

Population information

1. How many black bear biological populations occur in Washington state (based on variations in morphology, demography, geography, genetics)?

Based off genetics, bear populations throughout WA are continuous (only coat color varies between eastern (all color variations) and western (predominantly black) Washington. The agency currently manages bears the same in the 9 identified Black Bear Management Units.

2. What is the best estimate of abundance for each population, and what kind of confidence limits do we have for each estimate?

We are currently in the process of estimating densities in different sites statewide based on research that showed densities to be variable. This research estimated density in 2 areas and was initiated in 2013. We have 1 scientific publication (Welfelt et al. 2019) and one internal document (WDFW 2021, Estimating the statewide black bear population in Washington: an internal cross-region approach) that can be referenced. The estimate using that research would be about 20,000 bears statewide. We do not have confidence intervals around that number since it is an extrapolation from multiple sites.

Welfelt, L. S., Beausoleil, R. A., & Wielgus, R. B. (2019). Factors associated with black bear density and implications for management. *The Journal of Wildlife Management*, 83(7), 1527-1539.

3. What are the estimated maximum and current growth rates for each population?

We don't currently have this information. We have an ongoing research project monitoring reproduction, cub survival, and survival of all sex and age classes that will be used to estimate the growth rate. However, a common growth rate in the west is about 9-12 % and we would expect WA to be within that range.

4. What is the long-term population trend for each population?

We don't have a definitive answer to this question, which is one of the reasons behind the current DNA density monitoring effort. We currently manage bears statewide within 9 BBMUs. We use the percent of females harvested and median ages (both male and female) within the BBMUs to reflect hunting pressure and monitor trends. We have seen annual fluctuations in units, which is expected, but the 5 and 10-yr averages have do not indicate any significant change in trend. Continual monitoring and adding additional techniques are our best option to gain an understanding of the population trends.

General information

5. When do Washington's black bears arouse from hibernation?

It depends on location, sex, and age class. For all males, average emergence was March 16 in western WA and March 26 in eastern WA. For all females, average emergence was March 26 in western WA, and April 1 in eastern WA. Generally, females with cubs, on average, emerge 1 week later than other females (statewide)

6. What are their main prey and predation rates?

Bears are approximately 85% vegetarian. The remaining portion of their diet is made up of protein matter, of which the majority are insects. Bears are also scavengers and consume dead animals. Bears also opportunistically prey on neonates for approximately 17 days when they are less mobile. Marked ungulate mortalities (not predation rates) is typically 4-13% of the sample.

7. How do bears interact with cougars and wolves?

Generally, we know bears interact with these species. Bears may scavenge on old kills made by each of these species. A bear could take advantage of an actively cached cougar kill but are less likely to interact with wolves as they travel in packs. In these cases, they have evolved to climb trees to escape danger from wolves in a pack. It's likely these species do their best to avoid each other, but also likely that each kills individuals of the other species. We hope to learn more from results of the Predator-Prey project.

8. How often do males kill cubs?

Adult female black bears with cubs typically avoid areas where adult males occur. Cub survival is generally lower in higher bear density area. Generally, infanticide is suggested to be a density dependent phenomenon. Infanticide has been challenging to assess in Washington's black bears. Current research in the North Cascades is estimating cub survival rates but causes of death are often unknown as black bear cubs cannot be tracked via typical GPS collars. Intraspecific killing of yearlings by adult males has been documented, but it is not to increase the ability to breed with an adult female, as those yearlings would have dispersed by breeding season.

9. What is the extent of lumber damage attributed to bears?

We do not have access to this data. This information is considered proprietary to the timber companies. A recent study conducted in Oregon surveyed 122 stands from aerial and ground surveys. The researchers modeled four damage scenarios: salvage; total loss; root disease; and combined damage. They found aerial surveys overestimated bear damage by approximately 5-fold. They also estimated economic loss for both the salvage and total loss scenarios and found that both resulted in $\leq 35\%$ of the net present value of the timber. At a landscape scale, the estimated economic loss under the worst-case scenario (i.e., total loss) was \$56/ha (\$56/2.471

acres). They also observed, during ground surveys, that bear damage was typically older than 2 years and occurred at low frequency (1.5 bear damaged trees/ha). Their findings suggest that black bear timber damage is not uniformly distributed across the landscape and the impact varies with spatial scale. (Taylor et al. 2019).

Taylor, Jimmy D.; Kline, Kristina N.; and Morzillo, Anita T., "Estimating economic impact of black bear damage to western conifers at a landscape scale" (2019). USDA National Wildlife Research Center - Staff Publications. 2211.
https://digitalcommons.unl.edu/icwdm_usdanwrc/2211

10. What are the main risk factors for bears and what are the impacts of those factors?

Our best assessment of risk factors can be interpreted from the North Cascades black bear research project (2013-current) where >250 bears have been GPS collared to date. On the west slope of the North Cascades 49% of mortalities were hunter kills, 16% were conflict kills, 11% were poached, 11% were wounding loss, 7% were vehicle collisions, and 7% from natural causes (these are not annual rates but the sum of all mortalities in the study). On the east slope of the North Cascades, 59% were hunter kills, 21% were natural causes, 8% were from wounding loss, 8% were conflict kills, and 5% were vehicle collisions (these are not annual rates but the sum of all mortalities in the study). Of the 11 bears that died of natural causes, 10 of them were yearlings which either died of starvation, predation (adult male bear or cougar), or unknown natural causes. Black bear population dynamics are driven by survival and reproduction rates, as well as immigration (animals coming into the area) and emigration (animals leaving the area), and all these factors can be impacted by both natural and human factors. For example, a berry crop failure can increase human-caused mortality as bears may move closer to people in search of food and decrease reproduction rates for adult females through lower body condition. Understanding these population dynamics and how management actions may affect them is essential to maintaining a viable population and establishing sustainable harvest rates.

