UTAH BLACK BEAR MANAGEMENT PLAN
2023 - 2035

Utah Black Bear Advisory Committee

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Utah Division of Wildlife Resources
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UTAH BLACK BEAR MANAGEMENT PLAN V. 2.0 2011-2023

Plan Goal

Maintain a healthy bear population in existing occupied habitat and expand distribution while considering human safety, economic concerns, and other wildlife species.

Definition: 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.

Introduction

The purpose of the Utah Black Bear Management Plan is to provide direction for management of black bear (*Ursus americanus*) in Utah. This purpose is in accordance with the mission statement of the Utah Division of Wildlife Resources (UDWR). The mission of UDWR is:

To serve the people of Utah as trustee and guardian of the state's wildlife

The Utah Black Bear Management Plan will direct black bear management statewide for a period of twelve years (2023-2035). Over the life of the plan, four three-year harvest recommendation cycles will be presented to the Utah Wildlife Board for approval. In 2029, six years after the plan has been adopted, an evaluation of key objectives will occur, primarily those associated with the population management system. However, earlier reviews and updates may be needed in response to new scientific information. Similarly, an additional evaluation may be necessary after the first six years. In all cases, this document will be reviewed, management progress will be evaluated, and an updated management plan will be written and presented to the Utah Wildlife Board for approval in 2035.

Background

In 1999, the UDWR Director appointed an *ad hoc* committee, which became known as the Black Bear Discussion Group, to address concerns with black bear management and develop Utah's first black bear management plan. This group contained citizen representatives of sportsmen and animal protection groups, researchers, livestock

operators, and representatives from Federal and State agencies. In 2010 the Division revised the Utah Black Bear Management Plan using a similar process.

In 2022, UDWR established a committee to recommend changes to the black bear plan because the current plan was expiring in 2023. This plan is the product of those meetings and recommendations.

For details about subjects covered during these committee meetings, see Appendix A.

Natural History

The range of the American black bear historically included all the forested areas of the continent from Alaska to the northern states of Mexico and from California, east to Florida and the Canadian provinces of Newfoundland and Nova Scotia. Today, the range of black bear is reduced but still includes all or parts of 38 states, 11 Canadian provinces, and 7 Mexican states. In Utah, the black bear is present in much of the forested habitat and desert systems where oak (*Quercus sp.*) trees exist. The Deep Creek Mountains, Pilot Range, Henry Mountains, and Raft River Mountains are notable exceptions (Figure 1).
The black bear is secretive, long lived, and has a low annual reproduction rate compared to other large North American wildlife species. Based on harvest levels, Utah may have the smallest bear population of all the western states, except Nevada. Data from Utah during the past twenty years suggests the population may be growing.

Description

In the mountain west, most black bears have brown to dark chocolate pelage while a few are black. In the eastern USA, they are generally black except for the frequent presence of a white triangle on the upper chest, and brown muzzles. Bears from the west tend to have lighter muzzles, and some individuals are blonde. In Utah, the white chest patch is infrequent. The dark brown pelage may appear black, especially in low light conditions.

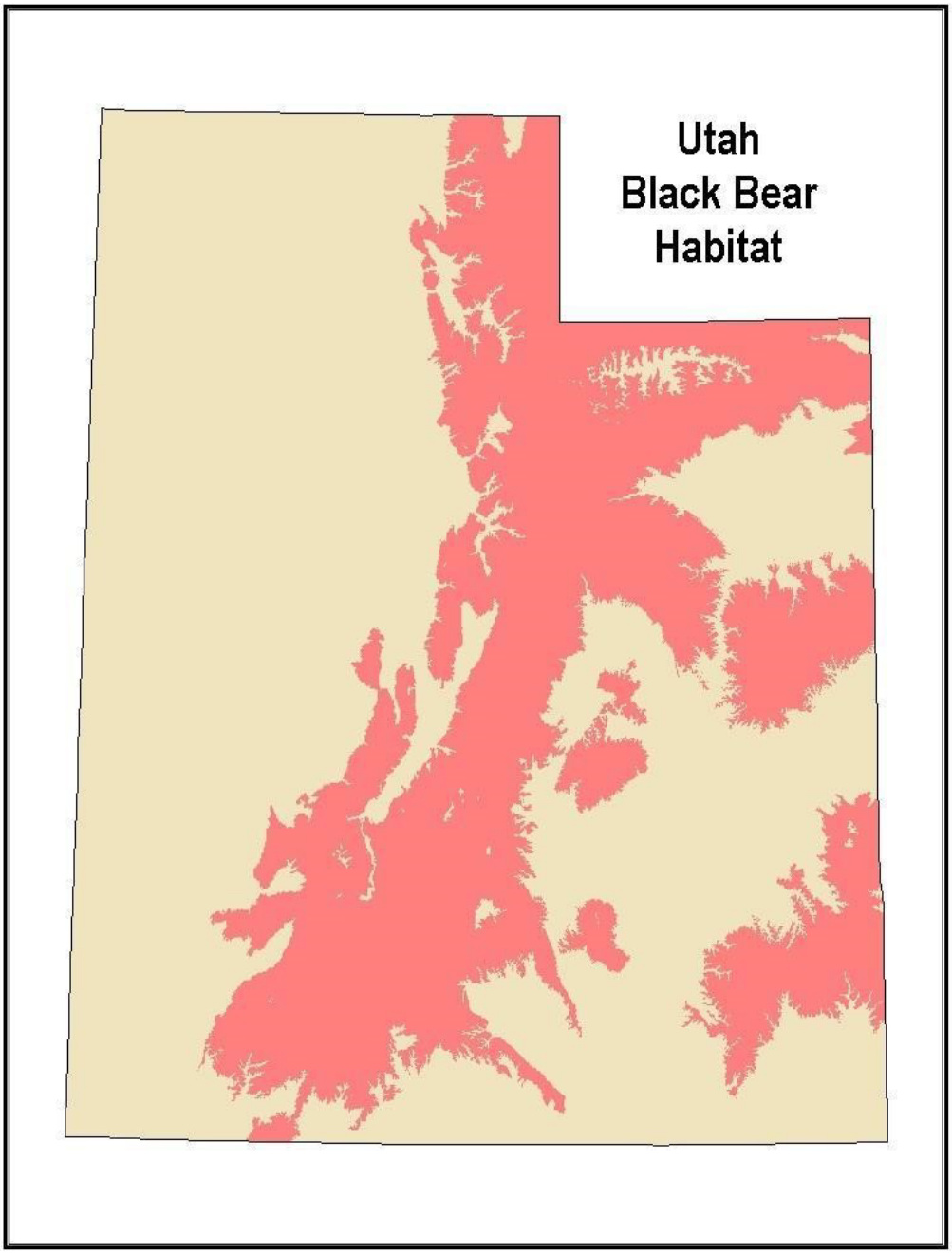
The weight of black bears varies. A male black bear that weighed 816 lbs was recorded in Minnesota in 1991. A female in Pennsylvania weighed 454 lbs. However, the mature western black bear male will typically be 250 - 300 lbs and the female 150-180 lbs in mid summer. These weights vary depending on season, age, and food supply. An Idaho study (Beecham and Rohlman 1994) showed a weight difference between male and female bears of all ages of 77 lbs (n=132). A Colorado study (Beck 1991) of a limited number of bears showed mean summer weights of 280 lbs for males and 167 lbs for females. In Utah, large males in summer may weigh over 300 lbs and adult females 130 - 150 lbs.

Black bears have a compact body with stout legs, especially the forearms, and feet. They have recurved claws, a straight facial profile and no shoulder hump. Mature males are about 60 in long while mature females are about 50 in. After about seven years, growth

slows. The length measurements from the Colorado study showed greater lengths than Idaho in both males and females. Some differences in measurement techniques could account for part of the difference but the heavier weights from Colorado suggest that the Colorado bears may genetically be slightly larger or have access to better food supplies. Weights and lengths from ongoing studies in Utah are comparable to Colorado. Black bears have a keen sense of smell and stand on their hind legs to aid in seeing and smelling. They are strong swimmers.

In the west, black bears of both sexes occasionally live in excess of 20 years of age. Study animals, as well as harvested animals, have exceeded 20 years in Utah. In hunted populations, average life span is shorter than in unhunted populations and differences between sexes may emerge. For example, males averaged several years younger than the females in hunted populations of Idaho (Beecham and Rohlman 1994), and males have only a 0.1% probability of living to be 20, while females have a 0.5% chance in hunted populations of Michigan (Waples et al. 2018) In Utah, apparent survival of bears is 2.2x higher in females than males (Pederson et al. 2012). Hunter selectivity for larger bears coupled with the male bears larger range make them more likely to be taken.

Figure 1. Distribution of black bear habitat in Utah, represented by dark (red) area on map.



