



Tracking Number: ( 2021-027 )

To request a change to regulations under the authority of the California Fish and Game Commission (Commission), you are required to submit this completed form to: California Fish and Game Commission, (physical address) 1416 Ninth Street, Suite 1320, Sacramento, CA 95814, (mailing address) P.O. Box 944209, Sacramento, CA 94244-2090 or via email to FGC@fgc.ca.gov. Note: This form is not intended for listing petitions for threatened or endangered species (see Section 670.1 of Title 14).

Incomplete forms will not be accepted. A petition is incomplete if it is not submitted on this form or fails to contain necessary information in each of the required categories listed on this form (Section I). A petition will be rejected if it does not pertain to issues under the Commission's authority. A petition may be denied if any petition requesting a functionally equivalent regulation change was considered within the previous 12 months and no information or data is being submitted beyond what was previously submitted. If you need help with this form, please contact Commission staff at (916) 653-4899 or FGC@fgc.ca.gov.

### **SECTION I: Required Information.**

*Please be succinct. Responses for Section I should not exceed five pages*

**1. Person or organization requesting the change (Required)**

Name of primary contact person: Sabrina Ashjian, California State Director, The Humane Society of the United States

Address: [REDACTED]

Telephone number: [REDACTED]

Email address: [REDACTED]

**2. Rulemaking Authority (Required) - Reference to the statutory or constitutional authority of the Commission to take the action requested:**

Cal. Fish & Game Code §§ 200, 203, 203.1, 302.

**3. Overview (Required) - Summarize the proposed changes to regulations:**

We request that the California Fish and Game Commission ("Commission") amend existing black bear (*Ursus americanus*) hunting regulations to eliminate open hunting season until (1) an empirical study is conducted of the state's black bear populations, (2) the effects of drought and recent wildfires on the state's bear populations are adequately studied, and (3) the state's bear management plan is updated to include the best available science, including social science.

**4. Rationale (Required) - Describe the problem and the reason for the proposed change:**

As detailed more fully in the letter included as Attachment A, we are gravely concerned about the status of California's black bear population given the numerous threats these bears face and recent data released by the Department of Fish and Wildlife ("DFW") indicating a steep decline in the state's bear population. We therefore request that the Commission take urgent regulatory action to protect black bears.



Black bears in California are threatened by numerous factors. To start, California has experienced record-level fires and drought in recent years. In 2021 alone, more than three million acres burned from intense wildfires. Yet, to date, DFW has not analyzed the effects these fires—and future fires— or California’s well-documented drought will have on the state’s black bears, their food sources, or their habitats. Climate change exacerbates these issues and poses a further threat to bears both because erratic weather events limit the availability of natural foods and because warmer weather causes bears to spend less time in their dens, increasing the potential for human-wildlife conflict. As a result, bear biologists warn we must do more to avoid attracting bears to human food sources by implementing bear-aware campaigns, but we should certainly not increase bear mortalities to reduce conflicts. Killing bears to reduce conflict risks extirpating local populations *and* multiple studies warn that hunting bears does nothing to reduce conflicts with them.

Human persecution of bears, such as through hunting and predator control, not only does not stop human-bear conflict, it also threatens these animals because it causes “super-additive” mortality, meaning that kill rates exceed mortalities that would occur naturally. This is because hunters typically target adult breeding animals, which disrupts animals’ social structure and leads to indirect effects, particularly increased infanticide resulting in decreased recruitment of young. Because bears are slow to reproduce, compared to other mammals, this super-additive mortality can be especially devastating to bear populations. Another form of human persecution, poaching, is of major concern in California; the current bear management plan suggests that poaching numbers equal that of legal killings in some areas of the state.

In the face of these threats to bears, we are alarmed by worrisome indications of a steep decline in California’s black bear population. In late October 2021, DFW posted its black bear “take” reports for the years 2017, 2018, 2019 and 2020. In the 2020 report, the agency suggests that the black bear population is 15,934 ( $\pm 6,163$ ), a marked decrease from the estimated population of 30,000-40,000 that DFW has suggested for years. DFW now believes that the California bear population could be as low as 9,771 individuals, which would indicate a 67% decline in the number of bears from the previously reported lowest population range of 30,000 bears.

Equally troublesome is DFW’s unempirical approach to estimating the state’s bear population. Although many large-carnivore biologists recognize that using kill levels to estimate bear populations is unreliable, DFW uses the number of hunted bears to approximate the live bear population in the state. In other words, DFW has no empirically based estimate of the state’s bear population. What we do know is that the numbers of black bears killed annually is in decline while the number of bear hunters themselves has increased with a record 30,388 in 2020, providing further indication that the state’s bear population is declining.

Under California’s Constitution and the Fish and Game Code, the Commission has a clear obligation to provide for the conservation of the state’s wildlife. California’s Constitution creates the Commission and gives the California legislature the authority to “delegate to the commission such powers relating to the *protection and propagation of fish and game*” as the legislature sees fit. Cal. Const. art. IV, § 20 (emphasis added). The legislature has accordingly granted the Commission “the power to regulate the taking or possession of . . . mammals.” Cal. Fish & Game Code § 200. More specifically, the Commission has regulatory authority to “establish, extend, shorten, or abolish open seasons and closed seasons” for game mammals,



such as black bears. *Id.* § 203. The legislature has provided specific factors that the Commission must consider when adopting such regulations, including “populations, habitat, food supplies, the welfare of individual animals, and other pertinent facts and testimony.” *Id.* § 203.1.

Further, the Commission has specific obligations with respect to its regulation of the black bear hunting season. The Commission must “annually determine whether to continue, repeal, or amend regulations establishing hunting seasons for black bears.” *Id.* § 302. This determination “shall include a review of factors which impact the health and viability of the black bear population.” *Id.*

Given the threats California black bears face and the indications of their population decline—factors that the Commission is *required* to consider in making its annual determination of whether to continue the black bear hunting season—we ask the Commission to eliminate the season until (1) an empirical study is conducted of the state’s black bear populations, (2) the effects of drought and recent wildfires on the state’s bear populations are adequately studied, and (3) the state’s bear management plan is updated to include the best available science, including social science. More specifically, the updated bear management plan should also consider the additional effects from climate change, including stochastic weather events (late freezes affecting mast crops), insect-borne diseases and parasites, sexually selected infanticide resulting from human persecution, and it should include plans to prevent human-bear conflicts, such as through bear-smart or bear-aware campaigns.

Our request to suspend bear hunting season until these conditions are met is not only consistent with the Commission’s legal obligations, it also honors the will of the people of California—70% of California voters do not want black bears killed for sport.

**SECTION II: Optional Information**

5. **Date of Petition:** December 10, 2021

6. **Category of Proposed Change**

- Sport Fishing
- Commercial Fishing
- Hunting
- Other, please specify:

7. **The proposal is to:** *(To determine section number(s), see current year regulation booklet or <https://govt.westlaw.com/calregs>)*

- Amend Title 14 Section(s): 365, 366, see Attachment B for proposed revisions
- Add New Title 14 Section(s):
- Repeal Title 14 Section(s):

8. **If the proposal is related to a previously submitted petition that was rejected, specify the tracking number of the previously submitted petition**   
Or  Not applicable.



**Attachment A**  
**November 22, 2021 Letter to Commission**



**THE HUMANE SOCIETY  
OF THE UNITED STATES**

November 22, 2021

Peter S. Silva, President  
Samantha Murray, Vice President  
Jacque Hostler-Carmesin, Member  
Eric Sklar, Member  
Erika Zavaleta, Member

**California Fish and Game Commission**

715 P Street, 16th floor, Sacramento, 95814  
P.O. Box 944209, Sacramento, CA 94244-2090

**Re: Urgent request to review black bear (*Ursus americanus*) hunting in California, draft an updated black bear management plan, and conduct a population study to avoid jeopardizing California's black bears**

Dear President Silva and Commissioners:

In light of the historic wildfires over the past several years (including the loss of more than a record three million acres from wildfires in 2021 alone<sup>1</sup>), and data recently released by the California Department of Wildlife (DFW), we are deeply concerned about the state of black bears in California.

In late October 2021, DFW posted its black bear “take” reports for the years 2017, 2018, 2019 and 2020. From the 2020 report, we are alarmed to see the agency suggest that the black bear population is 15,934 ( $\pm 6,163$ ) rather than the estimated population of 30,000 – 40,000 that DFW has suggested for years.<sup>2</sup> DFW now believes that *the California bear population could be as low as 9,771 individuals*, which would indicate a 67% decline in the number of bears from the previously reported lowest population range of 30,000 bears. A nearly 70% decrease in California's black bear population should spur the Commission to take urgent action to protect California's black bears from all harms, including an update to the 1998 black bear management plan.

**A. California's climate crisis is acute and harms black bears**

In 2021, California experienced record-level fires. According to CalFire, more than three million acres burned,<sup>3</sup> and in some areas, even soils experienced severe burn.<sup>4</sup> Because of erratic weather events from the climate crisis, including late season frosts or droughts, natural foods are increasingly unavailable to bears. For instance, in a Colorado bear study, the female cohort of the population declined by 57% because of human-caused mortalities from vehicle collisions, hunting and predator control, which coincided with widespread unavailability of natural foods. This would not have been detected by wildlife managers without the rigorous population monitoring study in place.<sup>5</sup> California has no such equivalent in population monitoring as we discuss below.

Climate change has resulted in a warmer climate, which causes bears to spend less time in their dens.<sup>6</sup> Because of all these factors, black bear biologists warn that wildlife managers must limit recreational black bear killing to reduce total mortality, and especially during years of poor natural food production, which is readily predicted by weather events.<sup>7</sup>



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## **B. Bears are slow to reproduce and thus are susceptible to overkill**

Black bear biologists suggest that the total annual human-caused mortality that a black bear population can sustain is only between 4% and 10% of the population; more than that is simply super-additive mortality.<sup>8</sup> In other words, when there is additive mortality, the population will decline in number, and sometimes that decline is unsustainable because of black bear biology. For example, female bears rarely migrate—they prefer to live near their natal areas, and this compounds the harms to their populations from hunting, chronic wildfires and other sources of mortality that affect their populations.<sup>9</sup> The loss of females reduces a bear population’s ability to bounce back as they are the key to sustaining the population.<sup>10</sup>

Human persecution of bears, such as through hunting and or predator control, causes “super-additive” mortality, meaning that kill rates exceed mortalities that would occur naturally.<sup>11</sup> This is because hunters like to target adult breeding animals,<sup>12</sup> which disrupts animals’ social structure and leads to indirect effects, particularly increased infanticide resulting in decreased recruitment of young.<sup>13</sup>

Compared to other mammals, bears are slow to reproduce. Generally, females are not considered to be adults until they are 3 to 6 years old—and in the arid West, that timeframe is generally older at 4 to 5 years—but females are capable of breeding until age 21.<sup>14</sup> Fecundity varies with age.<sup>15</sup> Females generally give birth to litters of cubs only every 2-3 years. Cub survival in one Colorado study was about 55%.<sup>16</sup> Cubs die from many factors including vehicle collisions, predation or starvation.<sup>17</sup> The intervals are dictated by both bear biology and weather and climate. Bears will keep their cubs to 15-24 months (or longer if they are underweight). But if there are droughts or frosts, bears’ foods can be unavailable to them—which both reduces reproduction potential and increases the intervals between litters of cubs and cub survival itself.<sup>18</sup> Thus, bears reproduce slowly,<sup>19</sup> and are highly susceptible to overkill<sup>20</sup>—including by hunters and predator-control agents.

