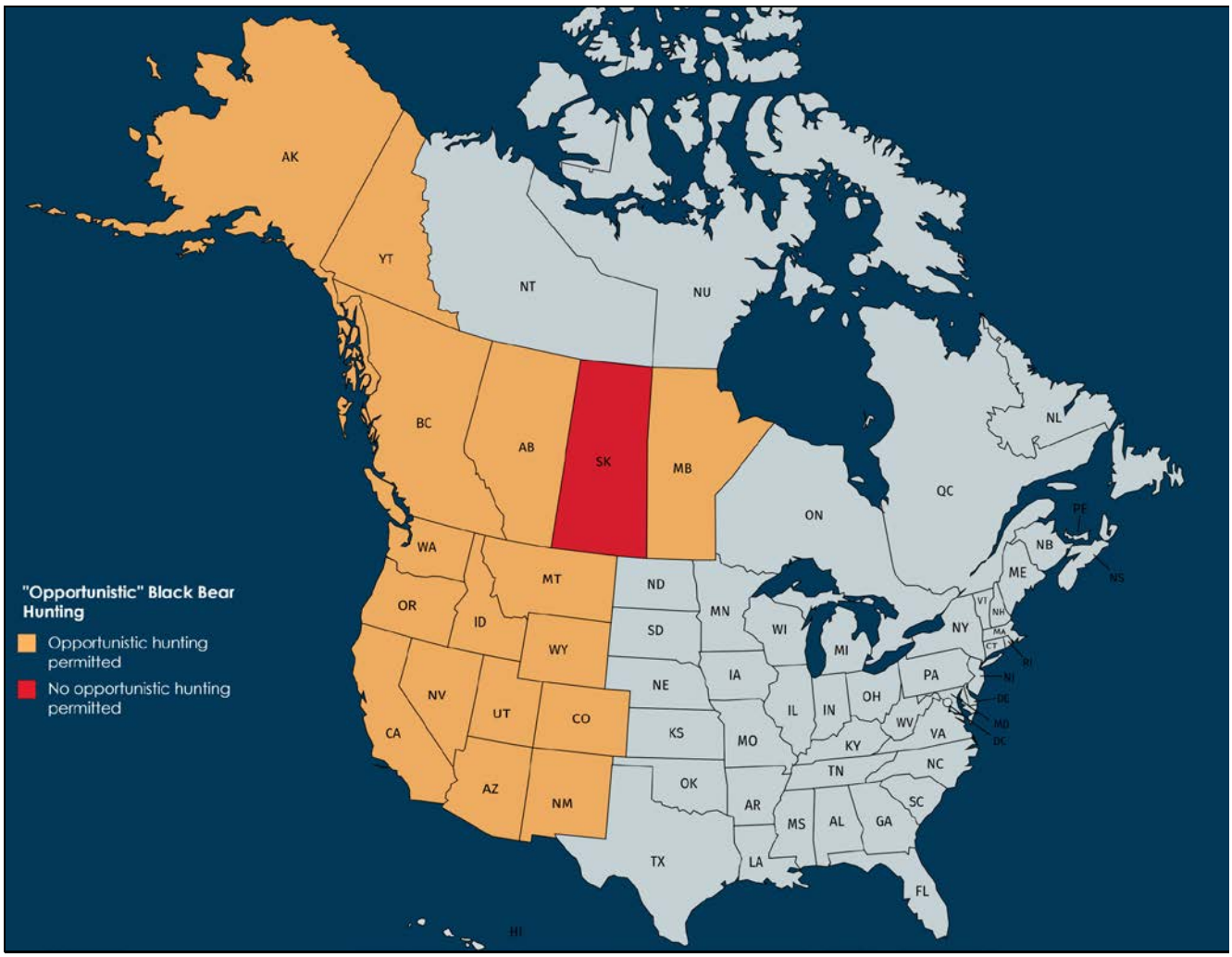
- Seasons (n=18; no hunt in TX)
  - Spring (14; no spring hunt in CA, CO, NV, OK, TX)
  - Fall (18)
  - Special Hunts (10; Damage/private land, landowner only, special properties/controlled hunts)

Slide 15



Slide 16

Texas is only jurisdiction with a bear population that is not hunted. The remaining 18 jurisdictions hunt during the fall; most (14, or all but CA, NV, CO, and OK) hunt during spring also.

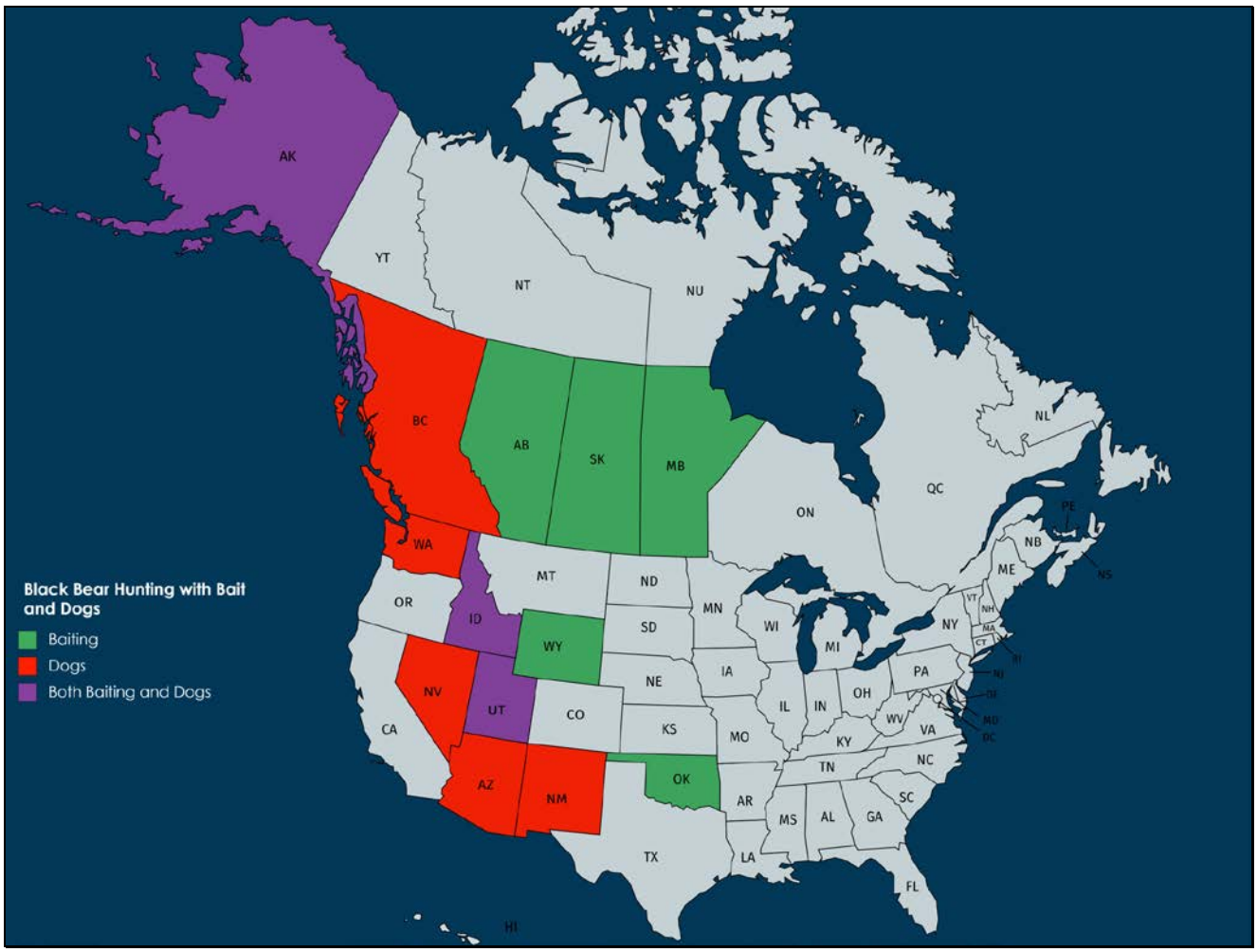


Slide 17

16 jurisdictions allow opportunistic hunting for black bear – this includes spot and stalk, still-hunting, hunting over natural foods, snow tracking…

Saskatchewan's answer to this question was NO; Oklahoma's response left this question blank.

Reminder: Texas does not have a hunting season.



Slide 18

Baiting is legal to hunt bears within 8 jurisdictions (AK, AB, SK, MB, ID, UT, WY, and OK); Dogs are allowed to be used in 8 jurisdictions (AK, BC, WA, ID, NV, UT, AZ, and NM)

Caveats: 1) WA, only allow dogs on timber damage hunts

2) WY only allow bait outside of grizzly recovery zone

3) OK only allow bait on private land

4) AZ only allow dogs from Aug 1 to Dec 31

Percent taken over bait: 26%–90+%

Percent taken with dogs: 1% (AK)–69% (NV)

Hunting Systems

- Restrictions
  - Bag limit (1/yr = 8; 2/yr=6; 4/yr=1; 1-5/yr=1)
  - Cubs of year protected (16 yes; AK except customary/traditional use; WA suggested; ID no)
  - Hunt days (combined) 24 (OK) – 365 (Alaska)
- Licensing (costs, restrictions)
  - Resident license fees: ave.= $48 ($15-$101)
  - Nonresident fees: ave.= $303 ($84-$610)

Slide 19

Annual bag limit/hunter is 1/year in 7 jurisdictions; 2/year in 6 jurisdictions (AB, BC, YK, WA, CO/ID (1–2)); 4/year in 1 jurisdiction (Oregon); 1–5/year in Alaska

Cubs of the year are protected in 16 of 19 jurisdictions

Cubs not protected in: Idaho or Washington (which suggests not shooting cubs), and during customary/traditional use hunts in Alaska

Restrictions (highlights): Saskatchewan requires guide for nonresidents of Canada; NV has a mandatory indoctrination course (?)

Slide 20

License fees vary dramatically across the responding jurisdictions, with fees as cheap as $15 for a Yukon resident hunter, ranging up to $101 for a resident of OK (NV is $100)

Nonresident hunters pay on average $303 to hunt black bear, with fees ranging from $84 in Alberta, to $610 in Alaska.

Figures show here are summaries, and the highest values were used where multiple fee schedules were provided.