Reproductive Biology

Black bears tend to be solitary, except for females with cubs, and during the breeding season of June and July. After fertilization, the egg remains free and unattached in the uterus until implantation in late fall. Birth occurs in late January or early February. The cubs are born with eyes closed and weigh 8 to 12 oz. In the Intermountain West, age at

first reproduction is typically 4.5 years. Males are sexually mature at 3.5 to 4.5 but do not reach physical maturity until age 7.5. Occasionally, first litters occur at 3.5 or as late as 7.5 years. Litter sizes may increase with the age of the female but two cubs are most common. Poor food crops may result in females skipping a year or more between cub production. While the average is 2 cubs per litter, litter sizes range from 1 to 4. Typically, litters are produced every other year (Beck 1991, Waples et al. 2018). The sex ratio of cubs is either 1:1 or slightly male biased. Cub mortality is higher in the west with Utah fitting the pattern at 45 to 50% (Beecham and Rohlman 1994; Tolman and Black 1998). The average annual litter frequency (number of litters for all females in a population) for a typical western population is 16 to 18% (Beecham and Rohlman 1994) and may vary significantly year to year. Cubs stay with the females for 16 to18 months after birth. Family groups break up in late spring prior to the breeding season. Causes of cub mortality are starvation, predation, and a variety of other causes of unknown significance. Yearlings and subadults have a survival rate as high as 90% depending largely on the level of human caused mortality, primarily hunting, and removal for depredation and nuisance activity.

Predation

As omnivores, black bears use a wide variety of foods, changing diets seasonally based on availability (Beck 1991, Kolenosky and Strathearn 1987) and typically do not obtain much of their food through predation. In Utah, carnivory is correlated to sex and elevation, with more carnivory observed in males and in bears living at higher altitudes (Hatch et al. 2019). Within this study, elevation was also correlated to density of ungulates. Rogers (1987) found that fruits, nuts, and insects were the foods most important to fall fattening and reproductive success. A study in Idaho (Beecham and Rohlman 1994) revealed that typically less than 2% of the diet is mammals. Black bear research in Utah (Richardson 1991, Bates 1991, Bunnell 1999, Black 2004) has found that vegetative matter is the most important item in their diet, followed by mast, insects and animal matter. Ogborn (1990) documented the importance of ants in the diet.

In the La Sal Mountains, Richardson (1991) found that animal matter was present in 2.3% of 859 bear scats. It was most important as a food item in summer and fall. Mule deer (*Odocelius hemionus*) remains were the most common mammal, occurring in 9 scats, or 1.1% of all scats. Other mammal remains included black bear (mostly from grooming), domestic cattle, rock squirrel, *Microtus sp*., cottontail rabbits, deer mouse, least chipmunk, jumping mouse, domestic sheep, and pocket gopher. Bone size and teeth of deer remains indicated that both adults and fawns were eaten. The presence of maggots in the scats indicated that cattle could have been fed upon as carrion. Bird remains were found in 2.1% of the scats analyzed.

LeCount (1986) reported that there are three different ways that black bears obtain animal matter as food: 1) predation, where the bear kills a healthy animal; 2) pseudo-predation, where a bear kills an animal that is sick or otherwise stressed and would have died anyway; and 3) scavenging, where death comes from other causes.

Black bear predation on young deer, moose (*Alecs alecs*), caribou (*Rangifer tarandus*), and elk (*Cervus elaphus*) has been reported in several studies (Kolenosky and Strathearn 1987, Franzmann et al. 1980). Smith (1983) radio-collared 54 newborn mule deer fawns on the La Sal Mountains. He found that fawn survival was 54% during the first month of life. Of the 22 fawns that died, predation was the cause of death for 16 (73%). Coyote (*Canis latrans*) and black bear predation accounted for most of these deaths, although he did not indicate how many were taken by which species. One was taken by a cougar. With a peak fawning date of 24 June, all bear predation had ceased by 24 July. Coyote predation continued past 18 August. While most black bear predation consists of newborn animals their first month of life, Bates (1991), Richardson (1991), and Bunnell (1999) reported limited black bear predation on adult deer in Utah.

Projar (2004) in a three-year mule deer fawn survival study in west-central Colorado attributed 4% of the fawn mortality to bears. Likewise, Lomas (2007) in a similar study in north-central New Mexico reported 3% of the mule deer fawn mortality was due to black bear predation.

At times, black bears are effective predators on domestic livestock. In Utah, from 1992 to 1999 and 2000 to 2009, an average of 373 and 516 livestock kills, respectively, by bears were confirmed annually. Almost 97% of all livestock kills were domestic sheep. Bears typically attack sheep herds after dark when sheep are bedded for the night. The majority of sheep predation occurs in June, July and August. Lambs accounted for 58%, and ewes 39% of black bear kills, respectively. The average number of livestock taken in a single predation incident was 6. In an apparent rare event in eastern Utah, a nine year old adult female bear killed three 150-200 lbs calves over a nine day period. This radio collared female had not exhibited this pattern of behavior in the five previous years when her behavior was monitored (Bunnell 1999). Records from 2003-2013 showed the most livestock and agricultural damage by bears in Utah was near Green River (Miller et al. 2016).

While black bears on occasion act as predators, they are also preyed upon. Rogers (1987) reported that nine wolves killed a female bear and her cub in a den. Cub mortality due to predation was less than 12% in years of good nutrition. Richardson (1991) found two cases of black bear cannibalism in southeastern Utah. A radio-collared two-year old female was eaten by another bear, while another yearling female was apparently eaten by the adult female while in the den.

Most researchers indicate that black bears are poor predators. As omnivores, they have not evolved behaviors found in cooperative hunters (Rogers 1987). Their bulky, heavy bodies lack the agility needed for effective predation. Legs are adapted for climbing, turning rocks and tearing apart logs and stumps, rather than speed. Most mammals, both large and small, are generally too fast for bears to catch (Kolenosky and Strathearn 1987). A bear's distance vision is poorly developed. These limitations prevent black bears from taking most prey, other than newborns or other animals whose escape is hampered by behavior, injuries, disease or deep snow.

Denning

Denning and hibernation in black bears is an evolved means of dealing safely with a winter food shortage. It also offers a protected situation for females to give birth to and raise young cubs. The choice of den location, size, and type are affected by topography and ease of construction. Concealment appears to be a higher priority than avoiding thermal loss. Where large trees are available they are generally selected, and the dens are dug into the tree or in the root system. The other options are ground dens which are excavated into a brushy hillside, or dens in rocky areas where rock provides a part of the den structure. In Utah, dens are predominately rock related (Tohlman and Black 1998). Females select sites that are at a slightly higher elevation than males in a given area. Few dens are reused from year to year but a yearling female may use a den previously used by the adult female. Availability of acceptable den sites is not likely to limit bear densities.

Beck (1991) noted that at least some bears made periodic movements to den-sites in the summer to prepare them with a lining of green vegetation. He also suggested that the primary function of the den is to provide protection from predators rather than weather. Both wolves (Pacquet and Carbyn 1986) and grizzly bears (Ross et al. 1988) have been observed killing black bears in winter dens.

Denning varies by reproductive groups: males den later and for shorter duration than subadults, non-parturient females, and parturient females (Fowler et al. 2019). This trend is true in the west; females tend to enter dens earlier, and exit dens later than males (Beecham 1980, Beck 1991). The onset of denning may be delayed by two to three weeks if plentiful food is still available from late mast crops. In the Intermountain West, denning occurs in October and November. Female denning typically peaks in late October while male denning peaks in mid-November. The dens are left in April and May. The timing is affected slightly by elevation of the den and aspect with the higher dens being left later. Beck (1991) noted females exited dens about 14 days later than males. The peak of den abandonment for males is late April and the peak for females is mid May. Den emergence is related to ecoregion and negatively correlated to spring temperatures and temperatures the spring and summer before denning in Utah (Miller at al. 2016). Broadly, black bears are capable of changing denning patterns in response to climate and this will likely be more variable in future years.Black bears enter dens later when food availability is good and snow accumulation is low (Fowler et al. 2019).

Home Range

Black bears are generally active early and late in the day. In areas of human activity they tend toward being more nocturnal. Several may be found in areas where food is concentrated, but otherwise are solitary. Black bear home range size varies widely depending on sex of the bear and quality of habitat. Adult males may have a home range 5 times that of an adult female. Female ranges overlap other females, particularly their

offspring. With their much greater range, the males have up to 100% overlap with other males and their territories will include several females. This range overlap helps assure breeding of all the females. Subadult males that are searching for a home range may temporarily share territory with adult males and females. The resulting density of bears varies widely depending on habitat quality. Home range varies from .15 bears per square mile in an Arizona study area to 1.7 bears per square per square mile in three disjunct areas in Virginia (Beck 1991). For the western states the average is around 0.8 bears per square mile. In a low density population in northern Utah, Pederson et al, (2010) found .03 bears per square mile.

Habitat

Pelton (1982) characterized black bear habitat throughout its range as having "relatively inaccessible terrain, thick understory vegetation, and abundant sources of food in the form of shrub or tree-borne soft or hard mast (fruit and nuts)". He summarized black bear food habits as "primarily grasses, forbs and insects in spring, soft mast in the form of shrub and tree-borne fruit in summer, and a mixture of soft and hard mast in fall". The spatial arrangement, abundance, and dependability of seasonally important food sources may explain much of the variation in black bear density, fecundity, home range size, and seasonal habitat use throughout the range of the species.