Large-bodied carnivores such as black bears are sparsely populated across vast areas, invest in few offspring, provide extended parental care to their young and reproduce slowly. Bears are capable of self-regulation<sup>21</sup> and are regulated by habitat and climatic conditions. Considering these biological factors, they rely on social stability to maintain resiliency.<sup>22</sup>

Without social stability, bears experience sexually selected infanticide; that is, when a resident, adult male is removed, subadult males vie for his home range and mates. These newcomers kill the adult male’s offspring in order to spur females back into breeding so the newcomers can pass on their genetic materials.<sup>23</sup> Gosselin et al. (2015) state: “In species with sexually selected infanticide (“SSI”), hunting may decrease juvenile survival by increasing male turnover.” This study and others show that hunting mortality can harm social organization of species, because it promotes male turnover and thus increases sexually selected infanticide upon cubs of deceased males.<sup>24</sup>

Welfelt et al. (2019) in their study of Washington bears found bear densities range widely by region, and that managers had over-estimated the population of bears in western Washington—including cubs—by 50 percent.<sup>25</sup> The implications for California are particularly salient, given that black bear habitat in California is also widely varied by region, and black bears are a forest obligate.<sup>26</sup> Density estimates from studies conducted in optimal quality habitats where animals are abundant can only be extrapolated cautiously to larger areas with similar habitats and landscape characteristics.<sup>27</sup> DFW has failed to accommodate differences in vegetation, land use and topography to avoid overestimating bears, and particularly females.<sup>28</sup>



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In sum, around the world and in California, large carnivores face extinction from human factors,<sup>29</sup> thus it is incumbent upon the Commission to conserve California's black bears now, so they are not extirpated like grizzly bears had been. Expanded human development into bear habitats during the climate crisis (including wildfires) exacerbates bear mortalities; thus, the Commission should act to curb black bear mortalities and especially by hunting.<sup>30</sup>

### **C. DFW's black bear census does not rely upon best available science**

Garshelis and Hristienko (2006) caution that many state wildlife managers fail to adequately investigate population sizes and trends, but rather rely on guesswork to estimate bear numbers.<sup>31</sup> Population trends must be determined using reliable methodologies; however, sightings, depredation events and kill levels are not reliable means to indexing a population.<sup>32</sup> In contravention to these principles for enumerating bears, the DFW's 2020 take report provides:

To produce a population estimate for a given year, the Department uses an age-at-harvest model reliant on the age and sex of bears harvested that year. In 2013, the use of hounds in the sport take of bears was prohibited, which violated a key assumption in that model regarding consistent hunter effort. Annual bear harvests have been relatively lower since this ban . . . resulting in correspondingly lower population estimates . . . . The average population growth rate in the years following the ban (1.00 in 2013-2020) remains steady and on par with the average population growth rate in years before the ban (1.03 in 1993-2012) . . . . The Department estimates approximately 15,934 ( $\pm 6,163$ ; 95% CI) bears inhabited the black bear hunt area prior to the start of the 2020 bear hunting season . . .

In short, DFW admits it uses dead, hunted bears to estimate the number of live bears in California. This is not empirical science, according to many large-carnivore biologists.<sup>33</sup> And ignores the many benefits bears confer on their forest ecosystems<sup>34</sup> and their intrinsic worth.<sup>35</sup>

What we do know is: the numbers of black bears killed annually is in decline while the number of bear hunters themselves were a record 30,388 in 2020. See: Figures 1, 2 and 3. In the absence of empirical population data, the Commission must act to prevent the overkill of California's bear populations.

Also, the average number of bears hunted in California from 1998 to 2012 was 1,777 bears, and for the years 2013 to 2020, the average was 1,258 bears. On average, 519 bears *were not* killed by hunters each year since 2013 – making DFW's model particularly doubtful – because less bears were killed by hunters and yet the population is likely in decline.

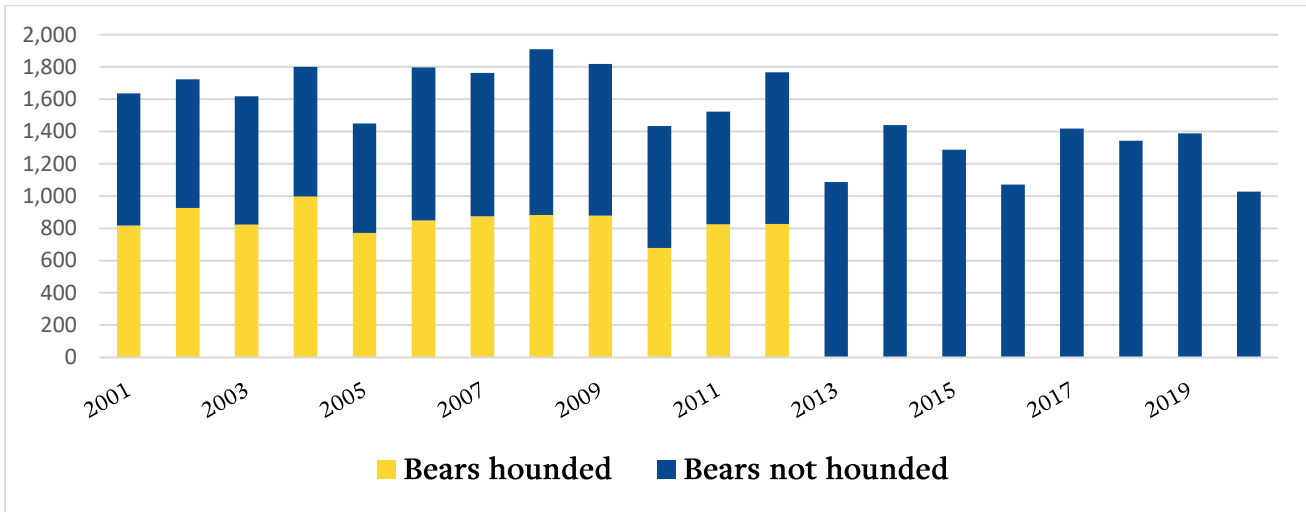
What we do know is: the numbers of black bears killed annually is in decline while the number of bear hunters themselves has increased with a record 30,388 in 2020. See: Figures 1, 2 and 3. In the absence of empirical population data, the Commission must act to prevent the overkill and jeopardy of California's bear populations.

DFW's bear population analyses have no basis in sound science because they are not based on traditional population enumeration methods, but rather on a discredited method of using the numbers of dead, hunted bears to guess at the number of live bears. Yet, the agency had claimed between 30,000 to 40,000 bears in California on its website, then in its 2020 Annual Bear Take Report precipitously dropped that population figure

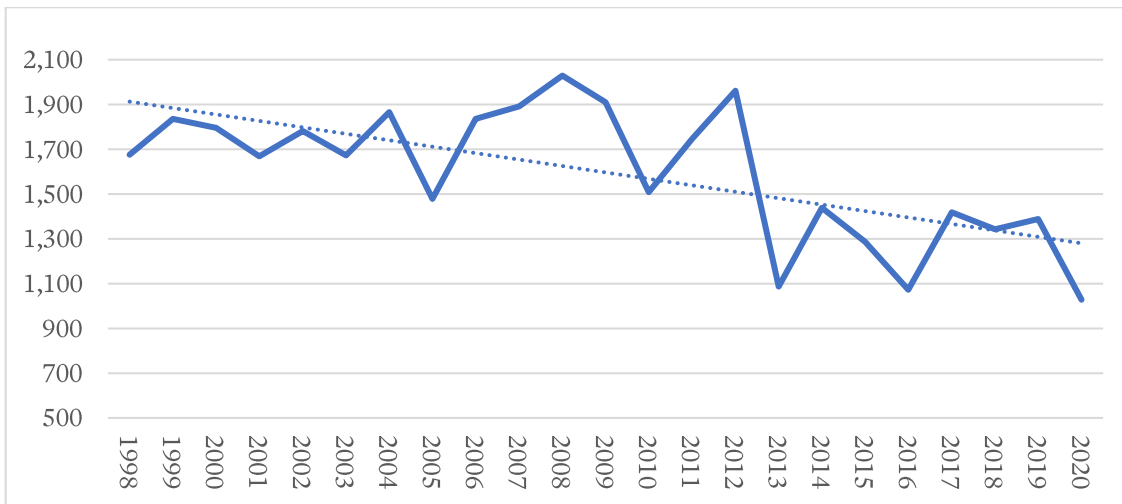


to 15,934 (±6,163) – a population range between 9,771 to 22,097 individuals – even as the numbers of bears killed by hunters has simultaneously declined in California. Figs. 1, 2 and 3.

**Figure 1. Black bears hunted in California, 2001-2020**



**Figure 2. Trend of black bears killed by hunters in California**

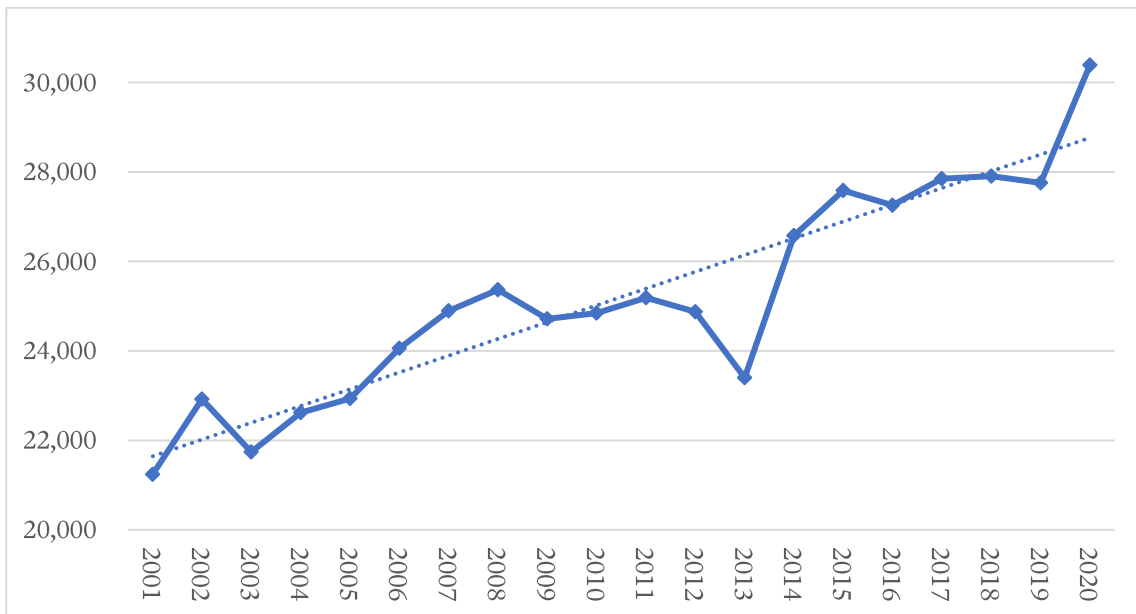


**A. DFW’s bear hunter data show that bear hunters are increasing while bears killed are decreasing**

In the absence of bear population studies, the only data relied upon by DFW are the numbers of dead bears per year in California. While a record number of hunters turned out in 2020, 30,387 bear hunters, they killed an all-time low number of bears, 1,028, compared to most other years since 1998. Figs. 1 and 2.



**Figure 3. Trend of black bear hunters in California**



DFW's data also show that since 2013 when hounding was banned, most California bear hunters are opportunistic deer hunters, 58%. Since 2013, only ~43% of bear hunters are dedicated to the activity. The DFW classifies 2% of bear hunters as "other."