Kill Data

- Quotas? : 11
- Hunter Surveys: 14
  - Mandatory: 5
  - Voluntary: 9
- Mandatory carcass checks: 14
- Mandatory online reports : 2 (+3 optional)
- Extrapolation Using % reported: 8
- Wounding loss database: 2

Slide 21

Of 19 jurisdictions, kill data was obtained by 14 through hunter surveys, and by mandatory carcass checks. 11 Jurisdictions use quotas to determine/limit harvest levels, only 2 jurisdictions use mandatory online reporting, with 3 others having optional online reporting. Eight extrapolate the harvest, using the harvest reporting rate.

Only 2 jurisdictions maintain a wounding loss database.

Five jurisdictions (YK, OK, NM, CO, AK) monitor berry/mast surveys. BC conducts berry surveys for grizzly bears only.

Biological Data Collected from Kills

- Teeth: 15; 14 have mandatory submission
- DNA (tissue and/or hair): 10
- Body condition: 4
- Reproductive tracts: 1 (Oregon) plus ND

Slide 22

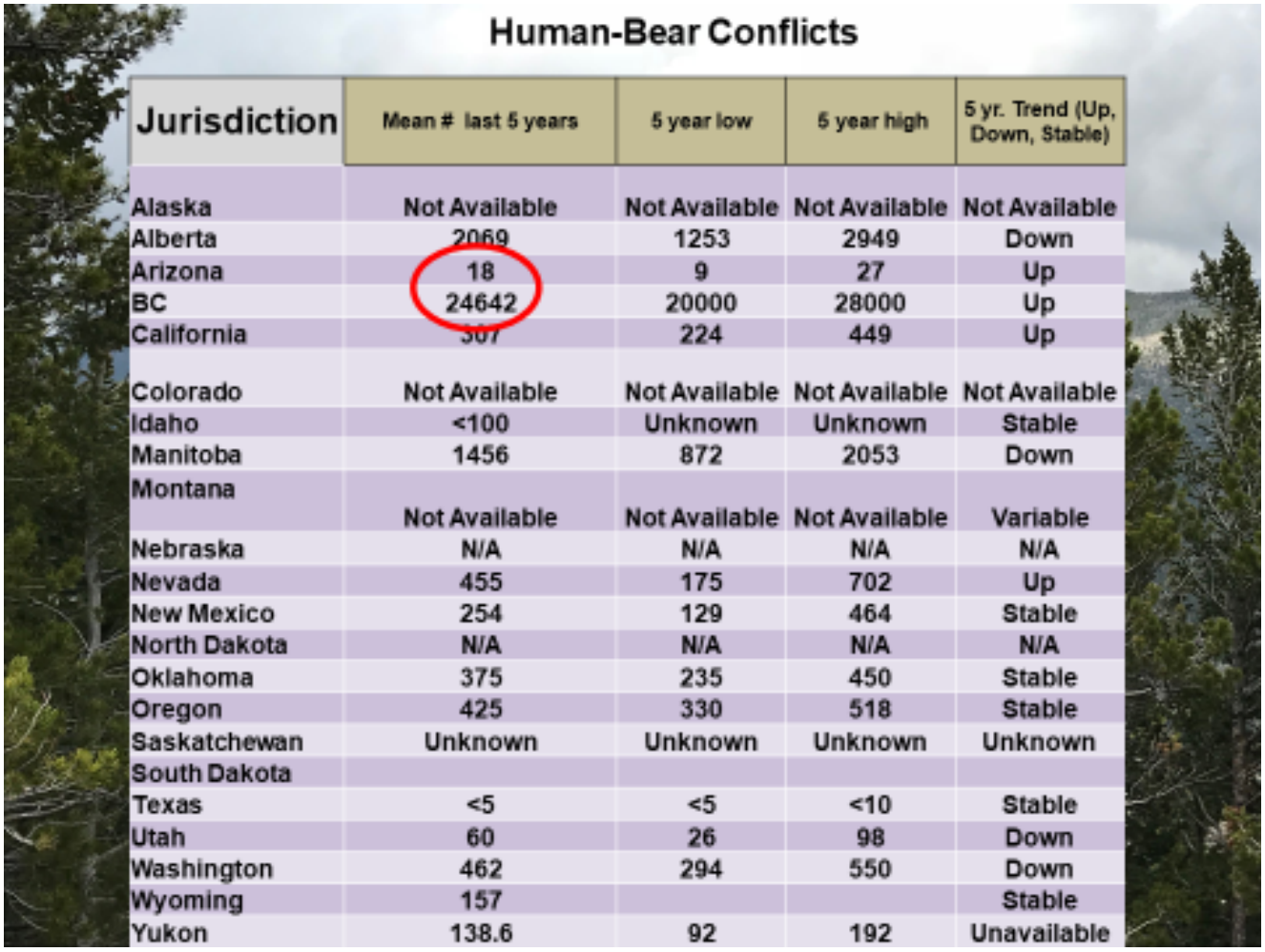
Human-Bear Conflict

- # complaints : <5 (TX) – 24,642 (BC)
  - Trend 4 up; 5 stable; 4 down; 1 variable
- Conflict Education
  - -high priority (10); moderate priority (7)
- Compensation Payments
  - Livestock (8); Ag (7); Apiaries (6); Property (3)
- Conflict Management Services (Agency/Outsourced)
- Regulation/legislation (feeding bears)

Slide 23

Systems for tracking complaints vary across the surveyed jurisdictions;

Revisit trend in conflict numbers: Up= AZ, BC, CA, NV; stable=ID, NM, OK, OR, TX, WY; Down= MB, UT, WA, AB

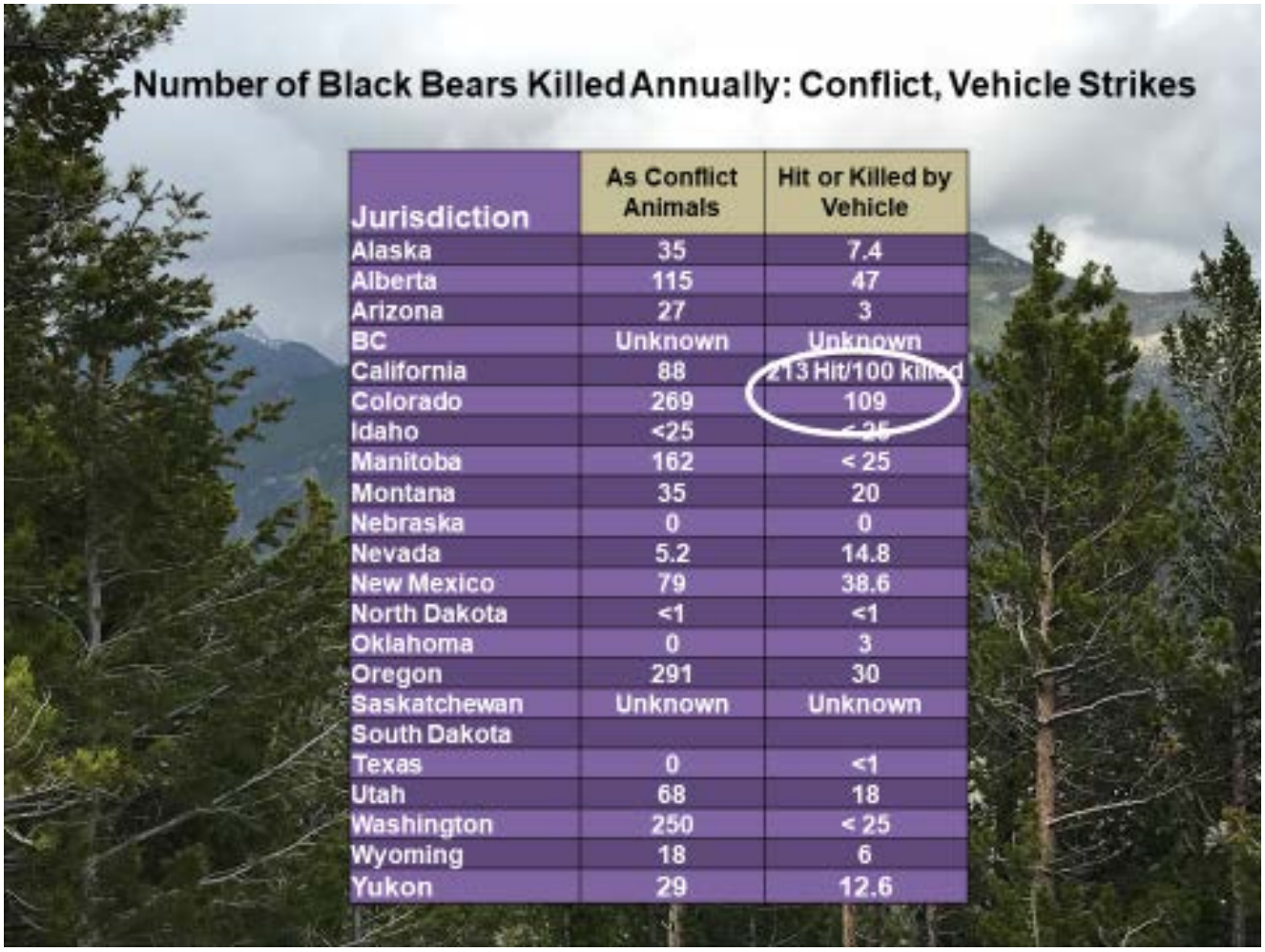


Human-Bear Conflicts

Jurisdiction	Mean # last 5 years	5 year low	5 year high	5 yr. Trend (Up, Down, Stable)
Alaska	Not Available	Not Available	Not Available	Not Available
Alberta	2069	1253	2949	Down
Arizona	18	9	27	Up
BC	24642	20000	28000	Up
California	307	224	449	Up
Colorado	Not Available	Not Available	Not Available	Not Available
Idaho	<100	Unknown	Unknown	Stable
Manitoba	1456	872	2053	Down
Montana	Not Available	Not Available	Not Available	Variable
Nebraska	N/A	N/A	N/A	N/A
Nevada	455	175	702	Up
New Mexico	254	129	464	Stable
North Dakota	N/A	N/A	N/A	N/A
Oklahoma	375	235	450	Stable
Oregon	425	330	518	Stable
Saskatchewan	Unknown	Unknown	Unknown	Unknown
South Dakota				
Texas	<5	<5	<10	Stable
Utah	60	26	98	Down
Washington	462	294	550	Down
Wyoming	157			Stable
Yukon	138.6	92	192	Unavailable

Slide 24

First, attention to human-bear complaints varies across the surveyed jurisdictions; a few report that this information is not available or unknown (AK, CO, MT, SK). Reported average annual complaint counts in jurisdictions that track them vary from a low of 18 in Arizona, to 24, 642 in British Columbia. In most jurisdictions, annual complaints average in the hundreds annually; most are reporting a stable (ID, NM, OK, OR, TX) or upward (AZ, BC, CA, NV) trend in these incidents. Only Alberta, Manitoba, Utah and Washington reported downward trends. Montana reported variable trend. What are the factors that contribute to these trends?