Western North America Perspective

The following is a review of information relating to black bear habitat, obtained largely from studies in Utah and other western states and provinces.

Food Habits

Understanding black bear food habits may be the key to understanding bear-habitat use. Foods eaten by black bears throughout their distributional range reflect the omnivorous feeding habits of the species. Bears primarily eat grasses, berries, and ants (Baldwin and Bender 2009), but also consume other vegetation, animal matter, and anthropogenic foods. In Rocky Mountain National Park, scats with anthropogenic foods were 15.2 times more likely to occur in the mid-2000s compared to scats collected in the late 1980s (Baldwin and Bender). This increase is likely occurring in many areas where humans and bears co-occur. The spring diet consists primarily of grasses and forbs. The summer diet also includes grasses and forbs but includes increasingly more ants in summer and fruits as the season progresses to fall. The fall diet consists primarily of a mixture of soft mast (fruits) and hard mast (nuts of deciduous and evergreen trees). Animal matter, primarily insects and carrion, generally comprises a smaller portion of the diet.

Spring (April-June) black bear diets in southwestern Colorado consist largely of grasses and forbs in oakbrush and aspen stands (Beck 1991). Bears in central and southeastern

Utah forage on grasses and forbs in aspen, aspen-conifer and mountain brush, as well as riparian areas and low elevation timbered canyon bottoms (Bates 1991, Richardson 1991).

Aspen buds are frequently observed in spring bear scats in southeastern Utah. Ants, carrion, rodents and ungulates provide spring dietary protein sources in the Utah studies (Ogborn 1990, Black 2004). Rodents, winter-killed and new-born mule deer comprise a portion of the spring diet in central Utah (Bates 1991). In two western state studies, neonatal mule deer fawn mortality attributed to black bear predation was less than 5% (Projar 2004, Lomas 2007).

Summer black bear diets consist of insects (primarily ants), grasses, forbs, and the flowers of some shrubs, until berries ripen. Fruits and flowers constitute the bear-food group highest in fats and carbohydrates (Richardson 1991). Larval ants are also high in fats and protein, and are sought by black bears in summer. In the La Sal's, ants made up >1% volume of nearly 40% of the bear scats collected (Auger et al. 2004). The authors suggest ants are an important source of food for black bears. Bears actively hunt ants when larvae occur close to the soil surface in response to warming temperatures (Bates 1991, Richardson 1991).

When available, berries are heavily used by bears during summer months. Although berries are eaten by bears prior to ripening (Tisch 1961), most use occurs after fruits ripen.

In Utah, areas likely to produce abundant berries include canyon bottoms with perennial water, where species such as elderberry (*Sambucus spp*.), currants (*Ribes spp*.), raspberries and thimbleberries (*Rubus spp*.) and others frequently occur. In the low to mid-elevation mountain brush types, species such as squawapple (*Peraphyllum ramosissimum*), serviceberry (*Amalanchier spp*.) and others (Table 1), ripen in midsummer and can provide an abundant source of food. Berry producing shrubs found at higher elevations are most productive in aspen stands, riparian areas, timber cuts, and along the edges of conifer stands in central and southeastern Utah, and southwestern Colorado. Aspen, mountain brush and oakbrush are the primary habitats that supply summer forage for bears in the intermountain west (Beck 1991, Bates 1991, Richardson 1991).

Fall diets consist largely of berries and hard mast. Berries ripen first at lower elevations and somewhat later as elevation increases. Seasonal bear movements may reflect their tracking of ripening fruits (Amstrup and Beecham 1976). Chokecherry (*Prunus virginiana*), which tends to bloom and fruit later than other brush species at similar elevations, is used heavily when available in Utah, Idaho and Colorado (Amstrup and Beecham 1976, Beck 1991, Bates 1991, Richardson 1991).

Hard mast species consumed by bears in Utah include gambel oak acorns (*Quercus gambelli*) and pinyon pine nuts (*Pinus edulis*). Fruits of these two species ripen somewhat later than the berry producing species (Table 1). Bears foraging at higher

elevations, or in areas which do not contain oak, may make long movements to lower elevation oakbrush communities in years when acorns are produced (Pelton 1982, Kellyhouse 1977, Beck 1991). Bears often remain in these areas until denning if mast is abundant. Bears feed heavily on hard and soft mast in the fall, prior to denning, and are physiologically capable of immense weight gains in a few weeks. Pinyon pine seed was reported as a bear food in the mountains of southeastern Utah, and the plateaus of the southern Dixie National Forest (Danvir et al. 1983). Bears may respond to abundant pinyon nut crops as they do to abundant oak mast. Seeds of other pines, most notably whitebark pine (*Pinus albicaulis*) are used heavily when available in Montana (Tisch 1961). Limber pine seeds (*Pinus flexilis*) are also eaten in Montana, and may provide food for bears in Utah as well.

Factors influencing production of both hard and soft mast include temperature, light, moisture, soil nutrients, insect predators and disease (Shopmeyer 1974). Freezing temperatures during the flowering period and extreme dryness during spring and summer appear to significantly affect mast production. Either of these conditions may result in nearly complete crop failure. Although data concerning the frequency of catastrophic mast failures is lacking, interviews with commercial seed collectors and survey respondents estimated ten-year intervals between abundant acorn crops in portions of Utah (Danvir et al. 1983). Bates et al. (1991) observed oak mast failure in central Utah during all three years of their study. Beck (1991) and Richardson (1991) observed concentrations of bears in patches of abundant acorn production.

Table 1. Plant species used as food items by black bears in Utah.

Species	Flowering Dates	Fruit Ripening Dates	Interval (yrs.) Between Abundant Berry Crops	Habitat and Distribution Dates
Serviceberry (*Amalanchier* spp.)	May-June	July-Aug	1-5 yrs.	Common in arid areas, in canyons and foothills, 4000-8000 ft
Bearberry or Manzanita (*Arctostaphylos spp*.)	March-May	June-Aug	Annually	Dry-moist soils, usually grows in association with lodgepole or Ponderosa pine in Utah
Squawapple (*Peraphyllum ramosissimum*)	May-June	June-July	Annually	Dry foothills and mountain slopes, welldrained soils, 4000-9000 ft
Chokecherry (*Prunus virginiana*)	May-June	July-October	2-5 yrs.	Widely distributed, esp. abundant along streams and moist canyon bottoms 45008000 ft
Currant (*Ribes spp*.)	April-June	June-August	2-3 yrs.	Exposed slopes and ridges 4000-11,000 ft
Raspberry Thimbleberry (*Rubus spp*.)	May-July	July-Sept	Annually	Widely distributed, wooded and open slopes alike, 5000-11,000 ft
Elderberry (*Sambucus spp*.)	April-July	July-Sept	Annually	Commonly found along streams and canyon bottoms, moist soils, 5000-9500 ft
Buffaloberry (*Shepherdia spp.*)	April-June	June-August	1-4 yrs.	S. argentea found along streams and river bottoms 3000-7500 ft

Snowberry (*Symphoricarpos spp.*)	June-August	August-Oct	Annually	S.rotundifolia found on steep, rocky slopes, 5000-8000 ft S. longiflorus and S. rotundifolius found in rocky slopes, canyons and valleys 4000-10,000 ft S. orephilus an S. alba found on wooded mountain slopes, valleys and riverbanks 5500-10,000 ft
Whortleberry or huckleberry (*Vaccinium spp.*)	June-July	June-September	Annually *poor berry production	Largely restricted to Uinta Mountains, grows on forested slopes 7000-12,000 ft
Pinyon pine (*Pinus edulis*)	June	September	2-10 yrs.	Dry, rocky foothills and mesas, 5000 - 7000 ft
Gambel oak (*Quercus gambellii*)	February-May	August-Oct	5-10* yrs.	Widespread, 4000-8000 ft, central and southern Utah. Dominant tree on dry foothills and canyon walls, but best stands grow on moist, rich well-drained soils

Physical Characteristics of Bear Habitat in Utah

Elevation: In a survey of bear observations recorded by resource managers in Utah, eighty percent of bear survey observations occur between 7,000 ft and 10,000 ft (Danvir et al. 1983). About 12% occur between 4,600 ft and 6,988 ft and 8% occurred between 10,000 ft and 12,000 ft. The only geographic unit in which the elevational distribution of observations differed markedly from this trend was in the Book Cliffs east of Desolation Canyon where elevation rarely exceeds 8,000 ft. Bears were commonly observed below 7,000 ft in the eastern Book Cliffs.

Bears in central Utah use low elevation (7,102 ft) mountain brush in summer and higher elevation (7,152 ft) aspen and conifer in spring and fall (Bates 1991). Bears in southeastern Utah are similarly found in higher elevations spring and fall (8,727 to 8,858 ft) and lower elevations (8,202 to 8,530 ft) in summer (Richardson 1991).

In contrast, bears in southwest Colorado use low elevation oakbrush (8,202 to 8,530 ft) spring and fall, summering in higher elevation aspen communities (8,858 ft) (Beck 1991). Similar patterns of low elevation use in spring and fall, with higher elevation use in summer has been observed in Idaho (Amstrup and Beecham 1976, Reynolds and Beecham 1977).

