Black Bear Population Analyses
2018
By Nathan M. Roberts

Abstract

Revised population models produced a statewide estimate of approximately 26,000 black bears in fall 2018. A harvest of 4,500 bears, resulting in 12,970 permits, was approved by the Natural Resources Board for the 2018 season. Approximately 124,000 individuals applied for a harvest permit or preference point for 2018.

Methods

Registration is required for all harvested bears. Registration is completed electronically by phone, computer or at a cooperating station. An upper first premolar, submitted by mail, is required to complete legal registration. The sex and county of kill were recorded for each bear. Teeth were sent to the Matson's Lab in Milltown, MT for processing, and ages were assigned by counting annuli in the cementum. Bear bait station surveys were not conducted by wildlife management and research personnel in the 2018.

Wisconsin's Bear Population Model was adapted from one developed and used in Minnesota (Garshelis 1990). Zone-specific models were updated in 2014 to include the most recent bear harvest, age, and bait station data, and were used to estimate bear population size in each Bear Management Zone (Figure 1). Starting population size in the models was adjusted in all zones in 2013 based on estimates from the tetracycline mark-recapture study conducted in 2011 and 2012 (MacFarland 2009, Rolley et al. 2014). Previously models were calibrated to maximize the correlation between model simulated population trends and trends in bait-station visitations.

Results

Teeth were collected from 3,540 of the 4,157 bears harvested in 2017. The ages of bears taken in 2017 are not available at the time of this writing. The age structure of female bears harvested during 1993-2016 has been relatively stable (Table 2); mean age of harvested female bears averaged 4.6 years (range 3.7 - 5.3). The age structure of harvested male bears has shifted to a younger distribution over the last 24 years with the mean age of harvested males declining from approximately 4 years to about 3 years over the period.

Zone-specific models were calibrated to yield estimates of the 2011 fall population that closely matched estimates from the 2011 tetracycline mark-recapture study. The models produced a statewide population estimate of approximately 26,000 bears in fall.

Discussion

Population models that were calibrated to the 2011 zone-specific mark-recapture estimates, but still have several uncertainties. Efforts are underway to build and calibrate new population models that better incorporate multiple sources of information. The Natural Resources Board approved a harvest quota of 4,550 bears for the 2018 season, a reduction of 450 from the 2017 quota of 5,000. This included 1,250 bears in Zone A, 800 in Zone B, 1,200 in Zone C, and 1,300 in Zone D.

Literature Cited

Garshelis, D.L. 1990. Monitoring effects of harvest on black bear populations in North America: a review and evaluation of techniques. East Workshop Black Bear Res. and Manage. 10:120-144.

MacFarland, D.M. 2009. Population estimation, habitat associations and range expansion of black bears in the upper Midwest. Ph.D. dissertation. University of Wisconsin, Madison.

