

Grizzly Bear Population Estimate for Yellowstone National Park in 2012

The number of grizzly bears with home ranges inside YNP is of interest to many park visitors. However, grizzly bear population estimates are expensive and difficult to obtain because grizzlies are solitary, live in rugged mountainous terrain, and spend considerable amount of time in forested areas where they are not readily visible. In addition, grizzly bears in the GYE do not recognize the political boundaries designating National Parks, National Forests, and other public and private lands, and freely move between these jurisdictions. Therefore estimates of the subpopulation of bears living within the boundaries of YNP are inherently imprecise.

Adult female grizzly bears with cubs-of-the-year (COY) are the most reliable segment of the population to count (Knight et al. 1995). The smaller average home range sizes of females with COY, the number of cubs per litter and pelage-color combinations of different family groups, as well as geographic locations and times of sighting, aid in identifying distinct adult females (Knight et al. 1995). On average, female grizzly bears in the GYE typically produce a litter of cubs approximately once every three years (Craighead and Craighead 1967, Eberhardt and Knight 1996, Schwartz et al. 2006). An estimate of the minimum number of adult females present in the population can be obtained by summing the counts of distinct family groups of females with COY from three consecutive years (Knight and Eberhardt 1985). The proportion of adult female grizzly bears in the Greater Yellowstone Ecosystem population is estimated to be 27.4% (Eberhardt and Knight 1996). An imprecise estimate of the subpopulation of GYA grizzly bears that live inside YNP can be obtained by summing the number of individual females with cubs counted in YNP over the most recent three year period, then dividing the sum by 0.274 (the proportion of adult females in the population). Counts of females with cubs inside YNP over the last three years were: 21 in 2010, 5 in 2011, and 14 in 2012 for a sum of 40 (M. Haroldson, IGBST, pers. Commun.). Forty divided by 0.274 ($40/0.274 = 146$) results in an estimate of 146 grizzly bears that had home ranges either wholly or partially inside YNP in 2012. Since 1990, estimates of the number of grizzly bears inside YNP have ranged from a low of 84 in 1993, to a high 175 in 2006.

This estimate contains several biases. It relies on counts of the number of female grizzly bears that produce cubs each year and assumes all females are counted. However, it is unlikely that all females with cubs are counted in any given year (Anderson et al. 2007). We believe that the number of females with cubs are under-counted, biasing the park population estimate low. This estimate also assumes an inter-birth interval of exactly 3 years. Available data suggests that the actual average inter-birth interval is approximately 3.2 years and that inter-litter interval varies annually (Anderson et al. 2007, Schwartz et al. 2006). In addition, the denominator of .274 used to project the number of adult females to total population size is only an approximation (Anderson et al. 2007). Thus the estimate of 146 grizzly bears with home ranges wholly or partially inside of YNP in 2012 should be considered a relatively simple, imprecise estimate. The estimate of the subpopulation of grizzly bears living inside YNP has been relatively stable since 1998 (Figure 9), suggesting that the Yellowstone National Park subpopulation may be at or near food limited and social carrying capacity.

Number of adult female grizzly bears accompanied by cubs-of-the-year observed in YNP, three year sum of counts of adult female grizzly bears with cubs-of-the year observed in YNP, and the estimates of the subpopulation of grizzly bears with home ranges entirely or partially within YNP, 1988 – 2012.

Year	Number of Females with Cubs	3 Year Sum of Females with Cubs	Yellowstone National Park Sub-population Estimate
1988	10	-	-
1989	9	-	-
1990	13	32	117
1991	6	28	102
1992	7	26	95
1993	10	23	84
1994	10	27	99
1995	6	26	95
1996	15	31	113
1997	14	35	128
1998	13	42	153
1999	15	42	153
2000	14	42	153
2001	12	41	150
2002	20	46	168
2003	5	37	135
2004	22	47	172
2005	11	38	139
2006	15	48	175
2007	14	40	146
2008	11	40	146
2009	11	36	131
2010	21	43	157
2011	5	37	135
2012	14	40	146