Topography: Most observations of black bears occur in areas of marked topographic relief. Eighty-five percent of those who responded to a survey on Utah bear observations indicated that bears were generally found in areas with steep, rugged topography including mountain slopes, cliffs, escarpments, and canyons (Danvir et al. 1983). Forty Three percent stated bears were most frequently observed in and near canyons, regardless of elevation.

In studies performed in Idaho, Utah and Colorado, black bears predominantly used steeper, more rugged topography and made seasonal elevational movements in response

to food resources (Amstrup and Beecham 1976, Bates 1991, Richardson 1991, Beck 1991). Bears in central Utah used progressively steeper slopes as the year progressed, whereas bears in southeastern Utah and southwestern Colorado made significant use of canyons.

Moisture: Although black bears obtain winter metabolic water from fat stored the prior fall, they require free water during the summer. Richardson (1991) found bears using areas closer to water in the fall and areas farthest from water in spring. Bates (1991) found bears, especially females, associated with creeks in spring and summer. Survey results (Danvir et al. 1983) indicated that bears in Utah most frequently occurred in areas containing moist soils and associated vegetation. Eighty percent of observations recorded in this survey fell within areas characterized by moist to wet soils. Forty-seven percent of observations were associated with perennial water, primarily streams in canyon bottoms. Soils within frequently used bear range are typically loamy soil associations on mountains and plateaus that receive sufficient precipitation to remain moist through all or part of the summer months. Precipitation level and soil characteristics largely dictate vegetative composition and availability of succulent forage. Vegetation types occurring on moist soils, such as riparian woodlands, wet meadows, mountain meadows and aspen provide year-round bear foraging areas for grasses, forbs and soft mast (Jonkel and Cowan 1971, Kellyhouse 1977, Pelchat and Ruff 1983, Smith and LeCount 1983, Beck 1991).

Food shortages resulting from summer droughts may affect the manner in which bears use their range. Annual home range sizes can double when food is scarce (Pelchat and Ruff 1983, UDWR unpublished CMR data) Summer drought was believed to have resulted in the dispersal of black bear cubs and yearlings out of the Book Cliffs into lower elevation areas in September and October of 1976 (Fair 1977).

Vegetation: Interspersed oakbrush, mountain brush, aspen and conifer communities tend to be used year-round in Utah and southwestern Colorado (Danvir et al. 1983, Bates 1991, Richardson 1991, Beck 1991). Black bears in southern California prefer canyon oak habitats for food and cover year-round (Novick et al. 1981). In Alberta, aspen communities are considered to be the most important plant community for black bears (Pelchat and Ruff 1983), containing important food items and used year-round. Large contiguous stands of mature conifers, such as the dense lodgepole pine (*Pinus contorta*) stands on the Uinta Mountains, and high elevation spruce-fir stands (*Picea engelmaniiAbies lasiocarpa*) were generally felt by bear survey respondents to support low bear densities (Danvir et al. 1983). Most observations in extensive coniferous forests occurred in canyons, where the diversity and interspersion of vegetative types is generally greater. Jonkel and Cowan (1971) found black bears in Montana preferred spruce-fir communities to lodgepole pine and were generally associated with forest edges. Bears used all seral stages of the spruce-fir/pachystima association, except recent burns and clearcuts. Barnes and Bray (1967) estimated bear density to be greater (1.4 bear/mi ^{2}) in a spruce, fir, whitebark pine, aspen and meadow interspersion than in monotypic lodgepole pine (1 bear/ 20 mi.^{2}). Bears in central and southeastern Utah preferred mesic,

north-slope conifer patches and 'stringers' as resting areas year-round (Bates 1991, Richardson 1991).

Most bear survey observations in pinyon-juniper woodlands were reported from the Bookcliffs, La Sal Mountains, and Abajo Mountains, where mast-producing mountain brush species intermix along mesa rims and in canyon bottoms (Danvir et al. 1983). Richardson (1991) noted use of pinyon-juniper primarily by adult male bears in late fall. There appears to be little black bear occurrence above timberline or in sage-steppe. Infrequent use of these types, particularly by females with cubs, may be due to lack of security cover. Both black and grizzly bears are believed to have evolved from a common forest-dwelling eurasian ancestor (Ursus etruscus) (Herrero 1972). Ancestral grizzly bears evolved to an open-ground dwelling species, where aggressive behavior became the principal means of protection from other predators. Black bears continued to evolve in woodland habitats, therefore tree-climbing behavior offered protection (Herrero 1972). Climbable trees or shrubs provide security to black bears, particularly females with young. While male bears will utilize sparser Arizona chaparral, females with young remain in denser stands of riparian woodland or shrub oak, presumably for security as well as forage advantages (Smith and LeCount 1983). LeCount et al. (1984), Bates (1991) and Richardson (1991) found black bears preferred shrub dominated feeding sites having dense horizontal cover. Bears in southeastern Utah selected areas of dense cover within all vegetation types, and by all sex and age classes, especially females with cubs (Richardson 1991).

High interspersion of preferred habitat types (such as aspen, conifer and brush patches) may improve bear-habitat quality. Richardson (1991) found bears and bear foods more common along patch edges in summer. Jonkel and Cowan (1971), Lindzey and Meslow (1977) and Bates (1991) similarly found bears associated with edges.

Females with cubs, as a group, tended to select areas having a rich diversity of plant species, a high interspersion of plant communities, proximity to water, hiding and climbing (escape) cover, and areas removed from roads (Bates 1991, Richardson 1991). Females used high elevations more than expected (Richardson 1991). Females utilized steeper, moister, higher elevation, more species-rich sites than did male bears.

Accessibility: Most survey respondents (85%) indicated that black bear observations generally occur in rugged canyons, on plateaus and mesa rims, and steep mountainous areas which are not accessible by vehicle and with little human use (Danvir et al. 1983). Black bears avoided roads in summer and fall in an Idaho study (Young and Beecham 1983). Bates (1991) noted that female bears avoided roads during spring. Bears of both sexes avoided roads and trails in fall. Young (1995), however, noted significant use of roads by bears in the Bookcliffs, and in fact used tracks on roads as an abundance index. Females tended to den in areas removed from human activity, and remain in these areas during spring. The apparent association of bears with canyons and similar steep, rugged topography may be related to several factors. Bears studied in mountainous terrain exhibited seasonal elevation shifts dictated by the abundance and phenological development of forage species (Amstrup and Beecham 1976, Bates 1991). Within the

elevation range that most bear observations occur, a wide range of topographic relief results in a greater interspersion of aspen, mixed conifer, and mountain brush. Bears may be able to obtain seasonally abundant foods within smaller home ranges in areas characterized by canyons than in terrain with less topographic relief. Areas with less relief may necessitate longer movements by bears to obtain seasonally abundant foods. Canyons and escarpments may serve as security cover as well as allowing bears to travel through areas which are otherwise heavily used by humans.

Denning habitat: Bears in Idaho, Arizona, California, Colorado and Utah primarily den in excavated or naturally occurring chambers in hillsides, under rocks, trees or shrubs (Beecham 1980, LeCount 1980, Novick et al. 1981, Beck 1991, Black 2004.) Bears in southwestern Colorado denned in all elevations and plant communities (Beck 1991). Bears in central and southeastern Utah generally denned at higher elevations in aspen or coniferous habitats (Bates 1991, Richardson 1991). Den sites are often located on steeper slopes, in areas of minimal human disturbance (Novick et al. 1981, Bates et al 1991, Beck 1991).

Relationship between food, seasonal movements and home range size: Resident black bears apparently make short-term exploratory excursions into 'new' territory periodically throughout the non-denning period (Amstrup and Beecham 1976, Pelchat and Ruff 1983, Beck 1991). These activities allow bears to discover changes in food availability and distribution through time. Studies in the mountainous portions of Idaho, Utah and Colorado (Amstrup and Beecham 1976, Reynolds and Beecham 1977, Bates 1991, Richardson 1991, Beck 1991) describe predictable, seasonal movements (in elevation and between vegetation types) in response to vegetation growth, flowering and fruiting of preferred bear foods. Rather long excursions to abundant, but patchy, chokecherry and oak mast crops have been observed in Idaho, Utah and Colorado. Tolerance of other bears apparently increases at abundant food sources. Richardson (1991) observed 9 telemetered bears feeding in a 7.4 acre patch of acorn-rich Gambel's oak. Beck (1991) observed annual migrations of bears from summer ranges lacking oakbrush into areas with abundant mast. These bears commonly moved distances of 9-25 mi to feed for several weeks prior to denning. Beck (1991) describes bears residing in a 193-386 mi ^{2} area concentrating in a single 10 mi ^{2} oakbrush stand each fall. Pelchat and Ruff (1983) saw similar 17 mi movements by bears to preferred seasonally abundant foods.

Lindzey et al. (1983) found that home range size of black bears in coastal Washington (coniferous forest) is influenced by food availability resulting from successive changes following logging. Bears selected more recently logged areas where berry producing shrubs (and berries) were most abundant. Home range sizes were smaller, and bear density greater, in more recently logged habitat dominated by early seral stages.