Jurisdiction	As Conflict Animals	Hit or Killed by Vehicle
Alaska	35	7.4
Alberta	115	47
Arizona	27	3
BC	Unknown	Unknown
California	88	213 Hit/100 killed
Colorado	269	109
Idaho	<25	< 25
Manitoba	162	< 25
Montana	35	20
Nebraska	0	0
Nevada	5.2	14.8
New Mexico	79	38.6
North Dakota	<1	<1
Oklahoma	0	3
Oregon	291	30
Saskatchewan	Unknown	Unknown
South Dakota		
Texas	0	<1
Utah	68	18
Washington	250	< 25
Wyoming	18	6
Yukon	29	12.6

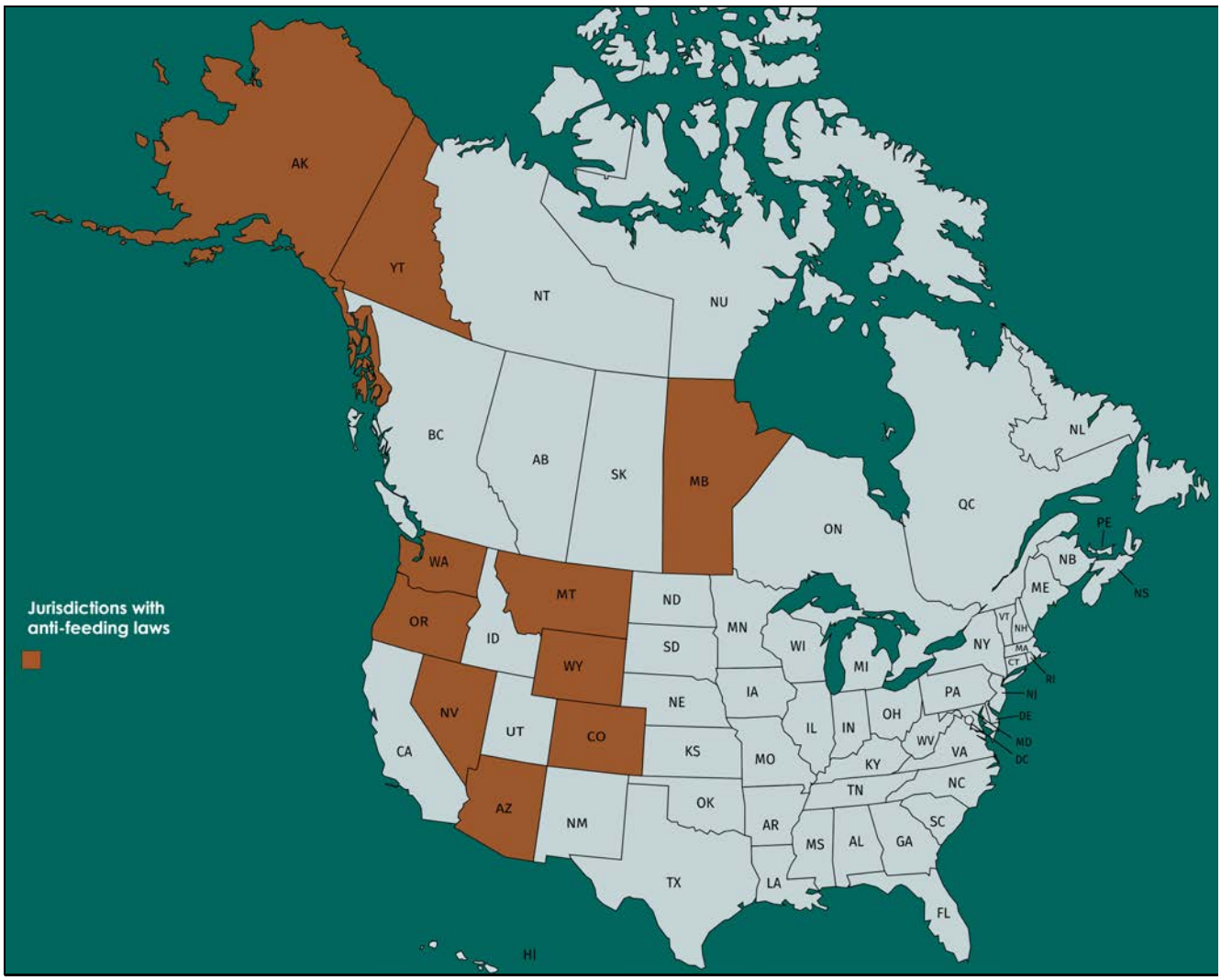
Slide 25

Number of black bears killed in response to conflicts (in jurisdictions with resident bear populations) ranges from 0 in Texas to 291 in Oregon; 3 jurisdictions (CO, OR, WA) report over 200 bears killed annually due to conflict resolution. Reported deaths due to vehicle strikes remain low; high reports come from California (213 hit/100 killed) and Colorado, with 109 reported killed annually.

Slide 26

Education directed at human-bear conflicts was considered a high priority by 9 jurisdictions (AZ, CO, MT, NV, NM, OK, OR, WA, YK); medium priority for 6 (AB, CA, MB, TX, UT, WY); low priority by 4(BC, ID, NE, ND). Alaska and Saskatchewan split their priorities: Med-High (AK); Low-medium (SK).

All jurisdictions employ educational programs; most (11) employ informal education; 2 employ formal only (MB, WY) and 5 (AK, AB, CO, MT, NM) employ both formal and informal educational efforts.


Jurisdictions with anti-feeding laws
AK
YT
NT
NU
BC
AB
SK
MB
ON
QC
NL
PE
NB
ME
NS
WA
OR
CA
ID
NV
MT
WY
UT
AZ
CO
NM
ND
SD
NE
KS
OK
TX
MN
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AR
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MD
DC
HI

Slide 27

Black Bear Damage Compensation Payments

Jurisdiction	Agriculture	Livestock	Apiaries	Property	Annual Payments ($$): last 5-year mean
Alaska	No	No	No	No	N/A
Alberta	Yes	Yes	No	No	14,005.60
Arizona	No	No	No	No	N/A
BC	No	No	No	No	N/A
California	No	No	No	No	N/A
Colorado	Yes	Yes	Yes	Ag Prod. Only	368,000.00
Idaho	No	No	No	No	None
Manitoba	Yes	Yes	Yes	No	281,044.00
Montana	No	Yes	Yes	No	Unavailable
Nebraska	N/A	N/A	N/A	N/A	0.00
Nevada	No	No	No	No	N/A
New Mexico	No	No	No	No	N/A
North Dakota	No	No	Yes	Yes	0.00
Oklahoma	No	No	No	No	No
Oregon	No	No	No	No	N/A
Saskatchewan	Yes	Yes	Yes	Yes	2,730.00
South Dakota					
Texas	No	No	No	No	0.00
Utah	Yes	Yes	No	No	100,886.00
Washington	Yes	Yes	Yes	No	Just instituted
Wyoming	Yes	Yes	Yes	Yes	47,217.00
Yukon	No	No	No	No	No

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Compensation for damage caused by black bears: 7 Jurisdictions pay for Agricultural damage (AB, CO, MB, SK, UT, WA, WY); 8 pay for Livestock damage (AB, CO, MB, MT, SK, UT, WA, WY); 7 pay for apiary damage (CO, MB, MT, ND, SK, WA, WY); 4 pay for other property damage (CO, ND, SK, WY). Payments in jurisdictions that offer them run from just under $3,000 in Saskatchewan to $368,000 annually in Colorado.

Conflict Management Services provided by Agency, or Outsourced

Jurisdiction	Advice / Education	Electric Fencing	Rehab Facilities	Aversive Conditioning	Hazing	Trap and Transport
Alaska	Both	Both	No	Agency	Agency	Agency
Alberta	Both	Both	In review	Both	Both	Agency
Arizona	Agency	No	Outsourced	No	Agency	Agency
BC	Both	Outsourced	Outsourced	No	No	No
California	Agency	None	Outsourced	Trial Location	Agency	Both
Colorado	Both	Agency	Both	Both	Both	Agency
Idaho	Both	Both	Outsourced	Agency	Agency	Agency
Manitoba	Agency	No	No	Agency	Agency	Agency
Montana	Both	Both	Yes	Both	Both	Agency
Nebraska	Yes	N/A	N/A	N/A	N/A	N/A
Nevada	Agency	Fence Loan Program	Outsourced	Agency	Agency	Agency
New Mexico	Both	Agency	Outsourced	Agency	Agency	Agency
North Dakota	Yes	No	No	No	No	No
Oklahoma	Yes	No	No	No	Yes	Yes
Oregon	Agency	No	Outsourced	No	No	Agency
Saskatchewan	Yes	Outsourced	Outsourced	No	No	Yes
South Dakota						
Texas	Agency	No	Outsourced	Agency	Agency	Agency
Utah	Both	No	Outsourced	Agency	Agency	Agency
Washington	Both	Both	Outsourced	Agency	Agency	Agency
Wyoming	Agency	Agency	Outsourced	Agency	Both	Agency
Yukon	Both	Both	No	No	No	No

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All 22 jurisdictions provide Advice/Education regarding conflict management (this includes the 3 jurisdictions participating that do not have resident black bear populations; 10 also employ outsourcing for advice/educational material.