Bear poaching is a major issue of concern in California. The 1998 black bear management plan, citing Sitton (1982), suggests that in some areas of California, poaching numbers equal that of legal killing.<sup>36</sup> The DFW's bear reports are silent as to the extent of poaching in California, so the public and the Commission are in the dark on this grievous issue. Again, the best available science indicates that bear populations can only withstand offtake in an amount under ten percent annually.<sup>37</sup>

### **B. Black bear hunting is unpopular amongst California residents**

Bear hunting is highly unpopular with Californians. A 2020 Remington Research poll of likely 2022 California voters found<sup>38</sup>:

- A supermajority, 70%, do not want California black bears killed for sport. This includes majorities of residents in the top two bear hunting counties from 2020 – Shasta County and Trinity County – who oppose the hunting of bears for sport.
- A supermajority, 71%, agree that wildlife officials should place a priority of non-lethal methods to reduce conflicts between bears and people (e.g., public education, trash management or frightening devices used by game officers) rather than killing bears
- A majority, 62%, would support legislation to stop the hunting of black bears



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Figure 4. DFW's black bear hunt data

Year	DFW's bear population estimate	Bear-hunter mortality	% Female bears	# Bear tags sold	% Deer & bear hunters	% Bear Hunters only	% Other hunters	Hunter success rate (%)
2008	37,150	2,029	37	25,631	34	44	8	7.9
2009	31,432 (± 7,991)	1,910	40	24,805	34	56	10	ND
2010	31,432 (± 7,991)	1,508	40	24,859	37	56	8	ND
2011	26,390 (±6,889)	1,745	42	21,581	28	56	16	8
2012	34,002 (±5,561)	1,962	38	24,872	32	67	2	7.9
2013	34,385 (±6,443)	1,087	37	23,397	53	47	1	4.6
2014	35,101 (±6,444)	1,439	42	26,576	51	49	0	5.4
2015	35,484 (±6,444)	1,287	40	27,578	57	39	5	4.7
2016	35,867 (±6,444)	1,072	40	27,253	69	41	2	3.9
2017	23,397 (±7,176)	1,418	40	27,864	63	50	1	5.1
2018	20,801 (±6,269)	1,342	37	27,885	61	39	0	4.8
2019	21,529 (±6,231)	1,389	40	27,755	59	35	6	5
2020	15,934 (±6,163)	1,028	38	30,387	54	45	2	3

## Conclusion

The harms from the recent wildfires on California's bear population are currently unknown, as are the effects of hunting and poaching on California's bear population, and the reason behind such a dramatic decline in the estimated population. Therefore, we respectfully request that the 2022 bear hunt be suspended by the Commission until an empirical population study can be conducted, the effects of the wildfires on California's bear population adequately studied, and the bear management plan updated to include the best available science, including social science.

Sincerely,

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## Sources cited

- <sup>1</sup> CAL FIRE, "2021 Incident Archive," <https://www.fire.ca.gov/incidents/2021/> (2021).
- <sup>2</sup> Despite the updated population figure in its reports, DFW still has the 30,000-40,000 figure listed on its website. <https://wildlife.ca.gov/Conservation/Mammals/Black-Bear/Population>
- <sup>3</sup> CAL FIRE, "2021 Incident Archive."
- <sup>4</sup> See: Dixie fire assessment here: <https://inciweb.nwcg.gov/incident/article/7811/67107/>
- <sup>5</sup> Jared S. Laufenberg et al., "Compounding Effects of Human Development and a Natural Food Shortage on a Black Bear Population Along a Human Development-Wildland Interface," *Biological Conservation* 224 (2018).
- <sup>6</sup> H. E. Johnson et al., "Human Development and Climate Affect Hibernation in a Large Carnivore with Implications for Human-Carnivore Conflicts," *Journal of Applied Ecology* 55, no. 2 (2018).
- <sup>7</sup> Ibid.
- <sup>8</sup> Julie A. Beston, "Variation in Life History and Demography of the American Black Bear," *Journal of Wildlife Management* 75, no. 7 (2011); Lindsay Welfelt, Richard Beausoleil, and Robert Wielgus, "Factors Associated with Black Bear Density and Implications for Management," *The Journal of Wildlife Management* (2019).
- <sup>9</sup> Laufenberg et al., "Compounding Effects of Human Development and a Natural Food Shortage on a Black Bear Population Along a Human Development-Wildland Interface."
- <sup>10</sup> Ibid.
- <sup>11</sup> Vucetich et al. 2005, Creel and Rotella 2010, Creel et al. 2015, Darimont et al. 2015.
- <sup>12</sup> Benjamin Ghasemi, "Trophy Hunting and Conservation: Do the Major Ethical Theories Converge in Opposition to Trophy Hunting?," *People and Nature* 3 (2021); A. R. Braczkowski et al., "Who Bites the Bullet First? The Susceptibility of Leopards Panthera Pardus to Trophy Hunting," *Plos One* 10, no. 4 (2015).
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- <sup>14</sup> Heather E. Johnson, David L. Lewis, and Stewart W. Breck, "Individual and Population Fitness Consequences Associated with Large Carnivore Use of Residential Development," *Ecosphere* 11, no. 5 (2020); D. L. Garshelis and H. Hristienko, "State and Provincial Estimates of American Black Bear Numbers Versus Assessments of Population Trend," *Ursus* 17, no. 1 (2006); Beston, "Variation in Life History and Demography of the American Black Bear."
- <sup>15</sup> Johnson, Lewis, and Breck, "Individual and Population Fitness Consequences Associated with Large Carnivore Use of Residential Development."
- <sup>16</sup> Ibid.
- <sup>17</sup> Ibid.
- <sup>18</sup> Craig McLaughlin, "Black Bear Assessment and Strategic Plan," *Maine Department of Inland Fisheries and Wildlife* (1999); Thomas D. Beck et al., "Sociological and Ethical Considerations of Black Bear Hunting," *Proceedings of the Western Black Bear Workshop* 5 (1995); Beston, "Variation in Life History and Demography of the American Black Bear."
- <sup>19</sup> S. Dobey et al., "Ecology of Florida Black Bears in the Okefenokee-Osceola Ecosystem," *Wildlife Monographs*, no. 158 (2005).
- <sup>20</sup> Garshelis and Hristienko, "State and Provincial Estimates of American Black Bear Numbers Versus Assessments of Population Trend."
- <sup>21</sup> A. D. Wallach et al., "What Is an Apex Predator?," *Oikos* 124, no. 11 (2015).
- <sup>22</sup> J. L. Weaver, P. C. Paquet, and L. F. Ruggiero, "Resilience and Conservation of Large Carnivores in the Rocky Mountains," *Conservation Biology* 10, no. 4 (1996); Wallach et al., "What Is an Apex Predator?."



- <sup>23</sup> S. C. Frank et al., "Indirect Effects of Bear Hunting: A Review from Scandinavia," *Ursus* 28, no. 2 (2017); Jacinthe Gosselin et al., "The Relative Importance of Direct and Indirect Effects of Hunting Mortality on the Population Dynamics of Brown Bears," *Proceedings of the Royal Society B* 282 (2015); M. Leclerc et al., "Hunting Promotes Spatial Reorganization and Sexually Selected Infanticide," *Scientific Report* 7, no. 45222 (2017); J. E. Swenson, "Implications of Sexually Selected Infanticide for the Hunting of Large Carnivores," in *Animal Behavior and Wildlife Conservation*, ed. M. Festa-Bianchet and M. Apollonio (Washington, D.C.: Island Press, 2003); J. E. Swenson et al., "Infanticide Caused by Hunting of Male Bears," *Nature* 386 (1997).
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- <sup>25</sup> Welfelt, Beausoleil, and Wielgus, "Factors Associated with Black Bear Density and Implications for Management."
- <sup>26</sup> Rahel Sollmann et al., "Habitat Associations in a Recolonizing, Low-Density Black Bear Population," *Ecosphere* 7, no. 8 (2016).
- <sup>27</sup> Cougar Management Guidelines, *Cougar Management Guidelines* (Bainbridge Island, WA: WildFutures, 2005), p. 47-8.
- <sup>28</sup> Mariela Gantchoff, Laura Conlee, and Jerrold Belant, "Conservation Implications of Sex-Specific Landscape Suitability for a Large Generalist Carnivore," *Diversity and Distributions* 25, no. 9 (2019).
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- <sup>32</sup> Cougar Management Guidelines, *Cougar Management Guidelines*.
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**Attachment B**  
**Proposed Regulatory Amendments**

**Cal. Code Regs. tit. 14, § 365 Bear.**

Except as provided in Section 366, bear may be taken only as follows:

(a) Areas:

- (1) Northern California: In the counties of Del Norte, Humboldt, Plumas, Shasta, Siskiyou, Tehama and Trinity; and those portions of Lassen and Modoc counties west of the following line: Beginning at Highway 395 and the Sierra-Lassen county line; north on Highway 395 to the junction of Highway 36; west on Highway 36 to the junction of Highway 139; north on Highway 139 to Highway 299; north on Highway 299 to County Road 87; west on County Road 87 to Lookout-Hackamore Road; north on Lookout-Hackamore Road to Highway 139; north on Highway 139 to the Modoc-Siskiyou county line; north on the Modoc-Siskiyou county line to the Oregon border.
- (2) Central California: In the counties of Alpine, Amador, Butte, Calaveras, Colusa, El Dorado, Glenn, Lake, Mendocino, Nevada, Placer, Sacramento, Sierra, Sutter, Yolo and Yuba and those portions of Napa and Sonoma counties northeast of Highway 128.
- (3) Southern Sierra: That portion of Kern County west of Highway 14 and east of the following line: Beginning at the intersection of Highway 99 and the Kern-Tulare county line; south on Highway 99 to Highway 166; west and south on Highway 166 to the Kern-Santa Barbara county line; and those portions of Fresno, Madera, Mariposa, Merced, Stanislaus, Tulare and Tuolumne counties east of Highway 99.
- (4) Southern California: In the counties of Los Angeles, Santa Barbara and Ventura; that portion of Riverside County north of Interstate 10 and west of Highway 62; and that portion of San Bernardino County south and west of the following line: Beginning at the intersection of Highway 18 and the Los Angeles-San Bernardino county line; east along Highway 18 to Highway 247; southeast on Highway 247 to Highway 62; southwest along Highway 62 to the Riverside-San Bernardino county line.
- (5) Southeastern Sierra: Those portions of Inyo and Mono counties west of Highway 395; and that portion of Madera County within the following line: Beginning at the junction of the Fresno-Madera-Mono county lines; north and west along the Madera-Mono county line to the boundary of the Inyo-Sierra National Forest; south along the Inyo-Sierra National Forest boundary to the Fresno-Madera county line; north and east on the Fresno-Madera county line to the point of beginning. Also, that portion of Inyo county west of Highway 395; and that portion of Mono county beginning at the intersection of Highway 6 and the Mono county line; north along Highway 6 to the Nevada state line; north along the Nevada state line to the Alpine county line; south along the

Mono-Alpine county line to the Mono-Tuolumne county line and the Inyo National Forest Boundary; south along the Inyo National Forest Boundary to the Inyo-Sierra Forest boundary; south along the Inyo-Sierra Forest boundary to the Fresno-Madera county line; north and east along the Fresno-Madera county line to the junction of the Fresno-Madera-Mono county line; south along the Mono-Fresno county line to the Mono-Inyo County line; east along the Mono-Inyo county line to the point of beginning.

~~(b) Seasons: Except in the deer hunt areas designated as zones X-1 through X-7b in subsection 360(b), the bear season shall open on the opening day of the general deer season as described in subsections 360(a) and (b) and extend until the last Sunday in December in the areas described in subsections 365(a)(1), (2), (3) (4) and (5) 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. The bear season shall be closed when the department determines that 1,700 bears have been taken pursuant to the reporting requirement in subsection 708.12(d). The department shall notify the commission, the public via the news media and bear tag holders via the U.S. mail and the news media when implementing this closure.~~

- (1) There is no open season for the hunting of bear in those portions of the state described in subsection (a) above.
- (2) The Commission may adopt regulations establishing an open season for the hunting of bear in those portions of the state described in subsection (a) above only after the Department:
  - (A) Using the best available science, completes an empirical and peer-reviewed study of the state's bear population, including but not limited to, developing updated population estimates;
  - (B) Completes a peer-reviewed study on the effects of drought and wildfires since 2018 on the state's bear populations, their habitat, and their food sources; and
  - (C) After completing the studies described in subsections (A) and (B) above, updates the current bear management plan utilizing the best available science, including but not limited to, science related to bear social structure.

(c) Bag and Possession Limit: One adult bear per hunting license year. Cubs and females accompanied by cubs may not be taken. (Cubs are defined as bears less than one year of age or bears weighing less than 50 pounds.)

(d) No open season for bear in the balance of the state not included in subsection (a) above.

(e) Bait: No feed, bait or other materials capable of attracting a bear shall be placed or used for the purpose of taking or pursuing a bear. No bear shall be taken over such bait. No person may take a bear within a 400-yard radius of a garbage dump or bait.

### **Cal. Code Regs. tit. 14, § 366 Archery Bear Hunting.**

Bear may be taken with bow and arrow during the bear season as specified in Section 365 and as follows:

(a) Areas: Those portions of the state as described in subsection 365(a).