Relationship between food, fecundity and bear density: Studies in forested habitats suggest that food supply influences bear fecundity and density. Lindzey et al. (1983) noted a rapid population increase and high cub production following a period of logging on an island in coastal Washington. Bear density and cub production declined as preferred bear food plants were replaced by coniferous trees. Rogers (1987) determined

that the principal non-hunting factor limiting bear density was starvation of cubs and yearlings, and nutrition-related reproductive failure of adult female bears. Research from Montana (Jonkel and Cowan 1971) and Colorado (Beck 1991) suggest that fall food availability influences fall bear condition (weight) and subsequent cub production. Cub production in the Bookcliffs similarly appears to be dependent on prior-year food availability and body condition of breeding-age females (Black 2004).

Management of Black Bear Habitat

Management of plants and plant communities involves using human creativity in the application and manipulation of the following "tools" and processes; succession, fire, rest, grazing (herbivory), animal impact and technology, to achieve desired conditions (Heady 1975, Savory 1988, Augustine and McNaughton 1998). Successful management of black bear habitat requires sound vegetation management, management of access and behavior of recreationists in "bear country", and maintaining connectivity between seasonally important large blocks and patches of habitat.

Forest management: Forested habitats supply escape and resting cover, food, and denning habitat to black bears. Aspen stands are probably the most important forest community in Utah, providing both cover and food. Aspen communities can provide abundant herbaceous forage, berry production and animal matter (insects and ungulates) for bears. Coniferous forests appear to have high cover values, but lower food value. Successional replacement of aspen stands by conifers can significantly reduce bear-food production in aspen communities. Both fire and selective logging of conifers can be used to maintain aspen vigor.

In portions of the state where conifer stands are uncommon, large-scale logging may be detrimental to bears (Bates 1991). Since black bear foods are often abundant on forest edges, selective cuts appear to be preferable to clear cutting of timber (Young and Beecham 1983, Hugie 1983). Small-scale openings in timbered habitats, providing early seral shrub-borne mast and herbaceous forage in close proximity to cover, can be beneficial (Lindzey and Meslow 1977, Young and Beecham 1983, Hugie 1983). Hugie (1983) found bears preferred abandoned roads and small clearings having early seral stage growth, but avoided clearcuts greater than 15 ac in size. Young and Beecham (1983) found bears used shrub fields resulting from selective cuts more than expected in spring and summer, but avoided clear cut areas all seasons.

Mountain shrub communities containing oak, chokecherry and other mast-producing species should be managed to avoid successional shifts to pinyon-juniper monocultures. Fire, selective cutting and mechanical treatements can all be used to retard succession to pinyon-juniper. Dependable mast-producing areas should be identified and managed for taller, older-age shrubs to maintain fruit production despite browsing by wild and domestic ungulates. While many mast-producing shrub species will vigorously resprout and produce fruit following winter defoliation by ungulates, excessive growing season utilization can significantly reduce both foliage and fruit production (Willard and McKell

1978, Kay 1995). Animal density of both wild and domestic herbivores should be managed to maintain diversity and vigor of both woody and herbaceous vegetation in all seasonally important vegetation types. Season-long livestock grazing can have negative impacts on both woody and herbaceous vegetation. Season long grazing may reduce seasonal bear food availability and increase the likelihood of predation. Jorgenson (1980) found bears and sheep competed spatially and temporally for food and space when grasses and forbs were limited, resulting in depredation, dead sheep, and dead bears. Conversely, livestock grazing can be used to reduce herbaceous competition, reduce suckering and promote apical dominance and seed production in shrubs (Urness 1990). Herded livestock, which are moved across the landscape, can maintain herbaceous plant diversity and vigor, and may reduce opportunities for predation.

Recreation management: Minimizing road density, human habitation and human access in high quality bear-habitat should reduce human contact with bears. Minimizing contact should increase longevity of breeding female bears, since they tend to utilize smaller ranges in less accessible areas when possible (Bates 1991, Beck 1991).

Graber and White (1983) noted that black bears in the coniferous forests of Yosemite spend a disproportionate amount of time near people and their high quality concentrated foods. Bear diets are generally high in carbohydrates and lacking in fats and protein. Consequently, bears seek out not only animal matter, but also human foods and garbage at campsites (Pelton 1982). Bears feeding on protein-rich sources (like contents of campground dumpsters) show significant weight gains (Rogers 1976). Augmenting bear habitat with human food-sources can result in increased size, fecundity and density of black bears (Herrero 1980). Since bears are extremely curious and learn quickly, it is important to avoid introducing these high quality food sources into bear habitat. Once bears become successful at exploiting human food-sources, they will continue to do so. With increased recreational demand in Utah's forested lands, education and enforcement of rules designed to minimize bear-access to human food-sources is essential in order to have both recreation and viable bear populations in bear country.

Landscape management: Successful bear management requires maintaining an adequate density of breeding females in high quality bear habitat. High quality bear habitat in Utah may be characterized as large interconnected blocks of land exhibiting high interspersion of aspen, mountain brush and coniferous plant communities with a healthy herbaceous and shrub component; well connected movement corridors between seasonal food sources and less accessible areas with variable topography. This requires management and planning at multiple scales, i.e. managing for healthy plants at the patch level, and managing at scales large enough to allow movement between blocks of important habitat. Connecting seasonal food sources maintains bear-condition, production and density; connecting habitat blocks maintains genetic diversity.

Utah Bear Harvest and Mortality

The black bear has been a protected species in Utah since 1967, when a group of sportsmen petitioned the Utah State Legislature to protect both cougar (*Puma concolor*) and bear. Management methods have evolved since then, from unlimited permits with a spring and fall season from 1967 to 1989, to a limited entry spring and fall hunt from 1990 to 1992, a limited entry fall only hunt from 1993 to 2000, a limited entry fall and experimental spring hunt from 2001 to 2005 and then a limited entry statewide spring and fall hunt from 2006 to 2010. Current hunting seasons include spring and fall hound hunts, a late spring, early summer bait hunt, and long fall spot and stalk hunt.

Black bear harvest and mortality statistics in Utah have been collected since 1967 (Harvest
Reports are available on the DWR Website here:
https://wildlife.utah.gov/annualreports/?dc=bear.

Utah's black bear population appears to have increased since 1990, as indicated by a) a trend of increasing hunting harvests, coupled with sustained hunter success, b) a preponderance of young age classes in recent bear harvests, c) evidence of reproduction by research bears in the Book Cliffs during most of the period, d) increasing numbers of bear/livestock conflicts and rising numbers of bears killed in control efforts despite declining numbers of sheep on the State's open range and, e) increasing numbers of human-bear conflicts and rising numbers of bears trapped, moved and euthanized as a consequence. Population reconstruction estimates minimum adult bear numbers have likely increased since 2006, and continue to grow, with some slowing in overall growth rate since 2015.

Assessment

The Black Bear Advisory Committee the following list of issues and concerns were reviewed from the previous plan and amended to reflect current opinions. In addition, regional wildlife managers and biologists listed their issues and concerns to be addressed by the advisory committee. Subsequent meetings focused on updating plan goals and objectives as well as changes to hunting regulations and season structure. Issues identified for discussion at the 2022 meetings are listed below.

For a more detailed view of topics discussed in the 2022 review process, see Appendix A.

Issues and Concerns

<u>Outreach and Education</u>

- Human safety
- Need for public education about hunting with hounds
- Need for improved sex and age determination by hunters
- Increase utilization of the meat from harvested bears

Habitat Management

- Loss of habitat (need to manage)
- Need for monitoring habitat (mast/food production)

Human/Bear Conflict Management (Largely Policy Driven)

- Conflict bear management
- Coordination with land management agencies on conflict bear translocations
- Techniques for dealing with conflict bears

Livestock and Agricultural Depredation

- Impact on livestock operations (prevention, compensation)
- Need to learn more about bears in Utah (ecology, biology, behavior) in general and relative to livestock depredation
- Appropriateness of depredation control on public land
- Adequate funding for livestock damage compensation
- Explore education, collaboration and funding for livestock producers to use nonlethal tools to prevent depredation by bears
- Impacts from bears on agricultural crops (primarily watermelons and bee hives).

Recreation

- Collaboration with public land management agencies on bait site locations
- Mitigate conflict between hound and bait hunters, and hound and archery hunters
- Maintain traditional hunting heritage and opportunity

Population Management

- Need to learn more about bears in Utah (ecology, biology, behavior), including in relation to other carnivores
- Identify reliable population measurement method(s)
- Need to manage metapopulation (connecting corridors)
- Adequate funding for management
- Effects of climate change (drought, fire) on bear densities
- Assuring continued viability of species in Utah

Research

- Identify reliable population measurement method(s)
- Identify reliable monitoring methods for diseases
- Techniques to improve use and awareness of nonlethal tools to reduce human-bear conflicts
- Effects of bears on other predators and prey species
- Impacts of bait stations on nontarget wildlife and disease risk (e.g., CDW)

Goal, Objectives, Strategies and Management System

The Black Bear Advisory Committee reviewed the plan goal, objectives, strategies and management system to address identified issues and concerns in 2022. After review on recent data, and looking at available literature, very few changes were warranted to plan goals and objectives beginning in 2023. One notable change is an allowance for district biologists, in consultation with regional wildlife managers and salt lake city staff, to determine hunt strategies for their district bear management units.