11. What is the total human-caused annual mortality for each black bear population?

Again, we manage bears as a statewide bear population. However, we have some information from the North Cascades research project where bears were divided based on east or west slopes of the North Cascades range. See answer 10. This information is also in the annual Department Status and Trend Reports.

Hunting information

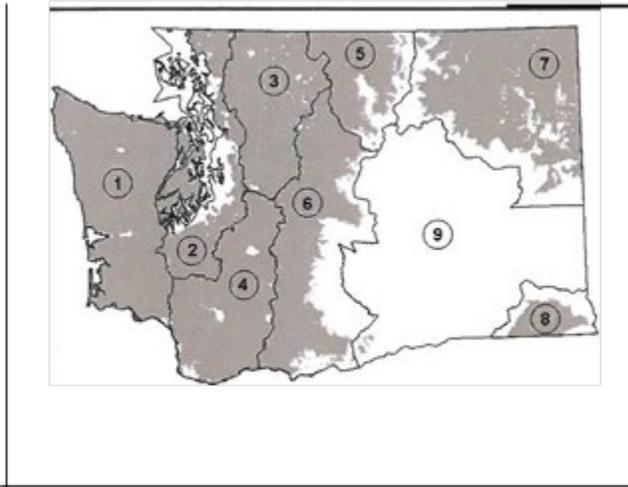
12. How many bears have been taken in this hunt over the past 10-15 years?

Statewide from 2011-2021, 1,143 bears (757 males and 386 females) have been harvested in eight of the nine BBMUs.

See excel attachment with graphics illustrating harvest for each BBMU (except for BBMU 5, 6, and 9, no spring harvest in these units) during 2011-2020.

13. Where are bears normally killed during the spring hunting season?

Spring Bear Special Permit Sum of all harvest 2011-2020			
Unit	#Harvested	#Male	#Female
BBMU1	108	73	35
BBMU2	3	0	3
BBMU3	91	58	33
BBMU4	59	35	24
BBMU5	0	0	0
BBMU6	0	0	0
BBMU7	517	348	169
BBMU8	241	164	77
BBMU9	0	0	0
Total	1019	678	341



14. What is the sex/age distribution of the bears killed?

For 2011-2020 the sex ratio was 67% male and 33% female.

See above table in question 13.

15. How many females with or without cubs were taken annually?

This is not known at a statewide level. We can provide the total annual harvest of females, but we don't conduct mandatory carcass checks for the fall general season. Data for WA indicate 35-45% of the adult female bears over 4 years old would have cubs of the year (lower end for eastern WA, higher end for western WA due to differences in age at first reproduction and interbirth interval). From WDFW research, about 25% of the bear population are breeding age females. We estimate ~40% of the breeding age females would be expected to have newborns with an average litter size of 2.0 cubs/litter derived from research. Survival of cubs of the year is difficult to assess and part of on-going work. Using the GPS collared bears in the North Cascades research project, approximately 30% of the GPS collared adult females harvested in the fall had cubs that year. We do not know if the cubs survived until fall or if they were lost during the year prior to harvest so it is difficult to generalize this information.

16. How does the period of arousal from hibernation overlap the proposed hunting season for 2022?

The spring hunt occurs after den emergence, so all bears have emerged.

17. How are hunts monitored?

Two ways, through online harvest reports and tooth submission. This tells the agency the percent females and ideally the age of the kills by sex (see table below). Approximately 25% of hunters submit a tooth for ageing and the median ages are based on those submissions.

Parameter	Harvest		
	Liberalize	Acceptable	Restrict
% Females in harvest	< 35%	35-39%	> 39%
Median age of harvested females	> 6 years	5-6 years	< 5 years
Median age of harvested males	> 4 years	2-4 years	< 2 years

18. How is compliance assessed?

Data for the 2021 seasons are not yet available. The department monitors hunter harvest reporting compliance and has started to monitor tooth submission compliance more directly. Hunter reporting rate for fall general and spring special permit is approximately 65%. We estimate that we receive approximately 25% of the teeth from the expected harvest for both seasons.

Compliance is considerably higher for spring bear special permits, averaging 55% tooth submission from hunters that reported harvest. We expect that number to increase due to the mandatory carcass checks, which were implemented during 2021.

19. How many bears are shot at or wounded but not recovered?

We don't have a way to effectively measure this factor. However, through on-going research, we would estimate poaching and wounding loss together at 20% of total mortalities documented. (This is not an annual rate but the sum of all mortalities in the study).

20. How much poaching occurs?

There are 284 violations, from 116 incidents, over the last five years (2016-2020). The higher value for the violations is caused by individuals receiving one or more violation types and counts for each incident. Data provided by our Law Enforcement program is shown in the table below. Also, the high number of violations in 2017 is a single incident that resulted in 47 violations which is over half of all 2017 violations (total n = 81).

WDFW Police 2016-2020 Black Bear Violations and Incidents						
	2016	2017	2018	2019	2020	Totals
Incident Reports	21	15	22	14	34	106
Violations	53	81	72	24	50	280
Spring (Jan-June) Incidents	2	5	11	4	7	29
Fall (July - Dec) Incidents	19	10	11	10	27	77

* Four violations unassigned an IRF/date