~~(b) Season: The archery bear season shall open on the third Saturday in August and extend for 23 consecutive days. There is no open season for taking bear with bow and arrow in the balance of the state.~~

(1) There is no open season for taking bear with bow and arrow in those portions of the state described in subsection 365(a).

(2) The Commission may adopt regulations establishing an open season for taking bear with bow and arrow in those portions of the state described in subsection 365(a) only after the Department:

(A) Using the best available science, completes an empirical and peer-reviewed study of the state's bear populations, including but not limited to, developing updated population estimates;

(B) Completes a peer-reviewed study on the effects of drought and wildfires since 2018 on the state's bear populations, their habitat, and their food sources; and

(C) After completing the studies described in subsections (A) and (B) above, updates the current bear management plan utilizing the best available science, including but not limited to, science related to bear social structure.

(3) There is no open season for taking bear with bow and arrow in the balance of the state not included in subsection 365(a).

(c) Bag and Possession Limit: One adult bear per hunting license year. Cubs and female accompanied by cubs may not be taken. (Cubs are defined as bears less than one year of age or bears weighing less than 50 pounds.)

(d) The use of dogs is prohibited during the archery season for bear.

(e) Bait. No feed, bait or other materials capable of attracting a bear to a feeding area shall be placed or used for the purpose of taking or pursuing a bear. No bear shall be

taken over such bait. No person may take a bear within a 400 yard radius of a garbage dump or bait.

**Attachment A**  
**November 22, 2021 Letter to Commission**



November 22, 2021

Peter S. Silva, President  
Samantha Murray, Vice President  
Jacque Hostler-Carmesin, Member  
Eric Sklar, Member  
Erika Zavaleta, Member

**California Fish and Game Commission**

715 P Street, 16th floor, Sacramento, 95814  
P.O. Box 944209, Sacramento, CA 94244-2090

**Re: Urgent request to review black bear (*Ursus americanus*) hunting in California, draft an updated black bear management plan, and conduct a population study to avoid jeopardizing California's black bears**

Dear President Silva and Commissioners:

In light of the historic wildfires over the past several years (including the loss of more than a record three million acres from wildfires in 2021 alone<sup>1</sup>), and data recently released by the California Department of Wildlife (DFW), we are deeply concerned about the state of black bears in California.

In late October 2021, DFW posted its black bear “take” reports for the years 2017, 2018, 2019 and 2020. From the 2020 report, we are alarmed to see the agency suggest that the black bear population is 15,934 ( $\pm 6,163$ ) rather than the estimated population of 30,000 – 40,000 that DFW has suggested for years.<sup>2</sup> DFW now believes that *the California bear population could be as low as 9,771 individuals*, which would indicate a 67% decline in the number of bears from the previously reported lowest population range of 30,000 bears. A nearly 70% decrease in California's black bear population should spur the Commission to take urgent action to protect California's black bears from all harms, including an update to the 1998 black bear management plan.

**A. California's climate crisis is acute and harms black bears**

In 2021, California experienced record-level fires. According to CalFire, more than three million acres burned,<sup>3</sup> and in some areas, even soils experienced severe burn.<sup>4</sup> Because of erratic weather events from the climate crisis, including late season frosts or droughts, natural foods are increasingly unavailable to bears. For instance, in a Colorado bear study, the female cohort of the population declined by 57% because of human-caused mortalities from vehicle collisions, hunting and predator control, which coincided with widespread unavailability of natural foods. This would not have been detected by wildlife managers without the rigorous population monitoring study in place.<sup>5</sup> California has no such equivalent in population monitoring as we discuss below.

Climate change has resulted in a warmer climate, which causes bears to spend less time in their dens.<sup>6</sup> Because of all these factors, black bear biologists warn that wildlife managers must limit recreational black bear killing to reduce total mortality, and especially during years of poor natural food production, which is readily predicted by weather events.<sup>7</sup>



## B. Bears are slow to reproduce and thus are susceptible to overkill

Black bear biologists suggest that the total annual human-caused mortality that a black bear population can sustain is only between 4% and 10% of the population; more than that is simply super-additive mortality.<sup>8</sup> In other words, when there is additive mortality, the population will decline in number, and sometimes that decline is unsustainable because of black bear biology. For example, female bears rarely migrate—they prefer to live near their natal areas, and this compounds the harms to their populations from hunting, chronic wildfires and other sources of mortality that affect their populations.<sup>9</sup> The loss of females reduces a bear population’s ability to bounce back as they are the key to sustaining the population.<sup>10</sup>

Human persecution of bears, such as through hunting and or predator control, causes “super-additive” mortality, meaning that kill rates exceed mortalities that would occur naturally.<sup>11</sup> This is because hunters like to target adult breeding animals,<sup>12</sup> which disrupts animals’ social structure and leads to indirect effects, particularly increased infanticide resulting in decreased recruitment of young.<sup>13</sup>

Compared to other mammals, bears are slow to reproduce. Generally, females are not considered to be adults until they are 3 to 6 years old—and in the arid West, that timeframe is generally older at 4 to 5 years—but females are capable of breeding until age 21.<sup>14</sup> Fecundity varies with age.<sup>15</sup> Females generally give birth to litters of cubs only every 2-3 years. Cub survival in one Colorado study was about 55%.<sup>16</sup> Cubs die from many factors including vehicle collisions, predation or starvation.<sup>17</sup> The intervals are dictated by both bear biology and weather and climate. Bears will keep their cubs to 15-24 months (or longer if they are underweight). But if there are droughts or frosts, bears’ foods can be unavailable to them—which both reduces reproduction potential and increases the intervals between litters of cubs and cub survival itself.<sup>18</sup> Thus, bears reproduce slowly,<sup>19</sup> and are highly susceptible to overkill<sup>20</sup>—including by hunters and predator-control agents.

Large-bodied carnivores such as black bears are sparsely populated across vast areas, invest in few offspring, provide extended parental care to their young and reproduce slowly. Bears are capable of self-regulation<sup>21</sup> and are regulated by habitat and climatic conditions. Considering these biological factors, they rely on social stability to maintain resiliency.<sup>22</sup>

Without social stability, bears experience sexually selected infanticide; that is, when a resident, adult male is removed, subadult males vie for his home range and mates. These newcomers kill the adult male’s offspring in order to spur females back into breeding so the newcomers can pass on their genetic materials.<sup>23</sup> Gosselin et al. (2015) state: “In species with sexually selected infanticide (“SSI”), hunting may decrease juvenile survival by increasing male turnover.” This study and others show that hunting mortality can harm social organization of species, because it promotes male turnover and thus increases sexually selected infanticide upon cubs of deceased males.<sup>24</sup>

Welfelt et al. (2019) in their study of Washington bears found bear densities range widely by region, and that managers had over-estimated the population of bears in western Washington—including cubs—by 50 percent.<sup>25</sup> The implications for California are particularly salient, given that black bear habitat in California is also widely varied by region, and black bears are a forest obligate.<sup>26</sup> Density estimates from studies conducted in optimal quality habitats where animals are abundant can only be extrapolated cautiously to larger areas with similar habitats and landscape characteristics.<sup>27</sup> DFW has failed to accommodate differences in vegetation, land use and topography to avoid overestimating bears, and particularly females.<sup>28</sup>



In sum, around the world and in California, large carnivores face extinction from human factors,<sup>29</sup> thus it is incumbent upon the Commission to conserve California's black bears now, so they are not extirpated like grizzly bears had been. Expanded human development into bear habitats during the climate crisis (including wildfires) exacerbates bear mortalities; thus, the Commission should act to curb black bear mortalities and especially by hunting.<sup>30</sup>

### C. DFW's black bear census does not rely upon best available science

Garshelis and Hristienko (2006) caution that many state wildlife managers fail to adequately investigate population sizes and trends, but rather rely on guesswork to estimate bear numbers.<sup>31</sup> Population trends must be determined using reliable methodologies; however, sightings, depredation events and kill levels are not reliable means to indexing a population.<sup>32</sup> In contravention to these principles for enumerating bears, the DFW's 2020 take report provides:

To produce a population estimate for a given year, the Department uses an age-at-harvest model reliant on the age and sex of bears harvested that year. In 2013, the use of hounds in the sport take of bears was prohibited, which violated a key assumption in that model regarding consistent hunter effort. Annual bear harvests have been relatively lower since this ban . . . resulting in correspondingly lower population estimates . . . . The average population growth rate in the years following the ban (1.00 in 2013-2020) remains steady and on par with the average population growth rate in years before the ban (1.03 in 1993-2012) . . . . The Department estimates approximately 15,934 ( $\pm 6,163$ ; 95% CI) bears inhabited the black bear hunt area prior to the start of the 2020 bear hunting season . . .

In short, DFW admits it uses dead, hunted bears to estimate the number of live bears in California. This is not empirical science, according to many large-carnivore biologists.<sup>33</sup> And ignores the many benefits bears confer on their forest ecosystems<sup>34</sup> and their intrinsic worth.<sup>35</sup>

What we do know is: the numbers of black bears killed annually is in decline while the number of bear hunters themselves were a record 30,388 in 2020. See: Figures 1, 2 and 3. In the absence of empirical population data, the Commission must act to prevent the overkill of California's bear populations.

Also, the average number of bears hunted in California from 1998 to 2012 was 1,777 bears, and for the years 2013 to 2020, the average was 1,258 bears. On average, 519 bears *were not* killed by hunters each year since 2013 – making DFW's model particularly doubtful – because less bears were killed by hunters and yet the population is likely in decline.

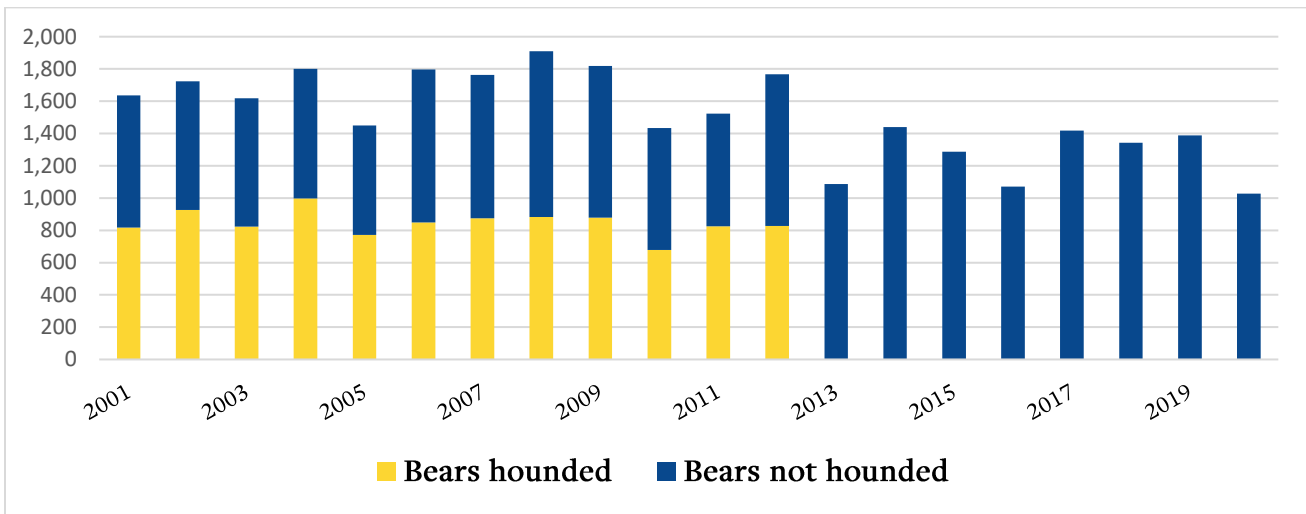
What we do know is: the numbers of black bears killed annually is in decline while the number of bear hunters themselves has increased with a record 30,388 in 2020. See: Figures 1, 2 and 3. In the absence of empirical population data, the Commission must act to prevent the overkill and jeopardy of California's bear populations.