Outreach and Education

Objective 1:

Increase awareness of reasoning for the use of hounds to pursue bears, and the regulations on the limits on the numbers of hounds allowed during a pursuit.

Strategy:

1. Partner with the Utah Houndsmen Association to help the public understand methods and best practices for the use of hounds in bear hunting.

Objective 2:

Reach and educate general public about bear safety and how to avoid conflicts with bears

Strategies:

1. Continue to work with the WAU Program; an effort generated by the Conservation Outreach Section of the Division of Wildlife Resources.
2. Continue to coordinate / standardize bear safety information materials amongst state and federal agencies and others.

Objective 3:

Continue to educate all bear hunters on how to determine the age/sex of bears to increase harvest selectivity through 2023 and continue to educate Division employees tagging bears.

Strategies:

1. Obtain high quality digital images of bears for sex and age identification purposes.
2. Produce an online orientation course for bear hunters.
3. Evaluate the relative effectiveness of mandatory and voluntary education efforts
4. Publish and refine information about sex and age identification techniques to be sent to bear permit holders.
5. Train Division employees responsible for tagging bears at least every other year.
6. Consider different color ear tags for male and female yearlings marked through the reproduction and survival study (denning) to provide an opportunity to improve sex identification in the field.
7. Investigate making collared females off-limits to harvest.

Objective 4:

Increase the utilization of bear meat from harvested bears.

Strategies:

1. Collect baseline hunter harvest meat utilization data by modifying the black bear mortality form to include a question about meat consumption.
2. Publish techniques on how to utilize bear meat on the UDWR web site and in the Black Bear Guidebook.
3. Encourage organizations to publish techniques on how to utilize bear meat in their newsletters and promote consumption to clients and members.
4. Monitor hunter response concerning bear meat consumption from data collected on the black bear mortality form.
5. Identify charities that will accept bear meat.
6. Educate hunters about proper care of meat, examples at:
   https://cpw.state.co.us/thingstodo/Pages/BearHtgTips.aspx
   https://dnr.maryland.gov/huntersguide/Pages/BearHunt_Care.aspx

Habitat Management

Objective 1:

Seek to prevent the loss of occupied and suitable unoccupied bear habitat and to improve existing bear habitat.

Strategies:

1. Define crucial bear habitat and review and update the Division's statewide suitable bear habitat coverage map.
2. Evaluate the potential for currently unoccupied habitat and habitat with low bear densities to support bear reintroductions / augmentations while considering human safety, economic concerns, and other wildlife species.
3. Use the results of Strategies 1-2 and Black Bear Research Objective 1, Strategy 2 to identify target areas for habitat improvement projects that would benefit bears and other wildlife associated with aspen and hard and soft mast producing communities, through the Utah Watershed Restoration Initiative.
4. Provide recommendations to land management agencies on ways to improve bear habitat and when projects, plans and practices may negatively influence the quality and quantity of bear habitat.
5. Coordinate law enforcement efforts in support of land management agency travel plans targeted at reducing wildlife habitat impacts in accordance with existing MOUs.

Human-Bear Conflict Management

Objective 1:

Work to reduce the number of human-bear conflicts that resulted in the removal (lethal or nonlethal) of bears.

Strategies:

1. Train existing Division employees involved in black bear conflict management on the policy for handling black bear incidents
2. Encourage land management agencies and other organizations to train employees and volunteers regarding the prevention of humanbear conflicts.
3. Continue to monitor black bear incidents through reporting and database updates.

4. Evaluate and report progress by comparing the three year average removal rates to subsequent three-year periods (four over the life of the plan) at the black bear Regional Advisory Council and Wildlife Board meetings.
5. Continue to provide land management agencies and the general public with standardized bear literature, signs and placards to deliver a consistent message about how to safely recreate and live in bear country.
6. Encourage land management agencies and private campgrounds to provide bear proof storage containers and dumpsters (provide literature for designing bear proof containers).
7. Continue to develop and evaluate aversive conditioning techniques to discourage human-bear conflicts.
8. Coordinate with affected agencies when bear translocations are being considered as defined in Division policy (W5WLD-03).

Livestock and Agricultural Depredation

Objective 1:

Reduce the level of depredation on livestock caused by bears.

Strategies:

1. Remove depredating bears by targeting offending individuals in accordance with the MOU with Wildlife Services. Track removal locations in support of Strategy 9.
2. Encourage land management agencies and livestock operators to utilize best management grazing practices to minimize bear depredation opportunities.
3. Encourage the implementation of nonlethal methods to reduce bear depredation on livestock such as:
    a. Use of herders
    b. Guard dogs (where potential for impacting other wildlife is low, e.g. deer fawns and elk calves)
    c. Moving animals away from conflict
4. Work to develop and test new non-lethal techniques and evaluate the effectiveness of existing non-lethal techniques.
5. Continue to compensate operators for livestock losses from confirmed bear depredation.
6. Work to improve the detection of livestock killed by bears.
7. Develop a GIS coverage map that identifies areas of high livestock / bear conflict.
8. Evaluate the impacts of recreational pursuit (+ and -) on livestock depredation.

9. In areas with chronic livestock depredation, facilitate a dialogue between the Division, the land management agency, Wildlife Services and the livestock producer focused on identifying / developing non-lethal ways to decrease depredation and the lethal removal of bears.

Objective 2:

Reduce the level of agricultural depredation caused by bears.

Strategies:

1. Provide recommendations (e.g. electric fencing, guard dogs, aversive conditioning…..) to agricultural operators on ways to reduce or eliminate damage from depredating bears.
2. When damage becomes extensive and abatement techniques have proven ineffective consider removing offending animals using sportsmen or agency personnel.
3. Allow commercial agricultural producers, in areas that the Division identifies as having chronic depredation problems, to lethally remove bears that are found in the act of depredating on commercial crops.
4. Develop a GIS coverage map that identifies areas of high agricultural / bear conflict to help focus preventative efforts.

Recreation

Objective 1:

Maintain the quality and quantity of black bear recreational opportunities, both consumptive and non consumptive.

Strategies:

1. Continue to offer a variety of black bear hunting opportunities, including hounding, baiting, pursuit and spot and stalk as management tools.
2. Eliminate the need for the bear baiting COR requirement, but allow each bait hunter up to two bait sites that are located in areas outside restricted areas identified in rule.

a. Require bait hunters to register bait sites online to capture GPS coordinates to depict the location of bait stations.
b. Allow bait hunters to give written permission for other licensed hunters to hunt from their bait sites.

3. Implement bear harvest and pursuit strategies designed to reduce conflicts between other resource users (recreationists, bear and big game hunters) (e.g. hunting, pursuit, pack size, season dates).
4. Coordinate with land management agencies to implement land use restrictions designed to reduce conflicts between resource users.

Population Management

Objective 1:

Maintain a stable bear population while considering other wildlife population objectives, the level of human-bear conflict and source-sink population dynamics.

Performance Targets:

Performance Target	Light Harvest	Moderate Harvest	Liberal Harvest
Adult Male (5 yrs old) in the sport harvest category	>35%	25 – 35%	<25%
Female in the sport harvest category	<30%	30 – 40%	40 – 45%
Population Growth Rate (DNA study)	+10 to +20%*	-10 to +10%	-10 to -20%

*Only applies if units have been moved from liberal to light within the last 2 recommendation cycles.

Management System (Figure 2):

1. Select one of the following harvest strategies for bear management units at the beginning of each three-year recommendation cycle:

    a. Light Harvest Strategy

        i. Manage based on performance targets referenced in the harvest strategy.
        ii. Criteria used to select this strategy include providing opportunity to harvest adult male bears, a low level of human-bear conflict, low bear population in need of harvest protection or population acting as source for adjoining bear management units.

    b. Moderate Harvest Strategy

i. Manage based on performance targets referenced in the harvest strategy.
ii. Criteria used to select this strategy includes moderate levels of human-bear conflict and a stable bear population.

c. Liberal Harvest Strategy

i. Manage based on performance targets referenced in the harvest strategy.
ii. Criteria used to select this strategy includes high levels of human-bear conflict, an increasing bear population, source population (refuge) adjacent or within the unit, chronic livestock issues on private land or when Wildlife Services bear mortalities have exceeded sport harvest on the unit during two of a three-year recommendation cycle or a high level of human-bear conflict has occurred.

d. Predator Management

i. If a unit is placed under a predator management plan, according to DWR Policy W1AG-4 (Managing Predatory Wildlife), that unit will be managed under the Liberal Harvest Strategy for the duration of the predator management plan.