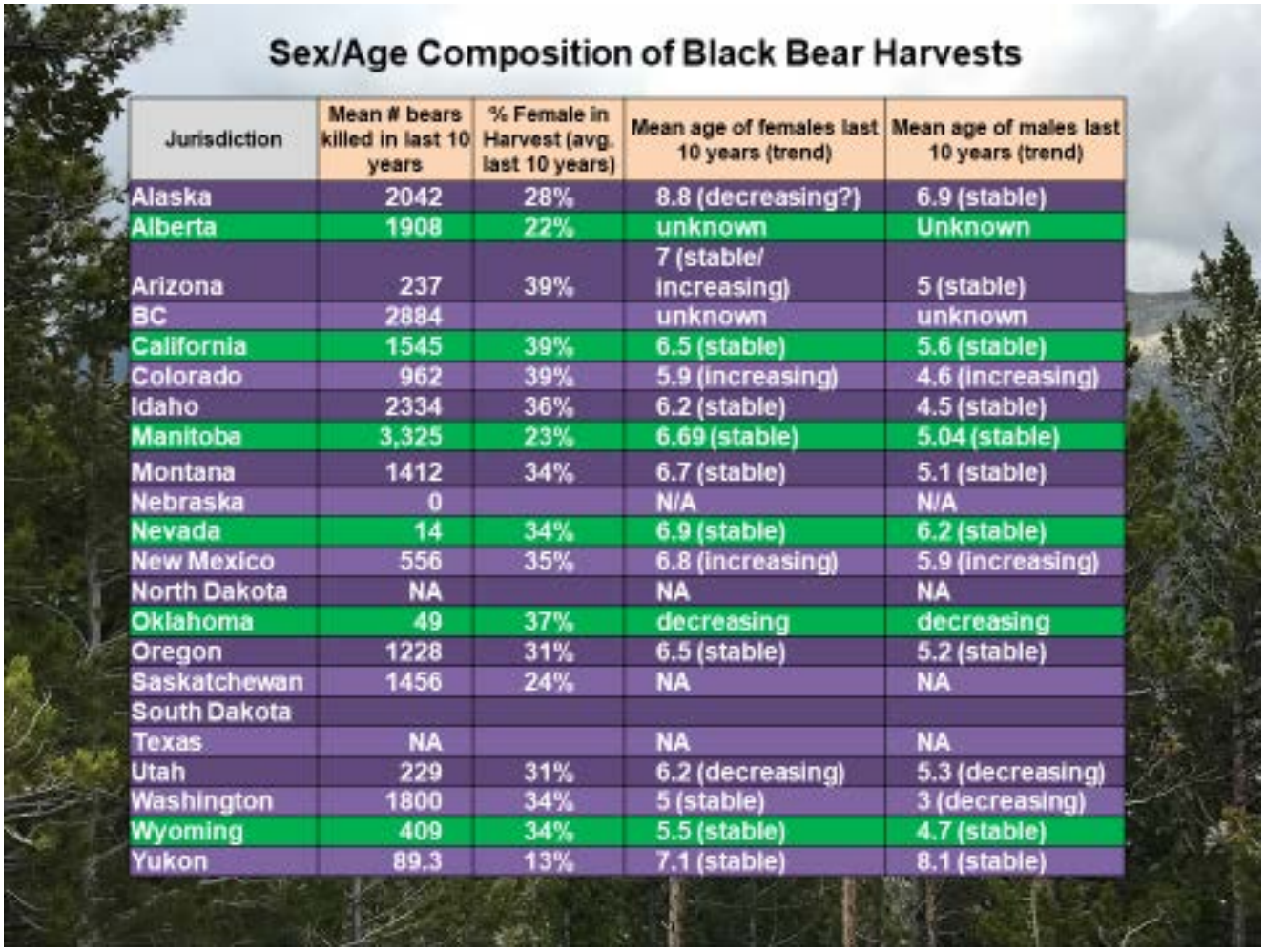
12 agencies participate in some way in an electric fencing program. 11 by agency; 6 both, 2 only use outsourcing.

Alaska, MB, ND, OK, and Yukon do not provide rehabilitation facilities. 14 use rehab facilities; most (13 outsource; only Colorado has agency rehab)

Arizona, BC, ND, OK, Oregon, SK, and YK do not provide aversive conditioning. 13 agencies use aversive conditioning; all agency, with Alberta, Colorado, Montana outsourcing also.

BC, ND, Oregon, SK, and YK do not participate in Hazing. 15 jurisdictions include hazing; all agency, and Alberta, Colorado, Montana, and Wyoming permit outsourced hazing.

BC, ND, Yukon do not have trap and transplant programs. 17 with trap/transplant; all agency, CA outsources as well.



Sex/Age Composition of Black Bear Harvests

Jurisdiction	Mean # bears killed in last 10 years	% Female in Harvest (avg. last 10 years)	Mean age of females last 10 years (trend)	Mean age of males last 10 years (trend)
Alaska	2042	28%	8.8 (decreasing?)	6.9 (stable)
Alberta	1908	22%	unknown	Unknown
Arizona	237	39%	7 (stable/ increasing)	5 (stable)
BC	2884		unknown	unknown
California	1545	39%	6.5 (stable)	5.6 (stable)
Colorado	962	39%	5.9 (increasing)	4.6 (increasing)
Idaho	2334	36%	6.2 (stable)	4.5 (stable)
Manitoba	3,325	23%	6.69 (stable)	5.04 (stable)
Montana	1412	34%	6.7 (stable)	5.1 (stable)
Nebraska	0		N/A	N/A
Nevada	14	34%	6.9 (stable)	6.2 (stable)
New Mexico	556	35%	6.8 (increasing)	5.9 (increasing)
North Dakota	NA		NA	NA
Oklahoma	49	37%	decreasing	decreasing
Oregon	1228	31%	6.5 (stable)	5.2 (stable)
Saskatchewan	1456	24%	NA	NA
South Dakota				
Texas	NA		NA	NA
Utah	229	31%	6.2 (decreasing)	5.3 (decreasing)
Washington	1800	34%	5 (stable)	3 (decreasing)
Wyoming	409	34%	5.5 (stable)	4.7 (stable)
Yukon	89.3	13%	7.1 (stable)	8.1 (stable)

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Harvest composition by sex and age do not necessarily provide much information regarding the trajectory of the underlying population, but review of trends in harvests, particularly portion of females, can be useful as a rule of thumb on harvesting rates. Here's a snapshot from this year's survey:

Proportion of females in harvest range from 13% in Yukon, to 39% in AZ, CA, and CO. Care to discuss?

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Seven jurisdictions reporting LE cases regarding gall bladders (British Columbia, California, Colorado, Manitoba, Montana, Oregon, and Washington. 21 responses)

Eight jurisdictions report LE cases regarding parts other than gall bladders (AK, BC, CA, CO, MB, MT, OR, WA)

Not much additional information contained in this set of questions

Research Summary

- (Not well-captured in this survey)
- 10 Jurisdictions are currently conducting population related research.
- Other work?
  - Urban bear behavior
  - Impacts of black bears on ungulate populations

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Acknowledgements

- Alaska – *Chris Krenz/Natalie Weber*
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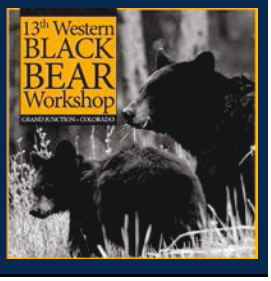
- Manitoba – *Ken Rebizant*
- Montana – *Bob Inman*
- Nebraska – *Sam Wilson*
- Nevada – *Pat Jackson*
- New Mexico – *Rick Winslow*
- North Dakota – *Stephanie Tucker*
- Oklahoma – *Jeff Ford*
- Oregon – *Derek Broman*
- Saskatchewan – *Mike Gollop*
- South Dakota – *Andy Lindboom*
- Texas – *Jonah Evans*
- Utah – *Darren DeBloois*
- Washington – *Rich Beausoleil*
- Wyoming – *Dan Bjornlie*
- Yukon – *Jodie Pongracz*



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Questions:

- Does the compilation of survey responses mesh with your perspectives on current bear management issues?
- What is needed for agencies to remain relevant, given society's expectations regarding black bear management in the changing West?
- This survey provided minimal insight into the relevant social issues surrounding bear hunting. What is needed for agencies to adapt to changing public perspectives and expectations regarding bears, and bear hunting?

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Conflict Topic Introductory Paper:

The Influence of Human Development on Black Bear Behavior and Demography: Lessons Learned from Durango, Colorado

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Stewart W. Breck, USDA-Wildlife Services, National Wildlife Research Center, Fort Collins, CO, USA

David L. Lewis, Colorado Parks and Wildlife, Durango, CO, USA

Stacy A. Lischka[2], Colorado Parks and Wildlife, Ft. Collins, CO USA; Department of Fish, Wildlife, and Conservation Biology, Colorado State University, Fort Collins, CO, USA

Jared Laufenberg[3], Department of Fish, Wildlife, and Conservation Biology, Colorado State University, Fort Collins, CO, USA

ABSTRACT Across the country, conflicts among people and black bears are increasing and have become a high priority for wildlife management agencies. Whether increases in conflicts reflect recent changes in bear population trends or just bear behavioral shifts to anthropogenic food resources has been largely unknown, with key implications for bear management. In response to this issue, we conducted a 6-year study in the vicinity of Durango, Colorado, to understand the influence of human development on black bear behavior and demography, and test the effectiveness of wide-scale urban bear-proofing for reducing human-bear conflicts.

Influence of human development on bear behavior: Using mixed-effects resource selection models, we found that bear use of development is dynamic and influenced by climate-driven variation in natural food conditions, challenging the assumption that bears will consistently rely on human food subsides. We also learned that warmer weather and use of anthropogenic food are reducing the length of bear hibernation, suggesting that future climate and land-use change will lengthen the active bear season, and likely result in increases in human-bear conflicts and human-caused bear mortalities.

Influence of development on bear demography: Using an integrated telemetry-mark-recapture analysis, we estimated a 57% decline in female black bear abundance immediately following a natural food shortage. The decline coincided with increased bear use of development, and subsequent increases in human-caused bear mortality (e.g., vehicle collisions, harvest and lethal removals), which resulted in a significant shift in the distribution of bears on the landscape. Known-fate vital rate analyses revealed that increased bear use of development was associated with reduced cub and adult survival, but increased body condition and cub productivity. Although human development influenced different vital rates in unique ways, population projection models revealed that the costs of reduced survival outweighed the benefits of increased productivity, resulting in declines in population growth as bear use of development increased.

Bear-proofing for reducing conflicts: Between 2011 and 2016, we conducted a before-after-control-impact experiment where we distributed 1,110 bear-resistant trash containers into two treatment areas, while also monitoring two paired control areas. We found that trash-related conflicts were 60% lower in treatment areas than control areas, resident compliance with local wildlife ordinances (properly locking away trash) was 39% higher in treatment areas than control areas, and the effectiveness of the new containers was immediate. Importantly, we found conflicts declined as resident compliance with wildlife ordinances increased to ~60% (by either using a bear-resistant container or just locking trash in a secure location). Our results suggest that changes in waste management can reduce conflicts, bear use of development, and presumably other consequences for people and bears. Our study has elucidated some of the factors driving increases in human-bear conflicts, and some of the associated consequences for bear populations. As human development

continues to expand on western landscapes, it will be increasingly important for wildlife agencies to monitor the dynamics of black bear populations, and increase efforts to limit the availability of anthropogenic foods.