DFW's bear population analyses have no basis in sound science because they are not based on traditional population enumeration methods, but rather on a discredited method of using the numbers of dead, hunted bears to guess at the number of live bears. Yet, the agency had claimed between 30,000 to 40,000 bears in California on its website, then in its 2020 Annual Bear Take Report precipitously dropped that population figure

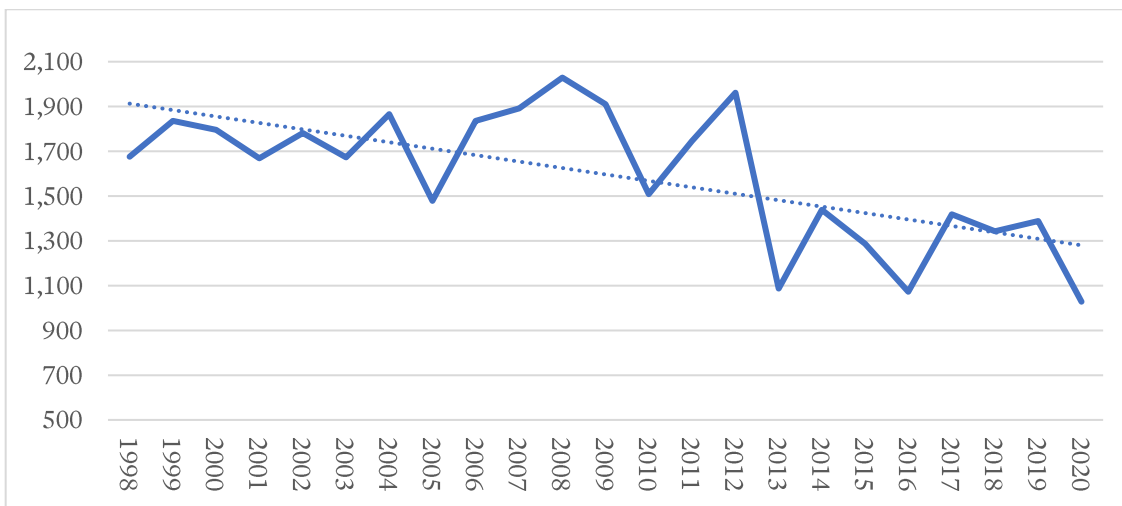


to 15,934 (±6,163) – a population range between 9,771 to 22,097 individuals – even as the numbers of bears killed by hunters has simultaneously declined in California. Figs. 1, 2 and 3.

**Figure 1. Black bears hunted in California, 2001-2020**



**Figure 2. Trend of black bears killed by hunters in California**

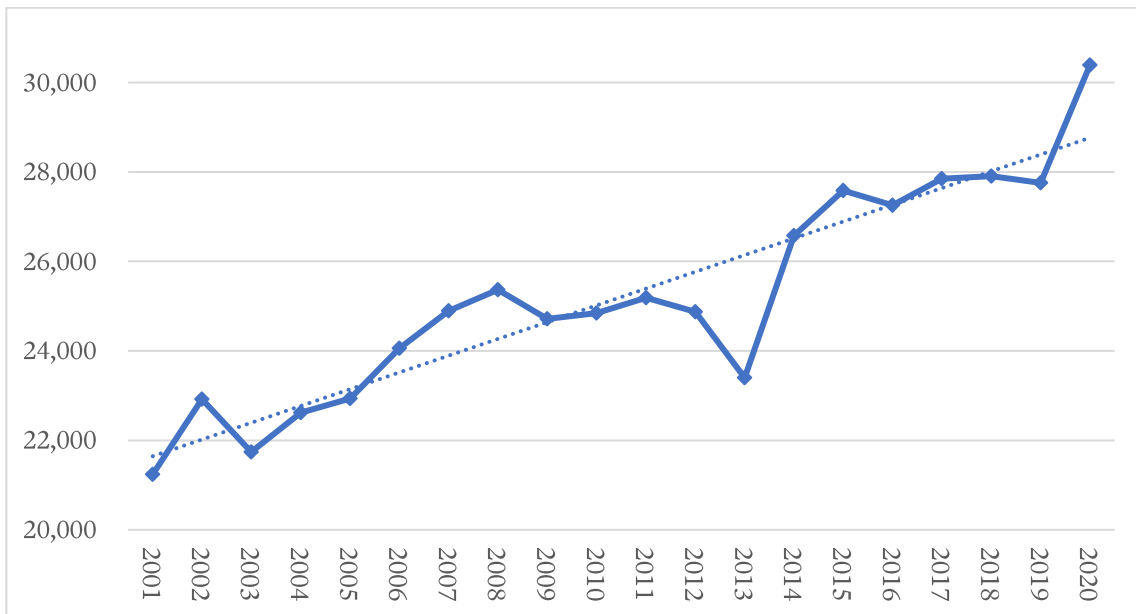


**A. DFW’s bear hunter data show that bear hunters are increasing while bears killed are decreasing**

In the absence of bear population studies, the only data relied upon by DFW are the numbers of dead bears per year in California. While a record number of hunters turned out in 2020, 30,387 bear hunters, they killed an all-time low number of bears, 1,028, compared to most other years since 1998. Figs. 1 and 2.



**Figure 3. Trend of black bear hunters in California**



DFW's data also show that since 2013 when hounding was banned, most California bear hunters are opportunistic deer hunters, 58%. Since 2013, only ~43% of bear hunters are dedicated to the activity. The DFW classifies 2% of bear hunters as "other."

Bear poaching is a major issue of concern in California. The 1998 black bear management plan, citing Sitton (1982), suggests that in some areas of California, poaching numbers equal that of legal killing.<sup>36</sup> The DFW's bear reports are silent as to the extent of poaching in California, so the public and the Commission are in the dark on this grievous issue. Again, the best available science indicates that bear populations can only withstand offtake in an amount under ten percent annually.<sup>37</sup>

### **B. Black bear hunting is unpopular amongst California residents**

Bear hunting is highly unpopular with Californians. A 2020 Remington Research poll of likely 2022 California voters found<sup>38</sup>:

- A supermajority, 70%, do not want California black bears killed for sport. This includes majorities of residents in the top two bear hunting counties from 2020 – Shasta County and Trinity County – who oppose the hunting of bears for sport.
- A supermajority, 71%, agree that wildlife officials should place a priority of non-lethal methods to reduce conflicts between bears and people (e.g., public education, trash management or frightening devices used by game officers) rather than killing bears
- A majority, 62%, would support legislation to stop the hunting of black bears



**THE HUMANE SOCIETY  
OF THE UNITED STATES**

Figure 4. DFW's black bear hunt data

Year	DFW's bear population estimate	Bear-hunter mortality	% Female bears	# Bear tags sold	% Deer & bear hunters	% Bear Hunters only	% Other hunters	Hunter success rate (%)
2008	37,150	2,029	37	25,631	34	44	8	7.9
2009	31,432 (± 7,991)	1,910	40	24,805	34	56	10	ND
2010	31,432 (± 7,991)	1,508	40	24,859	37	56	8	ND
2011	26,390 (±6,889)	1,745	42	21,581	28	56	16	8
2012	34,002 (±5,561)	1,962	38	24,872	32	67	2	7.9
2013	34,385 (±6,443)	1,087	37	23,397	53	47	1	4.6
2014	35,101 (±6,444)	1,439	42	26,576	51	49	0	5.4
2015	35,484 (±6,444)	1,287	40	27,578	57	39	5	4.7
2016	35,867 (±6,444)	1,072	40	27,253	69	41	2	3.9
2017	23,397 (±7,176)	1,418	40	27,864	63	50	1	5.1
2018	20,801 (±6,269)	1,342	37	27,885	61	39	0	4.8
2019	21,529 (±6,231)	1,389	40	27,755	59	35	6	5
2020	15,934 (±6,163)	1,028	38	30,387	54	45	2	3

## Conclusion

The harms from the recent wildfires on California's bear population are currently unknown, as are the effects of hunting and poaching on California's bear population, and the reason behind such a dramatic decline in the estimated population. Therefore, we respectfully request that the 2022 bear hunt be suspended by the Commission until an empirical population study can be conducted, the effects of the wildfires on California's bear population adequately studied, and the bear management plan updated to include the best available science, including social science.

Sincerely,

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- <sup>31</sup> Garshelis and Hristienko, "State and Provincial Estimates of American Black Bear Numbers Versus Assessments of Population Trend," p. 6
- <sup>32</sup> Cougar Management Guidelines, *Cougar Management Guidelines*.
- <sup>33</sup> Garshelis and Hristienko, "State and Provincial Estimates of American Black Bear Numbers Versus Assessments of Population Trend."; Cougar Management Guidelines, *Cougar Management Guidelines*.
- <sup>34</sup> M. S. Enders and S. B. Vander Wall, "Black Bears *Ursus Americanus* Are Effective Seed Dispersers, with a Little Help from Their Friends," *Oikos* 121, no. 4 (2012); L. E. F. Harrer and T. Levi, "The Primacy of Bears as Seed Dispersers in Salmon-Bearing Ecosystems," *Ecosphere* 9, no. 1 (2018); K. Takahashi and K. Takahashi, "Spatial Distribution and Size of Small Canopy Gaps Created by Japanese Black Bears: Estimating Gap Size Using Dropped Branch Measurements," *Bmc Ecology* 13 (2013); T. E. Reimchen and C. H. Fox, "Fine-Scale Spatiotemporal Influences of Salmon on Growth and Nitrogen Signatures of Sitka Spruce Tree Rings," *ibid.*; Remington J. Moll et al., "An Apex Carnivore's Life History Mediates a Predator Cascade," *Oecologia* 196, no. 1 (2021).
- <sup>35</sup> J.T. Bruskotter, M.P. Nelson, and J.A. Vucetich, "Does Nature Possess Intrinsic Value? An Empirical Assessment of Americans' Beliefs.," *The Ohio State University, Columbus OH, USA. DOI: 10.13140/RG.2.1.1867.3129* (2015).



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<sup>36</sup> California Department of Fish and Game, "Black Bear Management Plan,"

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=82769&inline> (1998): p. 11.

<sup>37</sup> Beston, "Variation in Life History and Demography of the American Black Bear." Welfelt, Beausoleil, and Wielgus, "Factors Associated with Black Bear Density and Implications for Management."

<sup>38</sup> Remington Research Group, "California Public Opinion," (2020).

**Attachment B**  
**Proposed Regulatory Amendments**

**Cal. Code Regs. tit. 14, § 365 Bear.**

Except as provided in Section 366, bear may be taken only as follows:

(a) Areas:

- (1) Northern California: In the counties of Del Norte, Humboldt, Plumas, Shasta, Siskiyou, Tehama and Trinity; and those portions of Lassen and Modoc counties west of the following line: Beginning at Highway 395 and the Sierra-Lassen county line; north on Highway 395 to the junction of Highway 36; west on Highway 36 to the junction of Highway 139; north on Highway 139 to Highway 299; north on Highway 299 to County Road 87; west on County Road 87 to Lookout-Hackamore Road; north on Lookout-Hackamore Road to Highway 139; north on Highway 139 to the Modoc-Siskiyou county line; north on the Modoc-Siskiyou county line to the Oregon border.
- (2) Central California: In the counties of Alpine, Amador, Butte, Calaveras, Colusa, El Dorado, Glenn, Lake, Mendocino, Nevada, Placer, Sacramento, Sierra, Sutter, Yolo and Yuba and those portions of Napa and Sonoma counties northeast of Highway 128.
- (3) Southern Sierra: That portion of Kern County west of Highway 14 and east of the following line: Beginning at the intersection of Highway 99 and the Kern-Tulare county line; south on Highway 99 to Highway 166; west and south on Highway 166 to the Kern-Santa Barbara county line; and those portions of Fresno, Madera, Mariposa, Merced, Stanislaus, Tulare and Tuolumne counties east of Highway 99.
- (4) Southern California: In the counties of Los Angeles, Santa Barbara and Ventura; that portion of Riverside County north of Interstate 10 and west of Highway 62; and that portion of San Bernardino County south and west of the following line: Beginning at the intersection of Highway 18 and the Los Angeles-San Bernardino county line; east along Highway 18 to Highway 247; southeast on Highway 247 to Highway 62; southwest along Highway 62 to the Riverside-San Bernardino county line.
- (5) Southeastern Sierra: Those portions of Inyo and Mono counties west of Highway 395; and that portion of Madera County within the following line: Beginning at the junction of the Fresno-Madera-Mono county lines; north and west along the Madera-Mono county line to the boundary of the Inyo-Sierra National Forest; south along the Inyo-Sierra National Forest boundary to the Fresno-Madera county line; north and east on the Fresno-Madera county line to the point of beginning. Also, that portion of Inyo county west of Highway 395; and that portion of Mono county beginning at the intersection of Highway 6 and the Mono county line; north along Highway 6 to the Nevada state line; north along the Nevada state line to the Alpine county line; south along the

Mono-Alpine county line to the Mono-Tuolumne county line and the Inyo National Forest Boundary; south along the Inyo National Forest Boundary to the Inyo-Sierra Forest boundary; south along the Inyo-Sierra Forest boundary to the Fresno-Madera county line; north and east along the Fresno-Madera county line to the junction of the Fresno-Madera-Mono county line; south along the Mono-Fresno county line to the Mono-Inyo County line; east along the Mono-Inyo county line to the point of beginning.