2. Harvest variables (adult male 5 years and female in the sport harvest category) identified in the performance targets at the bear management unit level over a three-year period will be evaluated as follows:

a. When both variables are within the normal range, permits will be stabilized or adjusted upward or downward by " 20% depending on the location within the range for the desired population level.
b. When one variable is inside the normal range and one variable is outside the normal range, permits will be stabilized or adjusted upward or downward by " 20% depending on the location within the range for the desired population level.
c. When both variables are outside the normal range in opposite directions, permits will be stabilized or adjusted upward or downward by " 20% depending on the location within the range for the desired population level.
d. When both variables exceed the normal range in the same direction, permits will be adjusted upward or downward by 20 – 40%.
e. When moving to a new harvest strategy at the end of a three-year recommendation cycle, permits will be adjusted upward or

downward depending on the new management direction but not to exceed ±50%.

f. When working with a small sample size (< 10 individuals) over the three-year period, decisions to adjust permits will be based on best professional judgment.

3. ~~The statewide rollup of harvest variables (adult male 5 years and female in the sport harvest category) will not be outside the performance target ranges identified in the moderate harvest strategy. Additional adjustments at the unit level may be necessary to move variables within normal range during the following three-year recommendation cycle. This will be accomplished by adjusting permits an additional ± 10% at the unit level.~~

   ~~a. Predator management plan units will not be considered as part of the statewide rollup.~~

Strategies:

1. Select the appropriate harvest strategy and manage to the performance targets identified in the management system.
2. Evaluate performance target ranges, harvest strategies and management system every 6 years.
3. Develop a GIS coverage map that identifies areas containing source-sink populations to help focus future harvest strategies

Black Bear Research

Objective 1:

Continue to improve basic understanding of black bear management and ecology through applied research.

Strategies:

1. Continue to support research efforts that utilize harvested bears and publicize the study results.
2. In addition, focus on the following research topics, as funding allows, during the life of the plan.
   a. Identify population connectivity and travel corridors
   b. Explore source / sink population dynamics
   c. Human-Bear conflict management
   d. Techniques for reducing livestock and agricultural depredation
   e. Document impacts to other resource users from summer bear pursuit activities, and implement actions to reduce impacts if warranted

f. Short term population density estimates
g. Potential impacts of selective versus non-selective hunt strategies
h. Dispersing yearling survival as compared to survival of established adults
i. Effects of bear on prey species such as deer fawns and elk calves
j. Monitor productivity of hard and soft mast producing communities
k. Short and long-term black bear use of wildfires or vegetation treatments in aspen, mixed conifer and mixed mountain browse habitats
l. Effects of roads and energy development activities (habitat fragmentation) on black bear use
m. Continue to monitor the survival of rehabbed bear cubs
n. Determine if there is a relationship between baiting and human-bear conflicts (i.e. does baiting increase the potential for human safety issues in the area of the bait). https://digitalcommons.unl.edu/icwdm_usdanwrc/2182/

3. Explore partnerships to leverage research funding.
4. Continue to use universities to conduct research.
5. When possible, use employees involved in the Division's continuing education program to conduct research.

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Appendix A

This appendix is meant to capture thoughts and rationales from the 2022 plan review process that created this plan. Included here are notes from the 5 committee meetings and resources presented as part of the process.

The committee was tasked with simplifying the plan in 2022 including separating hound and bait hunting to avoid law enforcement concerns about chasing bears off of bait stations which is illegal. Having those two activities occur simultaneously made enforcement very difficult. The committee also was asked to try to simplify the bear plan and make it easier for biologists, hunters and the public at large to understand how recommendations are made.

The committee separated hound and bait hunting in time to address enforcement concerns. They also shifted hound hunting in the fall to give archery big game hunters time in the field without bear hunting hounds. They also expanded fall spot-and-stalk hunting seasons to provide expanded bear hunting opportunities.

Meeting resources

The six meeting roles are:

1. Participant: The participants have a real stake in the meeting objectives. This is the group that will participate in providing the meeting content. Another job of the participants is to call foul if the facilitator or recorder strays from their neutral role and begin to comment on or offer content.
2. Recorder: The recorder captures the group memory (record of major points of discussion and decisions). This is done on flip charts at the front of the room. The recorder must write large enough so that people at the back can read. The recorder should use the words of the speaker as much as possible. Also the recorder should change the colors between major points and the recorder should number the pages sequentially.
3. Chair: The role of the chair of the meeting has several duties. This is the person that calls the meeting and sets the purpose (objectives) and any constraints on the meeting. The chair assigns follow-up tasks and represents the group to outsiders. The chair is responsible for the meeting results however; the chair does not run the meeting. Because the chair calls the meeting and sets the purpose and constraints it is the chair who is responsible for the meeting results.
4. Subject Expert: This person(s) participates only by giving unbiased information on the topic and answering questions. They do not recommend solutions to the issue at hand. This person may wear a uniform or other symbols of their authority and expertise. They are neutral and provide accurate information to the group. The subject matter expert does not offer opinions or suggestions unless asked by the group. They definitely should not run the meeting. Their power is in their neutrality and the information they present.
5. Observers: The role of observer is to watch and evaluate effectiveness of the meeting. OBservers participate only if asked. There is a tendency to jump into the conversation unless observers are clear on their role. Also, observers are seated separately from the group actually doing the work.
6. Facilitator: The facilitator role is that of a neutral servant of the group. The facilitator does not contribute content to the group's discussions. It is the job of the facilitator to keep the group focused on task and prevent straying away from the topic of discussion. The facilitator also encourages discussion and calls on people that have been very quiet asking for their opinions. Another critical role of the facilitator is that of protecting all participants from verbal attacks. The facilitator is to ensure a level and safe playing field for discussions. In addition, the facilitator works with the chair in planning the meeting and the facilitator supervises/assists the recorder during the meeting.

Discussion Items

NEEDS DISCUSSION	CATEGORIES

Bear hunting strategies Conflicts	Recreation
Pursuit season and dates for lion and bear permits	Recreation
Hounds versus bait, overlap of season dates	Recreation
Hounds during the big game archery season	Recreation
Weapon types available for bear take. Has liberalized weapon type over bait increased applications and take?	Recreation
Addressing how bears are managed across the state, and connectivity issues	Research/Pop Management
Are we meeting the metrics outlined in the current plan?	Recreation
Season structures	Recreation
Using containers for bait	Recreation
Maximum number of dogs	Recreation
Cost of various permits	Recreation
What tools are available, what is used the most	Population Management
Spot and Stalk doesn't control populations like bait/hounds, different hunt strategy success	Population Management
Overpopulation and oversaturation of bears in certain units. Plan for population reduction	Population Management
Improve and update "Performance Targets" in current plan (percentages with harvest). Simplify?	Population Management
How do we know density of bears?	Population Management
Do we always give biologist discretion over unit performance targets categories? How are they decided?	Population Management
Manage for trophy hunts while increasing opportunity	Recreation
Obtaining accurate population estimates across the state/per unit. What type of data is collected?	Research
Update plan with recent literature	Research
Across agency coordination with bear management	Population Management
Trail cameras and bear hunting	

Weeding out the noise, not addressing every complaint (ppl complain about everything) Public land is equal opportunity	All
Depredation, livestock producers	Depredation
Tools for livestock owners	Depredation
How to increase chances of public hunters removing conflict bears	Nuisance
How to improve hunting opportunities without increasing negative public sentiment (example wanted waste)	Outreach
What is the current public sentiment, what is on social media? Wanted waste in Utah	Outreach
Translocations for nuisance bears	Population Management
What is used as bait, are there concerns with CWD spread	Population Management
Hunter education for identifying sows versus boars	Population Management
How improve hunt opportunities by using different strategies (increase opportunity w/out hurting the resource)	Recreation
Strengthen language in plan to encourage consumption of bear meat. Avoid Oregon situation where wanton destruction of bears occurred	Recreation
Special opportunities for youth in bear hunting, no group applications permitted	Recreation
Baiting CORs, necessary or not?	Recreation
Baiting COR, allowing alternate hunters on one bait and preapproving baits if they want to move it	Recreation
Distance between different hunter's baits, standardize the way regions handle it	Recreation
Prevalence of trichinosis	Research
Data on bear meat consumption	

Meeting Agendas:

Statewide Bear Plan Committee

Draft Agenda

August 15, 2022 - 5:00 - 8:30 pm

CRCC Building Central Region Office (1115 N Main Street, Springville)

Facilitator: Chris Wood Chair: Darren Debloois Recorder: Elicia Cotcher

Committee Members: Ben Lowder , Travis O'Niel , Cory Huntsman , Bret Guyman, Kirk Player, Sunshine Brosi , Kaya Wasilewska , Julie Young , Sierra Nelson , Brayden Richmond , Chad Heuser, Wade Heaton , JW Hackett, Ross Worthington, Barbara Smith, Dustin Mitchell

Purpose: Assist the DWR in writing the statewide black bear plan.