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Panel I: Perspectives in Conflict Management Stakeholder Panel, Moderator – Stewart Breck

Matt Howell, Chapter President, Four Corners Safari Club International

Martin Lowney, Colorado Director, APHIS/Wildlife Services

Steve Barkley, Code Enforcement Officer, City of Durango

Perry Will, Area Wildlife Manager, Colorado Parks and Wildlife

Mike Orlando, Bear Biologist, Florida Fish and Wildlife Conservation Commission

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Panel Discussion Summary: Five speakers representing a diversity of views presented their perspectives on black bear issues and management in Colorado and Florida. The following is a summary for each speaker.

- Matt Howell offered a hunting perspective for the audience. He related hunting bears as a child in southern Colorado and shared his belief that the bear population had increased over several decades. He brought forward concern about bear predation on elk populations and the perspective that sometimes there was distrust between managers and hunters. He brought forward positive ideas about how to build better relationships through clear communication.

- Martin Lowney discussed issues related to bear predation on sheep and other livestock. In particular, Martin focused on the difficulty of understanding trends in depredation when using national statistics. The need to collect better data on bear impacts to this industry and the impact of management actions on bears was highlighted.

- Steve Barkley talked about the ongoing efforts to reduce garbage availability and other anthropogenic food sources in the town of Durango. The importance of law enforcement and community engagement were discussed with the recognition that changing cultural practices is difficult and requires a diversity of approaches that are backed up by clear and enforceable laws and regulations.

- Perry Will provided an update on the continuing work to reduce bear-human conflict in the Aspen and Roaring Fork area. Perry shared opinions and knowledge garnered from extensive efforts put forward trying to better manage people and bears in the area. The importance of getting people to change their behavior was emphasized and failures as well as successes in this regard were shared.

- Mike Orlando shared experience and knowledge from the Florida system that was primarily focused on reducing conflict with urban bears in Florida (see abstract below). The value of teamwork and utilizing a diversity of resources all aimed at a common goal of reducing negative interactions were emphasized.

The Florida Black Bear: FWC bear management and conflict strategies

Mike Orlando, Florida Fish and Wildlife Conservation Commission, 908 West Voorhis Ave. Deland, FL 32720, USA. Email: Mike.Orlando@MyFWC.com

ABSTRACT The Florida black bear population (*Ursus americanus floridanus)* was state listed as threatened throughout most of its range in 1974 due to low population numbers (approximately 300–500 individuals) and restricted range (13% of historic range). Updated population estimates (approximately 3,000 individuals), conservation practices and a review of state listed species designation facilitated the removal from the list in 2012. As the bear and human populations continue to increase, so have human-black bear conflicts. The current human population is approaching 21 million and the bear population is just above 4,000. The number of reported conflicts has increased from 840 in 2001 to 6,226 in 2017. The Florida Fish and Wildlife Conservation Commission (FWC) implements multiple approaches to help mitigate conflicts. The FWC has trained over 2,300 sworn and non-sworn personnel statewide to haze bears with less-lethal deterrents, changed rules to allow the public the haze bears with paintball guns and sling shots, hired over 25 private bear contractors to aid in field response statewide, hired 5 new field staff specifically dedicated to human-bear conflict response, created bear educational video clips, actively promotes a Florida black bear curriculum for K–12, changed the bear feeding rule and the associated penalties, manages a college intern program to help with bear management projects, uses coordinated statewide media events, deploys mobile billboards and 'pop-up' outreach booths to promote bear awareness in hot spot areas. Between July 1, 2007 and June 30, 2018, the FWC will have distributed almost $1.6 million to 16 counties with the highest levels of human-bear conflicts in the State. The funding shares the cost to purchase bear-resistant equipment with local governments, residents, and businesses to help them keep garbage and other attractants secure from bears. Grants have resulted in 10,400 bear-resistant trashcans, 9,750 sets of hardware that can be added to regular trashcans to make them bear-resistant, 170 bear-resistant dumpsters, 90 secured sheds, and 5 electric fence systems.

KEYWORDS Florida, *Ursus americanus floridanus*, education and outreach, bear-resistant, human-bear conflicts, BearWise, bear contractors.

Poster Session: Organizers – Kristin Cannon and Shannon Schaller, Colorado Parks and Wildlife

A Visual Case Story of Boulder, Colorado's Efforts to Coexist with Local Black Bears

Melanie Hill, University of Colorado MA Candidate, Media & Public Engagement, 1110 Monroe Drive, Unit D, Boulder, CO 80303, USA. Email: Melanie.hill@colorado.edu

ABSTRACT Each year in Boulder, Colorado, human communities frequently experience a variety of negative interactions with black bears. Unsecured trash, unharvested fruit, bird feeders, and other edible items are the common culprits that lure bears into urban areas. As a consequence, bears may become habituated to urban life and require physical management action to be taken, such as relocation or euthanasia. The presence of city-dwelling black bears also poses a threat to human safety as well as other matters relating to property damage. In response to these concerns, this Master's thesis explores how stakeholder collaboration, community engagement efforts, and visual storytelling materials may help reduce human-black bear conflicts in Boulder, while also serving as a guide to coexistence for other communities living with these omnivores. Responses from a 2018 community survey will provide background on residents' experiences and perceptions and will help frame future outreach materials. The Bears & People Project works with local stakeholder groups such as Colorado Parks & Wildlife, the City of Boulder, and Boulder Bear Coalition to strengthen community engagement efforts and create new opportunities for citizen involvement. Examples of community efforts include a jointly-managed bearsitter program, urban fruit harvests, the creation of a native forage buffer zone, and implementing new ambassador groups through various Boulder neighborhoods and the University of Colorado. The spring 2018 deliverable from this creative-track thesis will come in the form of a website which will be displayed as a visual case story of Boulder's efforts to coexist with local black bears.

KEY WORDS Black bear, Boulder, Coexistence, Collaboration, Community engagement, Conflict, Education, Outreach, *Ursus americanus*, Visual communication.

Black Bear Density, Habitat Use, and Tree Damage on the Muckleshoot Tribe's Commercial Timberlands in Western Washington.

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Michael P. Middleton, Muckleshoot Indian Tribe Wildlife Program, 39015 172nd Ave S.E., Auburn, WA 98360, USA. Email: Mike.Middleton@muckleshoot.nsn.us

ABSTRACT The Muckleshoot Indian Tribe has a history of managing big game based on science and sound biological principles. To better understand and manage black bear (*Ursus americanus*) in the Tribe's ceded treaty area of western Washington we are studying bear density, habitat use, and tree peeling behavior. Our objectives are to 1) estimate bear density and abundance in the White River drainage, WA 2) determine home range size while identifying habitats important to black bear 3) evaluate impacts of individual bears on commercial forest stands and tree value 4) investigate effectiveness of the current bear feeding and removal program and 5) write the Muckleshoot Indian Tribe's Black Bear Management Plan. Fieldwork began in 2017 and will continue through 2018. In 2017 we gps collared 25 bears resulting in collection of over 90,000 locations to date that will be used to develop a resource utilization function model that will take into account missing fixes for the bear gps data. For density estimation with spatially explicit capture mark-recapture modeling we constructed 63 hair snag sites and baited them for four one week trapping sessions resulting in collection of 760 hair samples and genotyping of 74 individual bears. To evaluate impacts of bears on forest habitats and tree value we investigated 97 GPS collar waypoint clusters from 20 bears and documented 100 freshly peeled trees at those sites. We also monitored use of 9 bear feeder barrels with hair snags, and surveyed 18 timber stands for tree peel rates.

KEY WORDS Washington, Muckleshoot, black bear, density estimation, habitat, depredation, tree peeling, gps, *Ursus americanus,* tribal wildlife grant.

Black bear (*Ursus americanus*) Demography, Space-use, and Habitat Associations in the Warner Mountains, California, USA

Steffen D. Peterson, Humboldt State University, Department of Wildlife, 1 Harpst Street, Arcata, CA 95521, USA. Email: Steffen.Peterson@humboldt.edu

ABSTRACT The American black bear (*Ursus americanus*) is a valued game species to the state of California and statewide increases in bear abundance have resulted in regional population growth and recolonization of historic range. In response to the states growing bear population, CDFW increased the statewide bear harvest quota by 13% in 2012 but has not expanded the current hunt zone due to insufficient information on populations beyond current harvest boundaries. Thus, CDFW biologists need spatially and temporally relevant information on black bear demography and space use to make scientifically and publicly defendable bear management decisions. In northeastern California, increased black bear nuisance reports and sightings have led to CDFW interest in investigating bear demography and assessing whether bear abundance is suitable for the implementation of harvest. An area of particular interest to regional biologists is the Warner Mountains where mounting issuance of depredation permits to private land owners have underscored the importance of assessing management strategies. Determining population demography and distribution are foundational to wildlife conservation and understanding factors that influence bear density, demographics, and habitat use will be essential to guiding black bear management in this region. Population density and demographic information will be estimated using non-invasive detector arrays within the 1,464 km^2 study area. Hair-snare stations will be placed within 2 km^2 grid cells arranged in 3 x 3 sampling grids. A total of 90 hair-snares distributed over 10 sampling grids will be monitored over five, 10-day long sessions in July–September, 2018. Additionally, a total of 60 trail-cameras will be deployed at a subset of hair-snare stations to estimate the cub-adult ratio for this population. Spatial capture-recapture (SCR) models will incorporate landscape covariates and capture history data to estimate density across the study area and identify habitat features that may be important to black bears.

KEY WORDS Abundance, black bear, demography, Great Basin, habitat, spatial capture-recapture, *Ursus americanus*, Warner Mountains.

Preliminary Results on the Spatial Distribution of Coat Color and Chest Blaze Phenotypes in American Black Bears (*Ursus americanus*)

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ABSTRACT The common names for black (*Ursus americanus*) and brown (*U. arctos*) bears belie the diversity of coat colors observed within each species. Data from geo-referenced photos and museum skins suggests that coat colors are distributed with distinct spatial patterns throughout each species range. Relatedly, the presence and shape of the chest blaze phenotype has not been studied to date, but likely has a heritable component resulting in spatial patterns. Thus, this project will describe the spatial patterns of phenotypes in bears, identify the genes and alleles underlying this diversity, then combine the information within a phylogeographic framework. Field-based phenotyping was performed across the range for black and brown bears in North America by photographing their chests and faces. Following color correction, images were analyzed to determine coat color, chest blaze presence, and chest blaze shape. Phenotypes were spatially referenced to describe patterns across the range. While this project focuses on the evolutionary ecology of bears, there may be latent management applications. Brown colored black bears appear at low frequencies in the northeastern portion of their range (i.e. Ontario, New York) which may be due to gene flow; this project could quantify rates of bear movement through continuous habitat. Second this project will provide proof of concept for linking phenotypes to genotypes. Thus, phenotypes of interest to managers may be identified and investigated in the future.