~~(b) Seasons: Except in the deer hunt areas designated as zones X-1 through X-7b in subsection 360(b), the bear season shall open on the opening day of the general deer season as described in subsections 360(a) and (b) and extend until the last Sunday in December in the areas described in subsections 365(a)(1), (2), (3) (4) and (5) 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. The bear season shall be closed when the department determines that 1,700 bears have been taken pursuant to the reporting requirement in subsection 708.12(d). The department shall notify the commission, the public via the news media and bear tag holders via the U.S. mail and the news media when implementing this closure.~~

- (1) There is no open season for the hunting of bear in those portions of the state described in subsection (a) above.
- (2) The Commission may adopt regulations establishing an open season for the hunting of bear in those portions of the state described in subsection (a) above only after the Department:
  - (A) Using the best available science, completes an empirical and peer-reviewed study of the state's bear population, including but not limited to, developing updated population estimates;
  - (B) Completes a peer-reviewed study on the effects of drought and wildfires since 2018 on the state's bear populations, their habitat, and their food sources; and
  - (C) After completing the studies described in subsections (A) and (B) above, updates the current bear management plan utilizing the best available science, including but not limited to, science related to bear social structure.

(c) Bag and Possession Limit: One adult bear per hunting license year. Cubs and females accompanied by cubs may not be taken. (Cubs are defined as bears less than one year of age or bears weighing less than 50 pounds.)

(d) No open season for bear in the balance of the state not included in subsection (a) above.

(e) Bait: No feed, bait or other materials capable of attracting a bear shall be placed or used for the purpose of taking or pursuing a bear. No bear shall be taken over such bait. No person may take a bear within a 400-yard radius of a garbage dump or bait.

**Cal. Code Regs. tit. 14, § 366 Archery Bear Hunting.**

Bear may be taken with bow and arrow during the bear season as specified in Section 365 and as follows:

(a) Areas: Those portions of the state as described in subsection 365(a).

~~(b) Season: The archery bear season shall open on the third Saturday in August and extend for 23 consecutive days. There is no open season for taking bear with bow and arrow in the balance of the state.~~

(1) There is no open season for taking bear with bow and arrow in those portions of the state described in subsection 365(a).

(2) The Commission may adopt regulations establishing an open season for taking bear with bow and arrow in those portions of the state described in subsection 365(a) only after the Department:

(A) Using the best available science, completes an empirical and peer-reviewed study of the state's bear populations, including but not limited to, developing updated population estimates;

(B) Completes a peer-reviewed study on the effects of drought and wildfires since 2018 on the state's bear populations, their habitat, and their food sources; and

(C) After completing the studies described in subsections (A) and (B) above, updates the current bear management plan utilizing the best available science, including but not limited to, science related to bear social structure.

(3) There is no open season for taking bear with bow and arrow in the balance of the state not included in subsection 365(a).

(c) Bag and Possession Limit: One adult bear per hunting license year. Cubs and female accompanied by cubs may not be taken. (Cubs are defined as bears less than one year of age or bears weighing less than 50 pounds.)

(d) The use of dogs is prohibited during the archery season for bear.

(e) Bait. No feed, bait or other materials capable of attracting a bear to a feeding area shall be placed or used for the purpose of taking or pursuing a bear. No bear shall be

taken over such bait. No person may take a bear within a 400 yard radius of a garbage dump or bait.



## THE HUMANE SOCIETY OF THE UNITED STATES

### The climate crisis and California black bears

#### Supplement to the Humane Society of the United States' Petition 2021-027 Submitted to the California Fish and Game Commission January 24, 2022

#### Introduction

On December 10, 2021, the Humane Society of the United States (“HSUS”) submitted Petition 2021-027 to the Fish and Game Commission. The petition requested that the Commission amend existing black bear (*Ursus americanus*) hunting regulations to eliminate the open hunting season until (1) an empirical study is conducted of the state’s black bear populations, (2) the effects of drought and recent wildfires on the state’s bear populations are adequately studied, and (3) the state’s bear management plan is updated to include the best available science, including social science. The petition was accepted by Commission staff and is scheduled for Commission action at the February 16-17, 2022 meeting.

We submitted our petition because of our profound concerns about the status of California’s black bear population given the numerous threats these bears face. In particular, the HSUS is concerned about the harms from record-level fires and drought on California’s bears. In 2021 alone, more than three million acres in California burned from intense wildfires. Further, the HSUS is alarmed by worrisome indications of a steep decline in California’s black bear population based on recent data released by the Department of Fish and Wildlife (“DFW”).

We write today to provide additional evidence supporting our request for regulatory change. Specifically, we provide evidence about the detrimental effects climate change and severe wildfires have on black bear populations. These threats, coupled with the apparent decline of the state’s black bear population, demonstrate that the Commission cannot allow bear hunting to continue in the state until it has a better understanding of the number of bears in California and how the recent record-breaking drought and fires have affected these bears. In turn, the state’s bear management plan must be updated accordingly, utilizing the best available science.

Under the Fish and Game Code, the Commission has “the power to regulate the taking or possession of . . . mammals.” Cal. Fish & Game Code § 200. More specifically, the Commission has regulatory authority to “establish, extend, shorten, or abolish open seasons and closed seasons” for game mammals, such as black bears. *Id.* § 203. The legislature has provided specific factors that the Commission *must* consider when adopting such regulations, including “populations, habitat, food supplies, the welfare of individual animals, and other pertinent facts and testimony.” *Id.* § 203.1. Further, the Commission has specific obligations with respect to its regulation of the black bear hunting season. The Commission must “annually determine whether to continue, repeal, or amend regulations establishing hunting seasons for black bears.” *Id.* § 302. This determination “*shall* include a review of factors which impact the health and viability of the black bear population.” *Id.* (emphasis added). Climate change and severe wildfires are “factors which impact the health and viability of the black bear population.” *See* Cal. Fish & Game Code § 302. Moreover, climate change and severe wildfires threaten black bears’ habitat, food supplies, and welfare. *See id.* § 203.1. The

Commission, then, must consider the information provided in these comments as it makes its decision about whether to grant our petition.

**A hotter planet risks species extinction, changes plant phenology (affecting black bears' food resources), reduces insulating snow cover for den sites, increases parasite invasion and increases drought in the West (harming both plants and setting the stage for severe wildfires).**

In 2019, a Paris conference of the Science-Policy Platform on Biodiversity and Ecosystem Services issued a press release from 145 participants from 50 countries who had assessed changes on Planet Earth for the past five decades and found that *one million species face extinction*, the most in human history. They reported that the species extinction rate is accelerating and the greatest ever over the last 10 million years. They also stated that regarding climate change, Planet Earth's temperature is increasing at "+/-0.2 (+/-0.1) degrees Celsius per decade" and that "for global warming of 1.5 to 2 degrees, the majority of terrestrial species ranges are projected to shrink profoundly."<sup>1</sup> (IPBES issued an updated report in 2021.<sup>2</sup>) The consequence of this warming, according to two dozen academics on fire ecology, is a "hotter climate and a markedly different biosphere."<sup>3</sup>

The loss of Earth's megafauna has so concerned preeminent biologists that dozens of them convened, and in 2011, produced a seminal and alarming paper, *Trophic Downgrading of Planet Earth*.<sup>4</sup> In it, the biologists, Estes et al. (2011), warn that the loss of top carnivores and other megafauna will increase pandemics, make ecosystems dysfunctional and accelerate the harms from climate change.<sup>5</sup> Black bears are megafauna, the third largest bear species and third largest mammalian carnivore in North America, and are gravely threatened by climate change.

The seminal Estes et al. (2011) paper was followed by several more peer-reviewed studies that warn about the losses of large carnivores during the *Anthropocene*,<sup>6</sup> that is, the reshaping of ecosystems because of human activities.<sup>7</sup> For black bears, the changes are profound:

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<sup>1</sup> Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), "Nature's Dangerous Decline 'Unprecedented' Species Extinction Rates 'Accelerating': Current Global Response Insufficient. 'Transformative Changes' Needed to Restore and Protect Nature; Opposition from Vested Interests Can Be Overcome for Public Good. Most Comprehensive Assessment of Its Kind; 1,000,000 Species Threatened with Extinction," news release, May 6, 2019, 2019.

<sup>2</sup> Intergovernmental Panel on Climate Change, "Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change," (<https://www.ipcc.ch/report/ar6/wg1/#SPM>; Cambridge University Press, 2021).

<sup>3</sup> L. T. Kelly et al., "Fire and Biodiversity in the Anthropocene," *Science* 370, no. 6519 (2020): p. 2.

<sup>4</sup> A Estes, James & Terborgh, John & Brashares, Justin & E Power, Mary & Berger, Joel & Bond, William & R Carpenter, Stephen & Essington, Timothy & D Holt, Robert & Jackson, Jeremy & Marquis, Robert & Oksanen, Lauri & Oksanen, Tarja & Paine, Robert & Pickett, Ellen & Ripple, William & Sandin, Stuart & Scheffer, Marten & W Schoener, Thomas & Wardle, David. (2011). *Trophic Downgrading of Planet Earth*. *Science* (New York, N.Y.). 333. 301-6. 10.1126/science.1205106.

<sup>5</sup> J. A. Estes et al., "Trophic Downgrading of Planet Earth," *Science* 333, no. 6040 (2011).

<sup>6</sup> W. J. Ripple et al., "Status and Ecological Effects of the World's Largest Carnivores," *ibid.* 343, no. 6167 (2014); William J. Ripple et al., "Extinction Risk Is Most Acute for the World's Largest and Smallest Vertebrates," *Proceedings of the National Academy of Sciences* 114, no. 40 (2017); Chris T. Darimont et al., "The Unique Ecology of Human Predators," *Science* 349, no. 6250 (2015).

<sup>7</sup> Kelly et al., "Fire and Biodiversity in the Anthropocene."

- Climate warming will change trophic effects that include the profusion of parasites and disease.<sup>8</sup> With warmer winters and extended fall and spring seasons, climate change will drive the expansion of ticks and tick-borne diseases to more northern latitudes and to higher altitudes.<sup>9</sup> Increases in temperature facilitate the proliferation of parasitic organisms,<sup>10</sup> including the potential for the spread of sarcoptic mange in black bears from the eastern U.S.<sup>11</sup>
- More stochastic weather events are occurring, and snow cover is increasingly lost,<sup>12</sup> which reduces the insulating properties associated with some bears' dens.<sup>13</sup>
- Rising temperatures have resulted in changed plant phenology, which is the timing of flowering, germination and leaving.<sup>14</sup> For bears, this means that some of their natural foods such as acorns (hard mast crops) or raspberries (soft mast crops) will be unavailable in some years because of drought, fires, or late spring frosts.
- Declining species' diversity could exacerbate phenological changes associated with warming.<sup>15</sup> Climate change affects temperatures and moisture, affecting precipitation amounts and thus plant growth, which could further degrade black bears' food supplies.<sup>16</sup>
- In a study on brown bears that is applicable to black bears, because they too cannot withstand much movement in warm weather because of their inability to sweat (while wearing a thick fur coat and building fat layers for hibernation):<sup>17</sup> A warming climate limits bears' foraging abilities because they are subject to hyperthermia, that is, the inability to dissipate heat from their bodies to stay sufficiently cool.<sup>18</sup> Bears adjust to the heat by foraging in habitats that have sufficient shade to stay cool, but these adjustments could affect their abilities to forage as efficiently<sup>19</sup> as canopy cover is consumed by increasingly severe wildfires that remove mature trees, trees that black bears rely upon for shade cover during the day and use as escape routes from predators—especially bear cubs.