Rolley, R.E., D.M. MacFarland, N.M. Roberts, and T.R. Pearson. 2014. Black Bear Population Analyses, 2014. Pages 28-34 in J. Kitchell and B. Dhuey (editors). Wisconsin Wildlife Surveys: August 2014. Wisconsin Department of Natural Resources, Bureau of Science Services, Madison, WI.
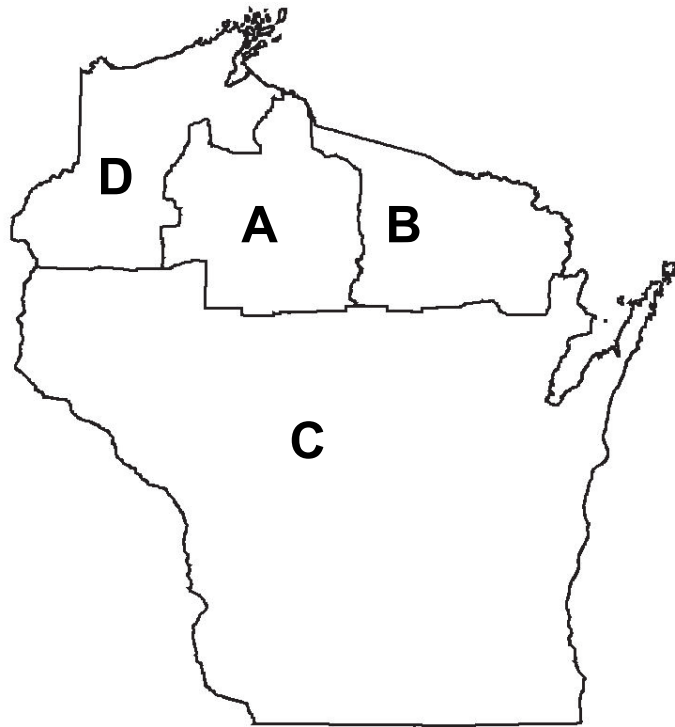
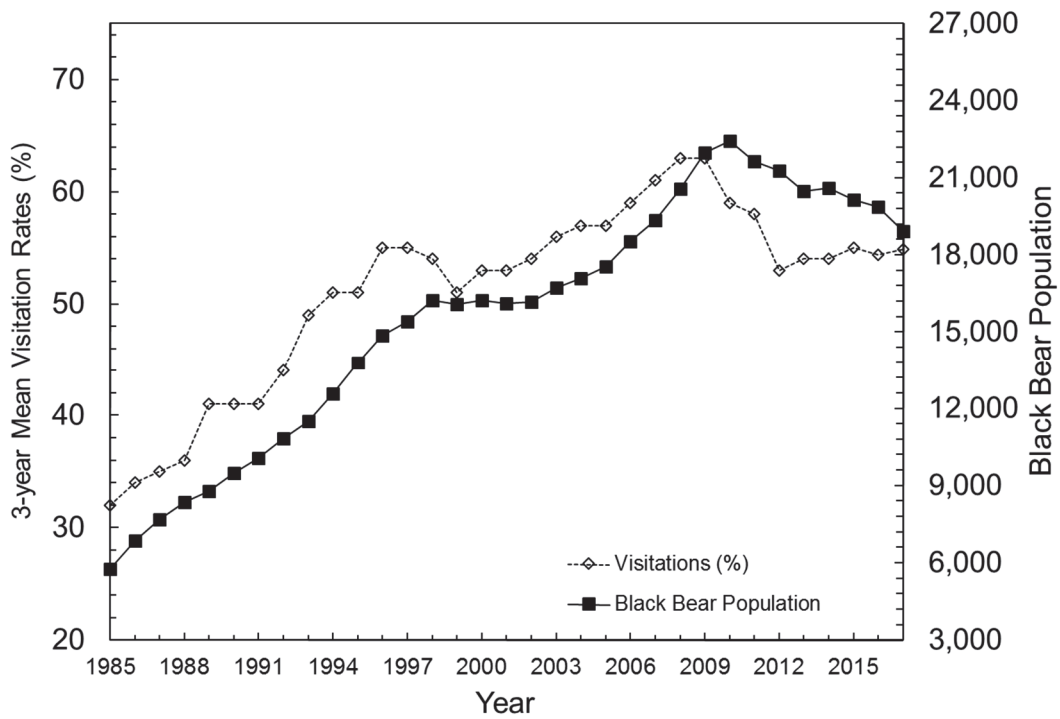**Figure 1.** *Wisconsin's Black Bear Management Zones, 2017.*

Figure 2. *Bear visitation rates on bait station surveys (3-yr running average) and pre-hunt population estimates calculated by the revised models for the primary range (Zones A, B, and D), 1985-2017.*