KEY WORDS chest blaze, coat color, evolutionary ecology, functional phylogeography, phenotype.

American Black Bear (*Ursus americanus*) Density, Diet, and Distribution Near Moab, Utah

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Çağan Hakkı Şekercioğlu University of Utah, Department of Biology, 257 1400 E, Salt Lake City, UT 84112, USA

ABSTRACT After building accounts of encounters with American black bears near the Rio Mesa Field Station near Moab, Utah I am investigating factors that influence the sustainability of these large mammals. With these individuals likely originating from southern populations in the La Sal Mountains, the potential for more black bear migrants increases with rising populations and hunting pressures. Research on the current density, diet and distribution patterns is valuable information in aiding the mitigation of human-wildlife conflict. Camera trap photos gathered during our preliminary study from May–November 2017 confirmed frequent use of canyons in the field station; prints and scat found near riparian areas documented further use of the property. To gather information about diet and density, I'm establishing at least 5 monitoring stations where two opposing camera traps will be facing a scented fur snare. The scent of the fur snare invites investigation by individual bears, increasing the probability of contact. The snare will collect fur from the animal's face, which will later be retrieved and brought back to the University of Utah for stable isotope analysis. Ratios of carbon and nitrogen isotopes allow insight into the general diet of the individual, with implications on how much plants, animals, or human food is a part of their diet. Furthermore, hydrogen and oxygen isotopes between significantly different elevations such as Rio Mesa and the La Sals give noticeable signatures. Well-preserved hairs can infer how much, if any, of an individual's lifespan was spent between the 2 localities. Information on the nutritional behavior and movement of local bears can be valuable tools for approaches to decrease human contact in this highly visited region.

I hope for this presentation to allow feedback that brings more insight or potential collaboration in improving this research to be valuable in aiding bear conflict mitigation.

KEYWORDS black bear, Moab, Utah, stable isotope, camera trap, fur snare, diet, density, conflict, *Ursus americanus*

Wildlife Ordinance in Snowmass Village

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Laurie Smith, Snowmass Village Animal Services, P.O. Box 5010, Snowmass Village, CO 81615-5010, USA

ABSTRACT The town of Snowmass Village adopted a wildlife ordinance in 1994. It was the first wildlife ordinance in the State of Colorado. The Snowmass Village Police Department encourages community compliance, and enforces the ordinance strictly, to prevent black bear relocation and euthanasia due to human food attractants. Our efforts are ongoing since 1994.

- Citations are issued annually for Feeding of Wildlife
- Surrounding communities are relocating and euthanizing bears
- Our wildlife ordinance enforcement is a continual work in progress
- The program is accepted by the community. New homeowners and visitors are educated to comply with the ordinance.

Two Animal Services officers are the foundation of the enforcement program but the entire police department is active in education and enforcement. We would like to present our successes and failures using photographs and simple statistics. Our poster presentation would be based on our management program and not science or statistic based.

Session I: Conflict, Moderator – Matt Eckert

Evaluation of Human-Black Bear Conflicts and Management Strategies in Wyoming

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ABSTRACT Wyoming has experienced stable to increasing black bear (*Ursus americanus)* populations in the last two decades. The Wyoming Game and Fish Department has used deterrence, attractant management, translocation, and removal to mitigate human-black bear conflicts. Some morphological factors considered when choosing management options include gender, age, physical condition of individual bears. Other factors include type and severity of conflict, availability of suitable relocation sites, human safety, and other social factors. The presentation will discuss Wyoming's experience with human-black bear conflicts. Topics to promote discussion include: brief history of conflicts in WY; attractant storage practices; information and education programs; the 'grizzly' factor; hunting and conflict; and the evolution of public attitudes and involvement.

Understanding the Effect of Conflict on Human Behavior and Tolerance for Black Bears

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Tara Teel, Colorado State University, Fort Collins, CO 80523, USA

Heather Johnson[2], Colorado Parks and Wildlife, Durango, CO 81303, USA

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Kevin Crooks, Colorado State University, Fort Collins, CO 80523, USA

ABSTRACT In response to increasing human-black bear conflicts in residential settings, management agencies and municipalities have instituted regulations and ordinances requiring bear-proofing of residential garbage with the goal of reducing anthropogenic food available to bears and, therefore, human-bear conflicts. Implicit in these actions is the assumption that a reduction in conflict will increase resident tolerance for bears, enabling long-term coexistence of bears and people. While ordinances are common, managers lack information about how to effectively motivate compliance with them and the outcomes of reduced conflict for communities and agencies. To this end, we used a longitudinal survey and observations of residential bear-proofing behavior to understand the social outcomes of a community-wide bear-proofing experiment in Durango, Colorado (2012–2016). We found that most residents used bear-resistant containers irregularly, at best; only 20% of observed households bear-proofed garbage on all observations in 2014 and 26% in 2016. Regression models of bear-proofing behavior showed that garbage-related conflicts increased compliance behavior, while greater trust in the management agency decreased such behavior. Tolerance for bears was moderate ($\bar{x}_{2012}$ = 2.78, Range 1–6) at the start of the experiment, and a meaningful reduction in conflicts (60%) did not increase tolerance for bears ($\bar{x}_{2016}$ = 2.82). Tolerance for bears was best explained by perceptions of benefits and risks from bears. While our data identify methods to increase bear-proofing behavior, they also indicate that efforts to reduce conflict may not be sufficient to increase tolerance for bears. Communication efforts which highlight both the risks to people from conflict and the benefits of bears to communities, as well as the importance of individual actions in reducing conflict, may be effective at increasing compliance and tolerance, ultimately contributing to the long-term goal of coexistence of people and bears in the rapidly changing landscapes of the West.

KEYWORDS Colorado, black bear, bear-proofing, conflict, human dimensions, tolerance.

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Using Stable Isotopes to Inform Human-Bear Conflict Management

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Richard A. Beausoleil, Washington Department of Fish & Wildlife, 3515 State Highway 97A, Wenatchee, WA 98801, USA. Email: richard.beausoleil@dfw.wa.gov

ABSTRACT Anthropogenic food is subsidizing wildlife populations at a global scale. Whether the subsidies are deliberate or unintentional, they can become a constant and reliable food source in human-altered landscapes with individual, population, and ecosystem level effects. Expanding human development and drought conditions have been considered major contributors to rates of human-bear conflict and consumption of anthropogenic foods (via garbage cans) by black bears in Washington State. Baiting as a hunting aid, and potential additional anthropogenic food source, is banned throughout Washington. However, an intentional feeding program described as diversionary feeding has operated in western Washington since 1985 as an attempt to reduce damage by black bears on commercial timber land. Our objectives were to quantify assimilated diet, compare diet between bears involved in human-bear conflict and those that were not, and identify relationships between diet and body mass. We used carbon and nitrogen stable isotope analysis to study the consumption of both anthropogenic food types (garbage and diversionary feed) by 127 bears on two study areas in Washington from 2012–2016. Due to similar isotope signatures, we were not able to distinguish between garbage and diversionary feed, therefore we grouped the two categories together into one anthropogenic food category. We did not detect a relationship between drought and anthropogenic food consumption, however adult males in western Washington consumed more human supplied foods (41%) than other sex-age classes (25%) and we found higher levels of anthropogenic food consumption in bears involved in conflict (45% vs. 24%). Analysis also revealed a significant relationship between diet and body mass for all sex-age classes in western Washington. Our results suggest that consumption of anthropogenic food by black bears is common and widespread in western Washington, which produces larger bears that in turn need to obtain a higher amount of calories, and have the potential for increased reproduction.

KEY WORDS anthropogenic, diversionary feeding, human-bear conflict, stable isotope, *Ursus americanus*.

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Implementing an Effective Community-Supported Ordinance to Secure Trash from Black Bears: A Case Study from Boulder, Colorado

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ABSTRACT Like many other communities, the City of Boulder (population 102,420) has experienced increased bear-trash conflicts. In 2014 four bears were killed in the city due to public safety concerns and community support increased for new laws requiring trash to be secure from bears. The three-year journey to establishing community-supported laws that require trash to be secured from bears consisted of stakeholder collaboration; increased community awareness about the association between unsecured trash and bears being killed; addressing obstacles such as increased costs; and a feasible enforcement strategy. Implementation of the new requirements was phased, and required approximately 6,000 waste carts to be bear-resistant as of October 2014, and an additional 8,700 carts and 460 dumpsters were required as of June 15, 2016. Implementation of the new ordinances has substantially decreased bears' ability to access trash in Boulder and brought a welcome increase in the cleanliness of the community.

Session II: Conflict Mitigation, Moderator – Craig McLaughlin

Summarizing Colorado's Black Bear Two-Strike Directive 30 Years after Inception

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ABSTRACT In 1985 Colorado Parks and Wildlife (CPW) implemented a new statewide management policy for nuisance black bears (*Ursus americanus)*, known today as the two-strike directive. It allowed wildlife managers to assess the repeatability of nuisance bear behavior after translocating them to quality bear habitat away from human food sources. We evaluated this directive using 30 years of nuisance black bear capture records. We also examined fates of a small subset of translocated bears from 1995 to 1997. Statewide, 53% of 1,093 bears caught, marked, and moved (1st strike) were never reported again, while 25% were killed for a 2nd strike, and hunters harvested 17%. Subadult males committed 2nd strikes more quickly than adult males and females. Although time between strikes was greatest for adult females (496 days), they had the highest probability of committing a 2nd strike among all cohorts. We found that the number of 1st strike captures, from late summer through fall was highest during poor mast production years. Using radio telemetry on a subset of translocated bears in the south-east region we estimated annual survival for adults (0.50, 95% credible interval [CI] = 0.36–0.65) and subadults (0.28, 95% CI = 0.12–0.48). The annual probability of dying due to repeat conflict behavior was slightly lower (0.22 [95% CI = 0.13–0.33] and 0.32 [95% CI = 0.19–0.47]) for adults and subadults, respectively, compared with nonconflict mortalities (0.28 [95% CI = 0.17–0.40] and 0.40 [95% CI = 0.25–0.56]). Based on bears that were not involved in known repeat human-bear conflicts, translocation success was 0.64 (95% CI = 0.49–0.78) and 0.58 (95% CI = 0.42–0.73) for adults and subadults, respectively. We suggest that the two-strike policy has been an effective management tool for nuisance black bears in Colorado because of low rates of nuisance behavior following 1st strike translocation. Additionally, if a state or local management objective was to increase black bear populations, we recommend wildlife managers increase tolerance of adult bears that have received their 1st strike in years when fall mast crops largely fail because they are less likely to commit a 2nd strike. Furthermore, some adult bears live for many years before committing a 2nd strike, which suggests bears are opportunistic, which may lead adults to seek urban foods primarily during natural fall forage shortages. Lower tolerance of subadult males may be warranted in bad food years, as they tend to repeat nuisance behaviors more quickly, especially in areas where reductions in bear populations are desired.