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<sup>8</sup> K. S. McKelvey and P. C. Buotte, "Climate Change and Wildlife in the Northern Rockies Region," in *Climate Change Vulnerability and Adaptation in the Northern Rocky Mountains*, ed. Jessica E. Halofsky, et al. (Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain 2018).

<sup>9</sup> Filipe Dantas-Torres, *Climate Change, Biodiversity, Ticks and Tick-Borne Diseases: The Butterfly Effect*, vol. 4 (2015).

<sup>10</sup> Erica E. Short, Cyril Caminade, and Bolaji N. Thomas, "Climate Change Contribution to the Emergence or Re-Emergence of Parasitic Diseases," *Infectious Diseases: Research and Treatment* 10 (2017). Kristin A. Clothier et al., "Generalized Dermatophytosis Caused by *Trichophyton Equinum* in 8 Juvenile Black Bears in California," *Journal of Veterinary Diagnostic Investigation* 0, no. 0 (2021).

<sup>11</sup> Kevin D. Niedringhaus et al., "The Emergence and Expansion of Sarcoptic Mange in American Black Bears (*Ursus Americanus*) in the United States," *Veterinary Parasitology: Regional Studies and Reports* 17 (2019).

<sup>12</sup> Dantas-Torres, *Climate Change, Biodiversity, Ticks and Tick-Borne Diseases: The Butterfly Effect*, 4, p. 8.

<sup>13</sup> K. E. Pigeon, S. D. Cote, and G. B. Stenhouse, "Assessing Den Selection and Den Characteristics of Grizzly Bears," *Journal of Wildlife Management* 80, no. 5 (2016).

<sup>14</sup> Amelia A. Wolf, Erika S. Zavaleta, and Paul C. Selmants, "Flowering Phenology Shifts in Response to Biodiversity Loss," *Proceedings of the National Academy of Sciences* 114, no. 13 (2017).

<sup>15</sup> *Ibid.*

<sup>16</sup> McKelvey and Buotte, "Climate Change and Wildlife in the Northern Rockies Region."

<sup>17</sup> Thomas D. Beck et al., "Sociological and Ethical Considerations of Black Bear Hunting," *Proceedings of the Western Black Bear Workshop* 5 (1995); Bernd Heinrich, *Why We Run: A Natural History* (Harper Perennial, 2002).

<sup>18</sup> K. E. Pigeon et al., "Staying Cool in a Changing Landscape: The Influence of Maximum Daily Ambient Temperature on Grizzly Bear Habitat Selection," *Oecologia* 181, no. 4 (2016).

<sup>19</sup> *Ibid.*

- And in the Western United States, drought has intensified to extremes not seen in the past 20 years.<sup>20</sup> Drought begets wildfire, and more severe droughts alter historic fire regimes.<sup>21</sup> As discussed below, wildfires pose grave threats to black bears.

**Increased drought and fuel build-up increase the severity of Western wildfires. Severe fires change black bears' habitat. In the aftermath of a severe fire, black bears and their habitats are harmed.**

Kelly et al. (2020) in their review article on fire and biodiversity,<sup>22</sup> warn of extinction risk from fire regimes that are different from the ones that species have evolved with; that is, the “type, frequency, intensity, seasonality and spatial dimensions of recurrent fire.”<sup>23</sup> For wildlife, the variations in intensity and occurrence of fire can reduce food and shelter, and reduce animals' ability to “recolonize regenerating habitats,” and in the case of severe fires, lead to mortality.<sup>24</sup>

Fire suppression, climate change and logging have changed the forests in the West over the past century.<sup>25</sup> meaning black bears in California face fire regimes different than those with which they evolved. Invasive and pervasive cheat grass (*Bromus tectorum*) has increased fuel loads in the West.<sup>26</sup> Recent wildfires are hotter and kill mature trees because of fuel-load buildup.<sup>27</sup> Western fire-adapted forests generally had experienced frequent fires on a 10 to 20-year time scale, but now burn at fire intervals between 70-90 years.<sup>28</sup> The result is that forests are now characterized by denser stands of trees with few trees older than 250 years and with diameters greater than 60 cm.<sup>29</sup> These smaller diameter trees grow in dense forests that are apt to experience stand-replacing fires.<sup>30</sup> Large fires leave a mosaic or burn patches of different levels of burn severity.<sup>31</sup>

For black bears, who prefer larger diameter trees for denning, resting and canopy cover for foraging, catastrophic fires can have negative, near-term consequences.<sup>32</sup> Females with and without cubs choose

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<sup>20</sup> Nadja Popovich, “How Severe Is the Western Drought? See for Yourself,” *The New York Times* 2021.

<sup>21</sup> Kelly et al., “Fire and Biodiversity in the Anthropocene.”

<sup>22</sup> More than two dozen biologists authored this article. They reviewed over 29,000 journal articles on fire.

<sup>23</sup> Kelly et al., “Fire and Biodiversity in the Anthropocene,” p. 1.

<sup>24</sup> Ibid.

<sup>25</sup> Brett J. Furnas, Benjamin R. Goldstein, and Peter J. Figura, “Intermediate Fire Severity Diversity Promotes Richness of Forest Carnivores in California,” *Diversity and Distributions* n/a, no. n/a (2021); Stanley Clifton Cunningham et al., “Black Bear Habitat Use in Burned and Unburned Areas, Central Arizona,” *Wildlife Society Bulletin* 31 (2003).

<sup>26</sup> Kelly et al., “Fire and Biodiversity in the Anthropocene.”

<sup>27</sup> Cunningham et al., “Black Bear Habitat Use in Burned and Unburned Areas, Central Arizona.”

<sup>28</sup> Furnas, Goldstein, and Figura, “Intermediate Fire Severity Diversity Promotes Richness of Forest Carnivores in California.” Citing Van de Water and Safford 2011.

<sup>29</sup> Ibid. Citing Beaty & Taylor 2007 and Youngblood et al. 2004.

<sup>30</sup> Ibid. Citing McIntyre et al. 2015.

<sup>31</sup> Jesse S. Lewis et al., “Mixed-Severity Wildfire Shapes Habitat Use of Large Herbivores and Carnivores,” *Forest Ecology and Management* 506 (2022).

<sup>32</sup> See for example: Furnas, Goldstein, and Figura, “Intermediate Fire Severity Diversity Promotes Richness of Forest Carnivores in California.”; Evelyn L. Bull, James J. Akenson, and Mark G. Henjum, “Characteristics of Black Bear Dens in Trees and Logs in Northeastern Oregon,” *Northwestern Naturalist* 81, no. 3 (2000); Shari L. Ketcham and John L. Koprowski, “Impacts of Wildlife on Wildlife in Arizona: A Synthesis” (paper presented at the Merging science and management in a rapidly changing world: Biodiversity and management of the Madrean Archipelago III and 7th Conference on Research and Resource Management in the Southwestern Deserts,

nocturnal and diurnal bed sites during their active season near “refuge” trees; that is, trees with coarse bark so the bears could readily climb up the tree if disturbed, and those bed sites were in high canopy cover.<sup>33</sup>

In fire ecology, the severity of the fire is highly variable. Lewis et al. (2022) write:

Fire severity . . . occurs across a gradient, which is characterized by **unburned forest** (where fire has not occurred for an extended period of time), **low fire severity** (where fire burns in the understory and does not kill mature trees), **moderate fire severity** (where fire kills some mature trees, but others survive), and **high fire severity** (where fire kills most or all trees, or at least top-kills them where the above ground portion of the tree is killed, but the root system remains alive). Wildfires are often characterized as mixed-severity, where a heterogeneous pattern of multiple fire severity types occur, especially for wildfires occurring over relatively large areas (Baker, 2009; Perry et al., 2011; Odion et al., 2014). **As fire severity increases, forest canopy cover decreases, but some plants can subsequently exhibit prolific regeneration through resprouting, suckering, or seed germination;** for example, some grasses, forbs, shrubs, and trees can exhibit a pulse of growth post fire (Lentile et al., 2007; Baker, 2009). In particular, fire-adapted species, such as aspen (*Populus tremuloides*) and Gambel oak (*Quercus gambelii*), can demonstrate rapid and widespread regeneration and growth in areas of moderate to high fire severity (Brown and DeByle, 1989; Bartos et al., 1994; Bailey and Whitham, 2002; Mack et al., 2008; Wan et al., 2014; Clement et al., 2019). **Importantly, heterogeneity in plant quantity and quality across the gradient of fire severity is expected to influence animal populations and habitat use.**<sup>34</sup>

In their study of fires in California for the years 2009-2018 and its effects on black bears, mountain lions and a host of mesocarnivores such as skunks, foxes, ringtails and bobcats in camera traps, Furnas et al. (2021) found the greatest carnivore richness in areas that experienced *intermediate* fire severity – that is on landscapes where fires occurred on a 10-year timescale.<sup>35</sup> Furnas et al. (2021) found that frequent, low severity fires provide short-term benefits for carnivores. They write that low-severity fires may provide about a “10-year pulse” of increased growing space for plants that feed bears (omnivorous carnivores) and small mammal prey (thus providing indirect benefits to obligate carnivores).<sup>36</sup> Furnas et al. (2021) found that frequent, low severity fires provide short-term benefits for carnivores. They write that low-severity fires may provide about a “10-year pulse” of increased growing space for plants that feed bears (omnivorous carnivores) and small mammal prey (thus providing indirect benefits to obligate carnivores).<sup>37</sup> Furnas et al. (2021), write that: “Low severity fire can also create forest openings, snags and logs while retaining large

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Tucson, AZ, 2013). Pigeon et al., “Staying Cool in a Changing Landscape: The Influence of Maximum Daily Ambient Temperature on Grizzly Bear Habitat Selection.”

<sup>33</sup> Susan A Mansfield et al., “Bed Site Selection by Female North American Black Bears (*Ursus Americanus*),” *Journal of Mammalogy* (2021).

<sup>34</sup> Emphasis added. Lewis et al., “Mixed-Severity Wildfire Shapes Habitat Use of Large Herbivores and Carnivores,” p. 2.

<sup>35</sup> Furnas, Goldstein, and Figura, “Intermediate Fire Severity Diversity Promotes Richness of Forest Carnivores in California.”

<sup>36</sup> Ibid. Citing Amacher et al. 2008, Roberts et al. 2015, Kelleyhouse 1980 and Swanson et al. 2010.

<sup>37</sup> Ibid. Citing Amacher et al. 2008, Roberts et al. 2015, Kelleyhouse 1980 and Swanson et al. 2010.

diameter overstorey trees”<sup>38</sup> – the denning habitat preferred by bears in some ecosystems.<sup>39</sup> Snags, broken at the top, can provide important den sites for black bears.<sup>40</sup> The 2021 California fires were not “low-severity fires”,<sup>41</sup> they were “trans-apocalyptic”<sup>42</sup>—leaving moonscapes for bears and other wildlife with which to attempt to cope.