Table 1. *Percent of bear bait stations visited by bears, 2004-2017.*

County	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Ashland	71	76	52	59	66	33	42	27	32	69	65	81	41
Bayfield	75	52	76	67	44	67	64	56	53	69	39	40	56
Burnett	46	43	37	35	5	51	48	43	21	38	23	30	23
Douglas	30	30	41	73	49	63	33	50	38	48	43	48	N/A
Florence	83	66	86	75	68	79	30	59	79	79	56	56	43
Forest	62	63	88	78	76	84	58	76	57	82	55	47	65
Iron	64	69	71	58	88	77	94	76	30	23	63	58	56
Langlade	63	53	44	46	48	46	61	57	56	37	41	38	56
Lincoln	30	39	73	61	64	68	37	42	60	28	38	37	47
Marinette	50	48	64	31	32	57	34	41	23	27	31	34	24
Oconto	23	17	23	53	39	48	43	24	17	41	17	29	26
Oneida	48	54	57	54	39	62	49	60	55	61	70	74	76
Price	26	33	50	66	69	84	67	53	57	67	66	65	59
Rusk	98	68	98	92	92	93	78	98	88	79	72	94	90
Sawyer	90	77	87	80	70	60	60	46	51	64	59	51	61
Taylor	90	66	92	86	89	76	75	62	65	79	66	89	87
Vilas	32	56	39	68	34	41	28	29	40	26	62	41	20
Washburn	92	70	88	87	70	80	78	76	63	79	84	97	78
Primary Range	**60**	**53**	**65**	**65**	**58**	**66**	**54**	**55**	**51**	**56**	**53**	**55**	**55**
Barron	30	5	3	19	40	29	44	34	45	35	22	40	45
Chippewa	47	17	35	44	40	53	72	78	42	63	62	50	47
Clark	48	28	45	47	55	33	42	36	44	36	43	49	15
Jackson	8	24	13	14	13	15	20	11	3	10	8	22	0
Marathon	53	45	38	51	42	44	44	42	30	29	31	34	23
Menominee	14	0	6	26	9	13	---	---	---	38	16	18	39
Shawano	3	0	0	4	10	0	0	3	10	9	0	7	5
Peripheral Range	**30**	**18**	**22**	**31**	**31**	**27**	**32**	**34**	**30**	**32**	**28**	**32**	**25**

*bait station index was not run in 2018

Table 2. *Age classes of bears harvested in Wisconsin, 1993-2016.*

Year	Sex	Percent in age class			No. aged	Mean age
		1-2 yr	3-9 yr	10+ yr		
1993	Male	50.9	41.7	7.4	405	4.3
	Female	37.8	41.7	7.4	405	4.3
1994	Male	62.6	31.4	6.0	441	3.9
	Female	50.9	45.0	4.1	271	4.2
1995	Male	55.7	41.4	2.9	600	3.6
	Female	37.7	52.0	10.5	435	5.3
1996	Male	60.0	37.3	2.7	771	3.6
	Female	46.8	45.6	7.6	536	4.7
1997	Male	65.0	32.6	2.5	765	3.5
	Female	47.9	44.2	7.9	620	4.6
1998	Male	65.0	33.4	1.6	1,134	3.3
	Female	49.0	44.2	6.9	904	4.5
1999	Male	67.6	29.9	2.4	1,058	3.3
	Female	51.5	39.3	9.2	954	4.7
2000	Male	68.1	29.0	2.9	1,227	3.3
	Female	49.8	41.5	8.7	1,046	4.7
2001	Male	67.8	29.2	3.0	1,250	3.4
	Female	51.2	40.8	8.0	1,023	4.6
2002	Male	59.5	34.6	5.9	1,094	3.9
	Female	44.5	43.7	11.8	946	5.2
2003	Male	64.3	33.3	2.4	1,349	3.1
	Female	48.4	43.0	8.2	1,065	4.6
2004	Male	62.9	33.9	7.9	1,332	3.2
	Female	48.4	43.7	3.2	1,177	4.3
2005	Male	57.1	40.1	2.8	1,267	3.4
	Female	44.7	47.8	7.6	898	4.5
2006	Male	58.8	38.7	2.5	1,421	3.4
	Female	44.8	47.0	8.2	1,258	4.6
2007	Male	61.0	36.6	2.3	1,367	3.3
	Female	42.0	48.3	9.7	1,135	4.8
2008	Male	58.1	38.5	3.4	1,456	3.6
	Female	42.9	49.0	8.0	1,169	4.7
2009	Male	59.6	38.4	2.0	1,794	3.3
	Female	45.6	47.2	7.3	1,523	4.4
2010	Male	68.5	30.0	1.4	2,144	2.9
	Female	50.0	42.1	7.9	2,190	4.3
2011	Male	61.4	34.6	4.0	1,882	3.4
	Female	42.2	47.1	10.8	1,786	5.0
2012	Male	70.7	27.3	2.1	2,984	3.0
	Female	49.0	41.5	9.6	2,171	4.5
2013	Male	60.0	36.4	3.6	1,884	3.4
	Female	42.5	46.2	11.3	1,753	4.9
2014	Male	69.2	28.9	1.9	2,098	2.9
	Female	50.9	41.6	7.6	2,047	4.3
2015	Male	66.5	31.6	2.0	1,777	3.0
	Female	45.8	44.3	9.9	1,650	4.5
2016	Male	66.9	30.9	2.2	1,839	2.4
	Female	50.1	41.9	8.0	1,945	3.7

*ages of bears taken in 2017 are not yet available