KEY WORDS black bear, Colorado, conflict, management, mortality, nuisance, second strike, translocation, *Ursus americanus.*

The Use of Conductive Electrical Weapons in the Aversive Conditioning of Black Bears

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ABSTRACT Colorado Parks and Wildlife (CPW) is statutorily responsible for managing bears to provide for the long-term conservation of bears as a viable species, to maintain human safety, to mitigate depredation to livestock, and to provide hunting opportunities. Over the last decade the use of Conductive Electronic Weapons (CEWs), such as TASERs, have become increasingly popular as a method of aversive conditioning of black bears. However, as with the other techniques, the use of a TASER CEW as an effective means of aversively conditioning a bear has not been evaluated. Colorado Wildlife Officers will discuss the CPW's policy for the use of CEWs along with specific instances where they have been used. They will also briefly present information about a proposed study to evaluate the use of TASER CEWs to aversively condition black bears that are in town and compare this treatment to other standard treatments (rubber bullets and beanbags) to evaluate whether one method has a greater behavioral response in altering how bears utilize these urban interface environments.

Agency Use of Dogs for Carnivore Conservation and Management in Washington

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ABSTRACT Since 2003, agency staff with Washington Department of Fish and Wildlife (WDFW) has been partnering with Karelian Bear Dogs (KBD's) for a variety of research, management, and enforcement applications. Our KBD program started with a desire to: (1) be more self-sufficient in black bear (*Ursus americanus*) and cougar (*Puma concolor*) research activities; (2) be more effective when responding to human-wildlife conflicts; and (3) employ aversive conditioning techniques of bears captured in human conflict situations. In addition to making us better at our jobs, we wanted a more effective means of connecting with the public to bring attention to the message of conflict prevention, and the dogs have proven themselves as very capable ambassadors.

The success of the KBD's, and incredible public support, has resulted in expansion of the program; as of May 2018, Washington has had 7 KBD's partnering and working with biologists and wildlife officers statewide. The KBD's help staff with tracking and radiocollaring efforts for agency research projects, finding injured and orphaned wildlife, human-wildlife conflict resolution, education and public outreach, and finding remains of illegally taken wildlife. Some of the rarer, unexpected capabilities of the KBD's include finding a deceased hiker's remains when search and rescue teams were unable to, capturing a black bear involved in a rare attack on a human within 15 minutes of being on the scene and restoring calm to the local community, and on-leash hazing of bighorn sheep and moose away from roads and people.

Most commonly, KBD's are working with bears involved in human conflict, as sometimes only hazing is needed. When attractants are more prevalent, and captured bears are candidates for release, we utilize on-site releases as much as possible, coupled with aversive conditioning. Sometimes that means literally on-site in someone's backyard (as many conflicts occur right on the wildlife/urban interface), but also transporting the bear (many times <1 mile) to the closest forested area and conducting the release there. This benefits the individual bear by staying within its home range where it ultimately has the best chance at survival (e.g. known natural food source locations, not having to cross unfamiliar roads trying to return, and not being placed in an area occupied by unknown bears). The hope is, if captured early in this behavior, is that the bear learns the danger zones within its own home range. By not transporting and relocating long distance, staff can use that time more effectively to find attractants, explain to the public why the conflict occurred, prevent a repeat performance, and educate the local community.

What we didn't expect about the KBD program, is the overwhelming public response and support of this program. Washington's citizens are very supportive of non-lethal solutions for resolving human-wildlife conflict and the KBD's offer us that option. The KBD Program is 100% supported by private donations. The agency allows the use and the transport of KBD's, but the fund provides the monetary support for everything else. Our KBD program has been featured on television numerous times including all major news networks in Washington, Good Morning America, Nightline, Animal Planet's Dogs 101, and many more.

In closing there are some "lessons from the field" that should be shared. The KBD's are not like other tools we use in bear management, they are not equipment, cannot be "stored until needed" and the dogs cannot be transferred among staff. The socialization that occurs from birth at Wind River Bear Institute (the only facility we would recommend), and throughout the dog's life, requires that these dogs not be used like a police K-9; people are partners and friends that are protected, and other dogs are not seen as foes. Also, not all biologists

and officers should be considered candidates. It takes a huge commitment and handling skills; so an approach of putting tacks on a map where conflicts occur and KBD's might be effective would be a huge mistake. The commitment of being a KBD handler is enormous and requires a 24 hour, 7 days a week, 365 days a year commitment. If an agency is considering using KBD's, it is recommended that you talk with other KBD handlers extensively. Also, establishing a 501c3 non-profit to stay away from agency budget fluctuations is recommended; as the dogs should never put in a situation of not being worked.

The Florida Black Bear: The Good the Bad and the Ugly

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ABSTRACT – Florida has a black bear population (*Ursus americanus floridanus)* that has recovered from a low of 300 to 500 bears in the 1970s to over 4,000 bears today, roaming across 45% of their historic range. Florida has a human population approaching 21 million and had over 100 million visitors in 2017. The number of reported human-bear conflicts has increased from 840 in 2001 to 6,226 in 2017. Over 1/3 of all calls report bears eating from garbage cans, which is the primary attractant luring bears into neighborhoods. There have been 15 incidents where bears have injured people in Florida since the 1970's, with four incidents resulting in serious injuries occurring between 2013 and 2014. Unlike some other states, most of the incidents occurred in suburban or urban neighborhoods. These incidents initiated several changes in how the FWC manages bears, including aggressively removing any bears that could be considered a risk to public safety, changing the bear feeding rule and the associated penalties, hiring new staff and contractors to respond to human-bear conflicts, and implementing a depredation permit system. The FWC also re-opened bear hunting in 2015 after a 21-year closure. The objective of the hunt was to stabilize four of the seven bear subpopulations by ensuring 20% overall annual mortality in each unit. The FWC faced public opposition to the 2015 bear hunt, including an unsuccessful attempt to stop the hunt in the courts. The hunting season was scheduled for October 24th to 30th, however, hunters had to check in with the FWC daily to find out whether the quota for each of the 4 management units was met, and if so, the hunt would be closed. The FWC closed the hunt statewide after 304 bears were harvested within the first 2 days of the hunt. The FWC Commission decided to suspend future hunts until the bear management plan was reviewed and updated with new information since its approval in 2012, and to include more information on hunting as a management tool. The plan is anticipated to be brought up for Commission review in 2019.

KEYWORDS Florida, *Ursus americanus floridanus*, human-bear conflicts, BearWise, Bear hunting.

Understanding and Managing Black Bear Damage with Imperfect Information

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ABSTRACT Information is needed about individual wildlife species to write management plans, conduct environmental evaluation, support hunting programs, and manage damage claims. We looked at multiple data-sets for managing black bear predation to sheep and cattle in Colorado to evaluate agency services. We used National Agricultural Statistics Service (NASS) data, United States Department of Agriculture - Wildlife Service's Management Information System and Bear and Mountain Lion Request Form data, and Colorado Parks and Wildlife compensation damage and hunter harvest data to better understand bear damage to cattle and sheep in Colorado. Bear predation on livestock occurs primarily from the last week of June to the third week of August. Male bears are responsible for more than 75% of predation on cattle, calves, rams, ewes and lambs. While only 4.4% of cattle and 10–12% of sheep producers in Colorado incur predation from any predator annually, these losses are deemed manageable. Larger livestock operations are range operations versus pasture operations and larger operations incur more predation losses than smaller operations. NASS data informs that black bears are involved in 1% of cattle losses in 2015 and 5% of sheep and 3% of lamb losses nationally in 2014. In Colorado, reported cattle and calve losses to black bears has been increasing since 2005. Reported cattle and calf predation losses to black bears is significantly higher in Colorado and Utah compared to other western states. While all sheep losses to black bears averages about 5% since 1994 nationally, in Colorado losses have been increasing since 1994 and black bears now account for 26% of all predator loss. Sheep losses are similar to cattle losses in the western states with Colorado and Utah losing about 3,000 sheep per year each to black bear predation while adjacent states loose only a few hundred. Cattle and sheep producers are compensated by Colorado for losses due to black bear predation. Cause of livestock death must be verified within 3–4 days of death, notification of discovery of damage filed within 10 days and a claim filed with the state within 90 days of the last loss or incident. Claim losses for sheep equal about a quarter of reported losses from NASS data. Claim losses for cattle equal about 1% of reported losses from NASS data. Differences in husbandry practices between sheep and cattle producers influences ability of each commodity to comply with compensation program requirements. Further, few cattle losses can be verified as to cause of death. NASS data for cattle losses due to predation may overstate actual losses. Case studies of compensation payments indicate timely removal of problem black bears may reduce payments by more than 50%. Further evaluation of compensation payments is needed. Overall mortality of bears from hunting and non-hunting causes has been increasing since the mid-1990s when an estimated 4,000 bears lived in Colorado. Today, about 20,000 black bears live in Colorado with hunter harvest taking about 1,150 bears and non-hunter harvest taking an additional 600 bears.

KEY WORDS black bear, cattle, compensation, National Agricultural Statistics Service, predation, sheep

Panel II: Agency Lessons in Liability and Litigation from Bear Attack Events, Moderator – Mark Vieira

Speaker Presentations

Martin Bushman, Assistant Attorney General, Utah Attorney General's Office

Brian DeBolt, Large Carnivore Conflict Coordinator, and **Dan Bjornlie**, Large Carnivore Biologist, Wyoming Game and Fish Department

Kelly Crane, District Wildlife Manager, Colorado Parks and Wildlife

Michael Rusing, Attorney, Rusing Lopez & Lizardi, P.L.L.C.

Panel Discussion Summary: Each speaker began with an introduction and description of the background and events surrounding a black bear attack that they were involved with. This included a fatal campground black bear attack in Utah, a fatal grizzly bear attack in Wyoming, a black bear fatality associated with illegal feeding in Colorado and a non-fatal black bear attack in Arizona. Each panelist provided their insights and suggestions to workshop attendees on the nuances of their particular situation as well as steps or evaluations they would recommend land management and wildlife agencies consider proactively before a potential black bear attack, as well as after an event. After a presentation from each panelist, a moderated panel discussion generated significant debate and interactions.