In a recently published fire study conducted in the White Mountains of east-central Arizona and western New Mexico *seven years after* Arizona’s 2011 Wallow Fire (to date, Arizona’s largest wildfire, which burned 538,049 acres), Lewis et al. (2022) evaluated five levels of burn severity: unburned, low, moderate, moderate/high and high.<sup>43</sup> For black bears, Lewis et al. (2022) found that black bears’ highest use of areas occurred in both unburned forest and in areas of higher fire severity.<sup>44</sup> Areas of higher fire severity likely exhibited a pulse of vegetation in response to fire, which likely provided food for them.<sup>45</sup> Lewis et al. (2022) found that low-fire severity such as prescribed burns, which do not remove the forest canopy, provide only a “pulse” of regrowth of about one to three years before the vegetation returns to a pre-fire state.<sup>46</sup> Whereas in places where fire severity is greater and the canopy cover is lost, the pulse in plant quantity and quality extends to ten or more years.<sup>47</sup> Yet, the losses of mature trees in California’s landscapes can have negative near-term consequences for black bears as discussed above. And it could take centuries to replace these mature trees, and ecosystems may forever be changed such as from invasive species.<sup>48</sup> Bears require canopy cover to escape heat for day sleeping and for foraging and large tree snags for densites during hibernation, and large trees provide escape for bear cubs. In other words, severe fires harm California’s black bears’ habitat, and are also detrimental to black bear populations and harm the bears’ welfare as we discuss below.

### **Severe wildfires are detrimental to black bear populations and harm their welfare.**

#### **a. Catastrophic wildfires reduce black bear survival and reproduction**

On January 16, 2022, the *Los Angeles Times* reported the story, “Mother Bear and Cubs Battle for Survival as Wildfire, Drought and Traffic Take Heavy Toll.” Reporter Louis Sahagun interviewed several biologists including Caltrans’ senior biologist Katie Rodriguez, who said that bear-vehicle collisions are measured along a 108-mile corridor of U.S. 395 in the Eastern Sierra, and that last year resulted in the most black bear deaths since record keeping started in 2002. In 2021, 13 bears were struck on U.S. 395 during the months of September and October as bears were desperately looking for food following the devastating wildfires in

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<sup>38</sup> Ibid.

<sup>39</sup> Ibid.(Citing Agee 1998); Bull, Akenson, and Henjum, “Characteristics of Black Bear Dens in Trees and Logs in Northeastern Oregon.”

<sup>40</sup> “Characteristics of Black Bear Dens in Trees and Logs in Northeastern Oregon.”

<sup>41</sup> Furnas, Goldstein, and Figura, “Intermediate Fire Severity Diversity Promotes Richness of Forest Carnivores in California.”

<sup>42</sup> Elizabeth Well, “This Isn’t the California I Married,” *The New York Times*, Jan. 3, 2022.

<sup>43</sup> Lewis et al., “Mixed-Severity Wildfire Shapes Habitat Use of Large Herbivores and Carnivores.”

<sup>44</sup> Ibid.

<sup>45</sup> Ibid.

<sup>46</sup> Ibid.Citing Severson and Rinne 1990 and Sittler et al. 2019.

<sup>47</sup> Ibid.Citing Bartos et al. 1994 and Wan et al. 2014.

<sup>48</sup> Kelly et al., “Fire and Biodiversity in the Anthropocene.” Lewis et al., “Mixed-Severity Wildfire Shapes Habitat Use of Large Herbivores and Carnivores.”

the region of the highway.<sup>49</sup> In 2020, no bears were struck on that stretch of U.S. 395, but in 2019, four bears were killed by vehicles.<sup>50</sup> According to the article, no statewide database for bear-vehicle collisions exists.

Reporter Sahagun also interviewed Fraser Shilling, director of the Road Ecology Center at UC Davis, who said, “I can’t think of a worse situation for wildlife — bears running for their lives from fire and then getting whacked by cars. It’s a biological tragedy compounded by the fact that humans are responsible for the climate changes that set the stage for these increasingly immense and deadly wildfires.”<sup>51</sup> The article notes that the bears killed were primarily females, and two who were killed this year had dependent cubs, who were found next to their mothers’ bodies making crying sounds.

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In two studies published about the catastrophic 1996 fire in the Four Peaks area of the Mazatzal Mountains of Arizona,<sup>52</sup> the immediate aftermath was black bear mortality, especially to the female demographic.<sup>53</sup> Researchers found a population “significantly skewed toward males (4M:1F)” (but in a nearby control area where there was no fire, the ratio was one to one, male to female).<sup>54</sup>

On top of that mortality, 12 breeding females who survived subsequently gave birth to 16 cubs in years between 1997-1999, but none of the cubs survived—most likely because of infanticide by starving male bears, or by the cubs succumbing to starvation themselves.<sup>55</sup> After the Four Peaks fire, both males and females with cubs were forced to share islands of vegetated habitat to avoid midday heat, but this exposed the cubs to cannibalistic males.<sup>56</sup> (In another study of a catastrophic fire, researchers noted that bears who moved into the burned area later fed on ungulate carcasses.<sup>57</sup>)

After catastrophic fire events, like those California has experienced in recent years, Cunningham and Ballard (2004) recommend that wildlife managers reduce the hunting of female black bears for at least four years.<sup>58</sup> Bear biologists and wildlife managers have noted, however, that the hunters are poor at recognizing the distinction between males and females – even when houndsmen tree bears and are able to observe them before killing them.<sup>59</sup> Therefore, out of an abundance of caution, wildlife managers should stop all bear hunting until the land can recover from catastrophic fire and agency or academic bear biologists can make a sound, empirically based population assessment.

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<sup>49</sup> Louis Sahagun, “Mother Bears and Cubs Battle for Survival as Wildfire, Drought and Traffic Take Heavy Toll,” *Los Angeles Times*, Jan. 16 2022.

<sup>50</sup> Ibid.

<sup>51</sup> Ibid.

<sup>52</sup> Stan C. Cunningham and Warren B. Ballard, “Effects of Wildfire on Black Bear Demographics in Central Arizona,” *Wildlife Society Bulletin* 32, no. 3 (2004); Cunningham et al., “Black Bear Habitat Use in Burned and Unburned Areas, Central Arizona.”

<sup>53</sup> Cunningham and Ballard, “Effects of Wildfire on Black Bear Demographics in Central Arizona.”

<sup>54</sup> Ibid.

<sup>55</sup> Ibid.; Cunningham et al., “Black Bear Habitat Use in Burned and Unburned Areas, Central Arizona.”

<sup>56</sup> “Black Bear Habitat Use in Burned and Unburned Areas, Central Arizona.”

<sup>57</sup> The study was conducted by Blanchard and Knight (1999) and cited by Cunningham and Ballard (2004). Cunningham and Ballard, “Effects of Wildfire on Black Bear Demographics in Central Arizona.”

<sup>58</sup> Ibid.

<sup>59</sup> Beck et al., “Sociological and Ethical Considerations of Black Bear Hunting.”; K. H. Inman and M. R. Vaughan, “Hunter Effort and Success Rates of Hunting Bears with Hounds in Virginia,” *Ursus* 13 (2002).



PHOTO BY Rich Beausoleil; A female black bear cub who survived the 2014 Carlton Complex fire in Washington. She was rescued by Rich Beausoleil, bear and cougar specialist for Washington Department of Fish and Wildlife, and others. Named “Cinder,” the cub had crawled out of the fire on knees and elbows and was badly burned on her limbs and face and she suffered from malnutrition and dehydration. She was flown to a burn rehab center in Nevada. Cinder and her rescuers spawned a children’s book. Rehabilitated back to health, Cinder was released into the wild in 2017 with a radio collar. Later, wildlife agents found Cinder’s skeletal remains after she was shot near the release site and her radio collar disabled.

#### **b. Wildfires cause suffering and death to black bears**

Bears in the path of wildfires are subject to a variety of harms. Most wildlife victims of wildfires die from smoke inhalation that causes asphyxiation,<sup>60</sup> which is a distressful experience.<sup>61</sup> Wildfires tend to move across landscapes rapidly and with high-intensity heat, usually *above* 63°C (145°F).<sup>62</sup> Wildlife caught in wildfires or their aftermath experience a variety of travails, including injury, mortality, stress, disease or starvation.<sup>63</sup> Young wildlife are more prone to injury or mortality.<sup>64</sup> And rather than evacuating, wildlife may stay in burrows, rock cavities or dens, leading to smoke inhalation and potential asphyxiation.<sup>65</sup>

<sup>60</sup> Ketcham and Koprowski, “Impacts of Wildlife on Wildlife in Arizona: A Synthesis.” (Citing Bock and Lynch 1970, Buech et al. 1977, Bluan and Barrett 1971, Chew et al. 1959, Harrison and Murad 1972 and Lyon et al. 2000.)

<sup>61</sup> Jara Gutiérrez and Javier de Miguel, “Fires in Nature: A Review of the Challenges for Wild Animals,” *European Journal of Ecology* 7, no. 1 (2021).

<sup>62</sup> Ketcham and Koprowski, “Impacts of Wildlife on Wildlife in Arizona: A Synthesis.”

<sup>63</sup> Gutiérrez and de Miguel, “Fires in Nature: A Review of the Challenges for Wild Animals.” Ketcham and Koprowski, “Impacts of Wildlife on Wildlife in Arizona: A Synthesis.” R. A. Beausoleil, “Burned Bear Rescued, Rehabilitated, and Released in Washington,” *International Bear News* 24, no. 3 (2015).

<sup>64</sup> Ketcham and Koprowski, “Impacts of Wildlife on Wildlife in Arizona: A Synthesis.”

<sup>65</sup> *Ibid.*

Bears, like other wildlife, can experience burns to the face and limbs, like Cinder the cub pictured above.<sup>66</sup> Burned skin can trap intense temperatures inside of an animal's body, leading to further subcutaneous burns.<sup>67</sup> If an animal's body is burned by more than half, death or euthanasia is the invariable outcome, but if the animal's joints or claws are burned, locomotion and tree-climbing are inhibited.<sup>68</sup> Wildlife fleeing from fires can be struck by vehicles.<sup>69</sup> Because of the timing of most fires – at the end of summer – fires can hinder population recovery, breeding and reproduction.<sup>70</sup> Springtime wildfires also harm reproduction, harming populations.<sup>71</sup>

## Conclusion

In the western United States, the effects of global warming are already severe with record-setting droughts and wildfires affecting black bears. In 2021, California experienced record-level fires. According to CalFire, more than three million acres burned,<sup>72</sup> and in some areas, even soils experienced severe burn.<sup>73</sup> The immediate result of catastrophic fires is the direct death of bears, particularly females, and the trauma for surviving bears includes the loss of food and thermal cover from daytime heat. Fires could reduce reproduction for at least three years. If the ground is bare, bears may be forced to congregate in island patches of vegetation, exposing cubs to cannibalism by male bears. Bears are not heat adapted, they bed in the daytime using canopy cover, and need shade to forage.

Further, as discussed more fully in our petition, recent DFW data indicate that California's black bear population has declined steeply. DFW now believes that the California bear population could be as low as 9,771 individuals, which would indicate a 67% decline in the number of bears from the previously reported lowest population range of 30,000 bears.

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<sup>66</sup> Gutiérrez and de Miguel, "Fires in Nature: A Review of the Challenges for Wild Animals." Citing Rethorst et al. 2018. Beausoleil, "Burned Bear Rescued, Rehabilitated, and Released in Washington."

<sup>67</sup> Gutiérrez and de Miguel, "Fires in Nature: A Review of the Challenges for Wild Animals."

<sup>68</sup> Ibid.

<sup>69</sup> Ibid.

<sup>70</sup> Ibid.

<sup>71</sup> Ketcham and Koprowski, "Impacts of Wildlife on Wildlife in Arizona: A Synthesis."

<sup>72</sup> CalFire, "2021 Incident Archive," <https://www.fire.ca.gov/incidents/2021/> (2021).

<sup>73</sup> See: Dixie Fire assessment here: <https://inciweb.nwcg.gov/incident/article/7811/67107/>

Because of the extent and severity of fires in California and the apparent decline in the state's black bear population, the Fish and Game Commission must eliminate the open hunting season for black bears until (1) an empirical study is conducted of the state's black bear populations, (2) the effects of drought and recent wildfires on the state's bear populations are adequately studied, and (3) the state's bear management plan is updated to include the best available science, including social science. All of the studies cited in this article are provided to the California Fish and Game Commission via a Google Drive:

<https://drive.google.com/drive/folders/1aI-R23NVBv4XgdRFB1DAEW57Flt0OBQW?usp=sharing>

If you have any questions or concerns, please do not hesitate to contact us.

Sincerely yours,

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