Time	*Topic*	*Person*	*Process*	*Product*
4:30	Dinner (provided by DWR)	All	-	-
5:00	Welcome by Director	J Shirley	Present	-
5:10	Introductions	All	Open Discussion	Know participants
5:20	Purpose, goals, roles, agenda of meeting	Chris	Present / Discuss	Functional agenda
5:30	Charter, ground rules, parking lot	Chris	Present / Discuss	Finalize charter and create ground rules
6:15	Expectations and direction from the Wildlife Board	Darren	Present	
6:20	Discussion- What is working? What is not working?	All	Discussion	
8:15	Assignments	All	Discussion	Assign tasks
8:20	Plan next meeting(s)	All	Discussion	Determine timing and purpose of next meeting
8:30	Adjourn	All	-	-

Statewide Bear Plan Committee

Draft Agenda Meeting #2

September 1, 2022 - 6:00 - 9:00 pm

CRCC Building Central Region Office (1115 N Main Street, Springville)

Facilitator: Chris Wood Chair: Darren DeBloois Recorder: Elicia Cotcher

Committee Members: Ben Lowder , Travis O'Niel , Cory Huntsman , Bret Guyman, Kirk Player, Sunshine Brosi , Lisa Church, Julie Young , Sierra Nelson , Brayden Richmond , Chad Heuser, Wade Heaton , JW Hackett, Ross Worthington, Barbara Smith, Dustin Mitchell

Purpose: Assist the DWR in writing the statewide black bear plan.

Time	*Topic*	*Person*	*Process*	*Product*
5:30	Dinner (provided by DWR)	All	-	-
6:00	Welcome/Introductions	All	Open Discussion	Know participants
6:10	Agenda overview	Chris	Present / Discuss	Agreement on meeting content
6:20	Bear Management overview.	Darren	Present	Better understanding of hunt strategies/structure/dates, big game/cougar season dates, current toolbox
6:40	Law Enforcement overview	Officers Bond & Decker	Present	Better understanding of LE experiences challenges and perspectives
7:00	Licensing overview	Lindy	Present	Better understanding of hunting success and hunting interest
7:20	Break			
7:30	Q&A about presentations	All	Discussion	Answer questions about all three presentations
8:00	Discussion & resolutions	All	Discussion	
8:40	Assignments	All	Discussion	Assign tasks
8:50	Plan next meeting(s)	All	Discussion	Determine timing and purpose of next meeting
9:00	Adjourn	All	-	-

Statewide Bear Plan Committee

Draft Agenda Meeting #3

September 22, 2022 - 6:00 - 9:00 pm
Southeastern Region Office (319 N Carbonville Rd Ste A)

Facilitator: Chris Wood Chair: Darren DeBloois Recorder: Elicia Cotcher

Committee Members: Ben Lowder , Travis O'Niel , Cory Huntsman , Bret Guyman, Kirk Player, Sunshine Brosi , Lisa Church, Julie Young , Sierra Nelson , Brayden Richmond , Chad Heuser, Wade Heaton , JW Hackett, Ross Worthington, Barbara Smith, Dustin Mitchell

Purpose: Assist the DWR in writing the statewide black bear plan.

Time	*Topic*	*Person*	*Process*	*Product*
5:30	Dinner (provided by DWR)	All	-	-
6:00	Welcome/Introductions	All	Open Discussion	Know participants
6:05	Agenda overview	Chris	Present / Discuss	Agreement on meeting content
6:10	Direction from DWR's Directors Office	Darren	Present	Understand the purpose of the committee and additional direction received form DWR leadership
6:15	Recap from law enforcement on season overlap challenges	Officers Bond & Decker	Present	Understand what challenges/complaints they are hearing from other hunters and user groups. Hear any recommendations on how to address those issues.
6:25	Discussion on season overlaps	All	Discussion	Generate recommendations on how to separate hunts and lessen conflicts among hunts/hunters.
6:50	Discussion on hounds, baiting, spot and stalk opportunities in units throughout the state	All	Discussion	Generate recommendations on hunting methods for units across the state
7:30	Break			
7:40	Presentation & discussion on pack including recent reg changes, avg # of dogs in units, social tolerances, etc	All	Discussion	Generate a recommendation on # of dogs for pursuit and hunting seasons
8:45	Assignments	All	Discussion	Assign tasks
8:50	Plan next meeting(s)	All	Discussion	Determine timing and purpose of next meeting
9:00	Adjourn	All	-	-

Statewide Bear Plan Committee

Draft Agenda Meeting #4

October 4, 2022 - 6:00 - 9:00 pm
Central Region Office

Facilitator: Chris Wood Chair: Darren DeBloois Recorder: Elicia Cotcher

Committee Members: Ben Lowder , Travis O'Niel , Cory Huntsman , Bret Guyman, Kirk Player, Sunshine Brosi , Lisa Church, Julie Young , Sierra Nelson , Brayden Richmond , Chad Heuser, Wade Heaton , JW Hackett, Ross Worthington, Barbara Smith, Dustin Mitchell

Purpose: Assist the DWR in writing the statewide black bear plan.

Time	*Topic*	*Person*	*Process*	*Product*
5:30 pm	Dinner provided by Director J J Shirley.	All	-	-
6:00 pm	Welcome/Introductions	All	Open Discussion	Know participants
6:05 pm	Agenda overview	Chris	Present / Discuss	Agreement on meeting content
6:10 pm	Season structure- Wrap up discussion on season overlap ideas and hunt strategy discussion. Discuss feedback from biologists	All	Present/Discuss/ Agree-vote	Decide on- fall bait season, expanding spot and stalk, rest of the season dates
6:50 pm	Dogs- presentation & discussion on dogs- including recent reg changes, avg # of dogs in units, social tolerances, etc	All	Present	Generate a recommendation using hounds for bear hunting including- # of dogs for pursuit and hunting seasons
7:30 pm	Break			
7:40 pm	Bear Baiting- # of stations, location restrictions, permitting process, tracking bait stations, locations, land agency concerns	All	Discussion	Generate a recommendation on bear baiting
8:10	Plan parameters and harvest strategies	All	Discussion	Discuss three categories and how to determine which units have- light, moderate, heavy harvest categories.
8:45	Assignments	All	Discussion	Assign tasks
8:50	Plan next meeting(s)	All	Discussion	Determine timing and purpose of next meeting
9:00	Adjourn	All	-	-

Statewide Bear Plan Committee

Draft Agenda Meeting #5

October 25, 2022 - 6:00 - 9:00 pm
Central Region Office

Facilitator: Chris Wood Chair: Darren DeBloois Recorder: Elicia Cotcher

Committee Members: Ben Lowder , Travis O'Niel , Cory Huntsman , Bret Guyman, Kirk Player, Sunshine Brosi , Lisa Church, Julie Young , Sierra Nelson , Brayden Richmond , Chad Heuser, Wade Heaton , JW Hackett, Ross Worthington, Barbara Smith, Dustin Mitchell

Purpose: Assist the DWR in writing the statewide black bear plan.

Time	*Topic*	*Person*	*Process*	*Product*
5:30 pm	Dinner provided by DWR	All	-	-
6:00 pm	Welcome/Introductions	All	Open Discussion	Know participants
6:05 pm	Agenda overview	Chris	Present / Discuss	Agreement on meeting content
6:10 pm	Recap- What the plan looks like, what decisions have been made	Darren	Present	An understanding of where we are and what we still need to discuss/recommend
6:20 pm	Bear Baiting- # of stations, sharing/changing stations, location restrictions, permitting process, tracking stations, locations, containers, land agency concerns	All	Present/Discuss/ Recommend	Generate a recommendation on bear baiting
7:20 pm	Break			
7:30 pm	Plan parameters and harvest strategies	Daren/All	Discussion/Recommend	Discuss three categories and how to determine which units have- light, moderate, heavy harvest categories.
8:00 pm	Outreach strategies	DWR Outreach personnel/All	Present/Discuss/ Recommend	Learn about DWR's outreach toolbox. Make recommendations on messaging and strategies.
8:25 pm	Statewide predator management plan	Darren/All	Present/Discuss	Understanding on how the plan applies to bear management
8:35 pm	Misc items to discuss	All	Discuss/Recommend	Wanton waste, recommendation on permit prices,
8:50 pm	Assignments	All	Discussion	Assign Life History, Habitat, etc sections
8:55 pm	Discuss next steps	All	Discussion	Determine whether additional meeting(s) and/or email communication is needed
9:00 pm	Adjourn			

Additional reading offered during discussions

- Who Takes the Bait? Non-target Species Use of Bear Hunter Bait Sites

(Thompson et al. 2008, Sorensen et al. 2014, Uehlinger et al. 2016

- Sorensen, A., F. M. van Beest, and R. K. Brook. 2014. Impacts of wildlife baiting and supplemental feeding on infectious disease transmission risk: A synthesis of knowledge. Preventive Veterinary Medicine 113:356–363.
- Thompson, A. K., M. D. Samuel, and T. R. Van Deelen. 2008. Alternative feeding strategies and potential disease transmission in Wisconsin white-tailed deer. Journal of Wildlife Management 72:416–421.
- Uehlinger F. D., A. C. Johnston, T. K. Bollinger, and C. L. Waldner. 2016. Systematic review of management strategies to control chronic wasting disease in wild deer populations in North America. BMC Veterinary Research 12:173.
- Chocolate and cocoa products and bear mortality https://wildlife.onlinelibrary.wiley.com/doi/full/10.1002/wsb.647