Topics discussed included:

- responsibility for signage when an agency was aware of a bear in a certain area
- the need to good documentation from agency staff
- the pros and cons of general versus specific wording in agency policy regarding bear conflicts
- liability from the collections of live-time GPS data on bear locations

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Clinic I: Drones

Unmanned Aircraft System applications at the National Wildlife Research Center: how can we apply this to black bears?

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Justin ran a nearly 2-hour clinic on the possible role of drones for use in managing black bears. He applied his extensive experience as a drone pilot working on issues associated with conflicts, feral pig damage and applied these concepts to black bears. Justin provided background information on the evolution of drones and their current capabilities. Several different drone models were discussed and data from work on feral pigs was presented to illustrate a variety of feature and methodologies that can be utilized with drones. Issues of handling data and the legalities of flying drones as a biologist in a federal agency were covered. Justin finished by speculating that drones could be useful for identifying and quantifying crop damage caused by black bears, as a method for quantifying the number of bears in the field and could possibly for hazing bears.

Session III: Bear Ecology, Habitat and Predation, Moderator – Chuck Anderson

Natural Rewilding of the Great Basin: Genetic Consequences of Recolonization by Black Bears (*Ursus americanus*)

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ABSTRACT In the mid-twentieth century, many populations of large-bodied mammals experienced declines throughout North America. Fortunately, within the last several decades, some have begun to rebound and even recolonize extirpated portions of their native range, including black bears (*Ursus americanus*) in the montane areas of the western Great Basin. In this study, we examine genetic variation in source and recolonized areas to better understand the genetic consequences of extirpation followed by a natural recolonization. Using multiple loci, we characterized genetic variation among source and recently recolonized areas occupied by black bears, tested for population structure, and applied Approximate Bayesian Computation (ABC) to test competing hypotheses of demographic history. We assessed signals of gene flow using expectations of genetic consequences derived from alternative modes of recolonization (Bottleneck, Metapopulation, Island Model) and tested for significant signals of genetic bottlenecks in areas recently recolonized by black bears. As anticipated from field survey data and hypothesized expectations, genetic variation of western Great Basin black bears retain an overall signature of demographic decline followed by recent rebound. Furthermore, results reveal that bears in the recolonized range are minimally differentiated from the source area, but newly established subpopulations have lower effective population sizes and reduced allelic diversity. Nevertheless, recolonized areas fail to show a significant signal of a genetic bottleneck. Moreover, bears occupying recolonized areas experience asymmetric gene flow, yielding strong support for a model of genetic connectivity that is best described as a metapopulation. This study presents one of the few empirical examples of genetic consequences of natural recolonization in large-bodied mammals. Further, these results have implications for understanding the complexities associated with the genetic consequences of recent and ongoing recolonization and highlight the need to develop management strategies uniquely tailored to support connectivity between source and recolonized areas.

KEY WORDS BIMr, black bears, DIYABC, Great Basin, metapopulation, PCoA, recolonization.

A 30-year-old Female American Black Bear in Utah: A Reproductive Case History and Implications for Data Collection and Management

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ABSTRACT In 1989 a female black bear cub was born on the East Tavaputs Plateau, Utah, and later captured as a pregnant 4 year old in summer 1992. This bear turned 30 years old in January 2018 and has worn a radio-collar continuously these past 26 years. In the first 14 years after sexual maturity, her reproductive success was effectively zero. She raised only 1 of 14 cubs (from 5 litters, 1992 to 2005) to the yearling stage, and the 1 surviving male yearling was killed as a 4 year old. During that time there were 7 years when she was unaccompanied by any offspring in her den (observed each March). In 2006/07, triplets were born and successfully raised to yearling stage. Another set of triplets was raised in 2008/09. Oddly, in 2010 she co-denned with a 2-year-old male from her previous litter. In 2011/12 twins were successfully reared. No young have been produced since that time (2013 to present), likely indicating reproductive senescence. Several questions arise from this lifetime case history: Is late reproductive success a pattern among black bear females in this population? How variable are individual females in their reproductive success and are there advantages of revealing this variation through long-term studies? What factors may have allowed this female to avoid being killed in legal hunts for the many years she lived without the protective status of attending cubs or yearlings? We will use data from a long-term study to supplement discussion of these questions. We will also discuss this bear's future value to scientific investigation of bone physiology and wildlife diseases.

KEY WORDS fecundity, individual variation, cub survival, senescence

Understanding Habitat Relationships: an Agency Approach for Improving Black Bear Density Estimates

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ABSTRACT Variations in black bear population density across Washington State have previously been hypothesized to be a function of precipitation-based habitat quality, with higher precipitation resulting in more food availability. Washington Department of Fish and Wildlife (WDFW) has used average densities of 39 and 18 bears/100km^2 in western Washington and eastern Washington, respectively, since the 1970's based on small-scale capture-removal efforts in the more productive western portion of the state and assumed to be half that in drier portions of eastern Washington. Population abundance and acceptable harvest rates have been inferred ever since, yet there have been no rigorous studies to test the accuracy of these population densities or which habitat factors affect bear density in Washington. We conducted a DNA capture-recapture study in two areas of Washington from 2012–2016 to test hypotheses about which spatial factors best describe observed patterns of density across and between study areas and thus provide more rigorous estimates of density in multiple habitats for wildlife managers in Washington. In contrast to previous estimates, we found that on average black bears occurred at higher densities in our eastern Washington study area (32.8/100 km^2) compared to western Washington (23.2/100 km^2), and that population density in our western Washington study area was negatively associated with human development (β = -0.098, SE = 0.042). Upon completion of density analysis, we then performed a simulation study with the objective of identifying a rigorous monitoring protocol that WDFW can consider for estimating population density statewide with the least amount of staff time, materials, and expenses. We will discuss these findings and the results of our simulation study and make recommendations for other agencies to consider in their bear management programs.

KEY WORDS capture-recapture, density, development, habitat, monitor, simulation, *Ursus americanus*

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Dynamic Foraging Tactics of Black Bears Preying on Caribou Calves in Newfoundland, Canada

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ABSTRACT We examined patterns of black bear (*Ursus americanus*) predation of caribou (*Rangifer tarandus*) neonates in Newfoundland, Canada using data from 317 collared individuals (9 bears, 34 adult female caribou, 274 caribou calves). During the caribou calving season, we predicted that landscape features would influence calf vulnerability to bear predation, and that bears would actively hunt calves by selecting areas associated with increased calf vulnerability. Further, we hypothesized that bears would dynamically adjust their foraging tactics in response to spatiotemporal changes in calf abundance and vulnerability (collectively, calf availability). Accordingly, we expected bears to actively hunt calves when they were most abundant and vulnerable, but switch to foraging on other resources as calf availability declined. As predicted, landscape heterogeneity influenced risk of mortality, and bears displayed the strongest selection for areas where they were most likely to kill calves, which suggested they were actively hunting caribou. Initially, the per-capita rate at which bears killed calves followed a type-I functional response, but as the calving season progressed and calf vulnerability declined, kill rates dissociated from calf abundance. In support of our hypothesis, bears adjusted their foraging tactics when they were less efficient at catching calves, highlighting the influence that predation phenology may have on predator space use. Contrary to our expectations, however, bears appeared to continue to hunt caribou as calf availability declined, but switched from a tactic of selecting areas of increased calf vulnerability to a tactic that maximized encounter rates with calves. Our results reveal that black bears can dynamically adjust their foraging tactics over short time scales in response to changing prey abundance and vulnerability. Further, they demonstrate the utility of integrating temporal dynamics of prey availability into investigations of

predator-prey interactions, and move towards a mechanistic understanding of the dynamic foraging tactics of a large omnivore.

KEY WORDS Black bear (*Ursus americanus*), caribou (*Rangifer tarandus*) calves, cause-specific survival analysis, foraging tactics, kill rates, predation risk, resource pulse, resource selection function (RSF), ungulate, trophic interaction.

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Effects of Calf Predation and Nutrition on Elk Vital Rates in New Mexico

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ABSTRACT Demographic data indicated a population of elk (*Cervus elaphus*) in northern New Mexico had reduced juvenile recruitment, resulting in a concern over quality hunting opportunities. Following several years of low calf:cow ratios of <25:100, we conducted a 4-year study from 2009–2012 to identify reasons for poor recruitment and evaluated the role of predation and nutrition in limiting productivity of an elk population. We captured and fixed ear-tag radio transmitters to 245 elk calves (126M, 119F) to determine cause-specific mortality and estimate calf survival. During the second half of our study, we implemented a new spring black bear (*Ursus americanus*) season resulting in higher spring black bear harvest and evaluated response in calf survival. We also quantified herd-wide nutritional condition and productivity. We estimated percent ingesta-free body fat (IFBF) and pregnancy rates by sampling 1,808 hunter-harvested female elk from autumn through winter. The primary cause of summer mortality for calves across all years was black bear predation. Estimates for annual calf survival were greater when spring black bear harvest was moderate to high (0.44–0.47) compared to periods with lower bear harvest (0.33–0.35). For every additional bear harvested in spring, radio-tagged elk calves were 2.4% more likely to survive the summer. Across years and age classes 82% (SE = 1%) of females were pregnant (Table 2). Pregnancy rate was greatest for prime aged (2–14 years) females (88%, SE = 1%). Our herd-wide estimate of IFBF for prime-aged adult female elk IFBF was 11.9% (SE = 0.19) but varied by pregnancy and lactation status. Our results that black bear predation was the primary cause of summer calf mortality and that adult females were in adequate nutritional condition suggested that black bear predation was limiting population productivity. Additionally, calf survival was higher in drought years, the same years when targeted spring black bear harvest was implemented. Our results demonstrated that productivity could be increased by implementing a spring black bear harvest strategy targeted around calving areas and could be applied in other areas experiencing low elk calf survival. Additionally, our methods could be applied in other areas experiencing low calf survival, with black bear predation being the primary cause of early calf mortality.

KEY WORDS black bear, *Cervus elaphus*, Cox Proportional Hazards, elk, juvenile survival, New Mexico, nutrition, predation, *Ursus americanus.*

Open Business Meeting

Mark Vieira, Workshop Chairman

A meeting of state and provincial agency representatives was held immediately following the final workshop session. The only action item was determination of the host for the 14th Western Black Bear Workshop. The Wyoming Game and Fish Department was nominated as the initial host for 2021 and this was accepted by all representatives, pending agency approval by Wyoming. The group also had an initial discussion and evaluation to see if there was support to propose chartering a WAFWA black bear working group.