2021 Spotlight Survey

Wildlife Diversity Program Note #21-1

Methods

The spotlight survey was initiated in 1981, and has been conducted annually since that time. Observers drive slowly (10–15 mph) on public roads, using 100,000-candlepower spotlights to detect animals by seeing their entire bodies or light reflected from their eyes. Sampling begins an hour after sunset. Most routes are 25 miles in length.

Sampling is phased in from Illinois' southernmost counties (21 March to 4 April) to the northernmost (11–25 April) to account for differences in phenology. Ideally, routes are sampled when relative humidity is ≥60%, air temperature is >32˚F, and rain or heavy fog is absent (Rybarczyk 1978).

Results

During 2021, staff sampled 1002 miles and observed 8,581 animals on 41 routes (Table 1). Animals observed in addition to target species included 33 coyotes, 1 beaver, 2 bobcat, and 176 house cats. Staff also recorded 5 foxes, 9 owls, 3 geese and 1 otter and 4 mink; in some cases, species could not be determined.

The number of raccoons observed per mile on 41 routes sampled during 2021 was higher than 2019, but surveys were not conducted in 2020 due to COVID19 (Table 2). Indices varied from 0.60–5.12 raccoons per mile for individual routes (Table 3). Long-term indices (1981–2021) correlated negatively with harvest levels during the preceding season ($r = -0.751$; $p < 0.01$).

Discussion

Spotlight surveys are useful for monitoring relative abundance of the raccoon at large spatial and temporal scales (Bauder et al. 2021, Gehrt et al. 2002). In recent years, the statewide spotlight index was about 3 times greater than when surveys started in 1981. The index for 2021 was 1.97.

Results allow IDNR to adjust harvest regulations for large changes in abundance of raccoons. Since 1990-91, seasons for trapping raccoon increased four times, adding a total of 30 days in the northern zone and 32 in the south. Hunting seasons increased from 62 days (north) or 55 days (south) to 93 days. Such changes are not likely to affect harvest levels during periods of low pelt values (Hubert 1990). However, liberal seasons maximize recreational opportunities for core participants and make the most of upswings in volatile markets.

Raccoons are an important part of Illinois' fur harvest. They also cause property damage (Bluett 2003), harbor zoonoses (Page et al. 2016), and affect other wildlife populations through diseases, parasites, and predation (Schmidt 2002, Heske et al. 1999, Mitchell et al. 1999). Spring spotlight surveys provide reliable information for management decisions, ecological research, and efforts to increase public support for wildlife conservation. Like Nielsen et al.

(2009), we recommend sampling ≥ 37 routes per year.

LITERATURE CITED

Bauder, J.M., Allen, M.L., Benson, T.J. et al. An approach for using multiple indices for monitoring long-term trends of mesopredators at broad spatial scales. Biodivers Conserv (2021). https://doi.org/10.1007/s10531-021-02259-8

Bluett, R.D., G.F. Hubert, Jr., and C.A. Miller. 2003. Regulatory oversight and activities of wildlife control operators in Illinois. Wildlife Society Bulletin 31:104–116.

Gehrt, S.D., G.F. Hubert, Jr., and J.A. Ellis. 2002. Long-term population trends of raccoons in Illinois. Wildlife Society Bulletin 30:457–463.

Heske, E.J., S.K. Robinson, and J.D. Brawn. 1999. Predator activity and predation on songbird nests on forest-field edges in east-central Illinois. Landscape Ecology 14:245–254.

Hubert, G.F., Jr. 1990. Raccoon investigations. P-R Project Report, W-99-R-2, Study XII, Jobs 1–4. Illinois Department of Conservation, Springfield, Illinois, USA.

Mitchell, M.A., L.L. Hungerford, C. Nixon, T. Esker, J. Sullivan, R. Koerkenmeier, and J.P. Dubey. 1999. Serologic survey for selected infectious disease agents in raccoons from Illinois. Journal of Wildlife Diseases 35:347–355.

Nielsen, C., E. Hellgren, and J. Nawrot. 2009. Cooperative fur-bearing and nongame mammal investigations. Federal Aid Project W-135-R-9–10 Final Report. Cooperative Wildlife Research Laboratory, Southern Illinois University, Carbondale, Illinois, USA.

Page, L.K., D.A.P. Delzell, S.D. Gehrt, E.D. Harrell, M. Hiben, E. Walter, C. Anchor, and K.R. Kazacos. 2016. The structure and seasonality of *Baylisascaris procyonis* populations in raccoons (*Procyon lotor*). Journal of Wildlife Diseases 52:286–292.

Rybarczyk, W.B. 1978. Evaluation of a spotlight survey technique as an index to Iowa white-tailed deer (*Odocoileus virginianus*) and raccoon (*Procyon lotor*) populations. Thesis, Iowa State University, Ames, Iowa, USA.

Schmidt, K.A. 2002. Nest predation and population declines in Illinois songbirds: a case for mesopredator effects. Conservation Biology 17:1141–1150.

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Table 1. Numbers of animals observed per mile for spotlight survey routes in Illinois, 2021.

Species	No. observed	No. observed/mi	% change from 2020[a]

[a] No routes were ran in 2020, so there is no direct comparison to 2021. (41 routes in 2021)

Raccoon	1976	1.97	N/A
White-tailed deer	5758	5.75	N/A
Cottontail rabbit	412	.41	N/A
Domestic cat	176	0.18	N/A
Opossum	120	0.12	N/A
Striped skunk	53	0.08	N/A

Table 2. Annual trends in spring spotlight survey observations for raccoons in Illinois, 1981–2021.

Year	No. routes	No. miles sampled	No. raccoons observed	No. raccoons observed/mi	No. comparable routes	% change from previous year[a]
1981	34	834.0	454	0.54	--	--
1982	41	1007.0	600	0.60	34	+18.4
1983	41	1002.0	670	0.67	39	+10.1
1984	43	1066.0	666	0.62	40	-3.4
1985	45	1114.0	653	0.59	43	-3.7
1986	45	1119.0	797	0.71	42	+13.6
1987	46	1145.0	647	0.57	45	-19.8
1988	45	1099.0	768	0.70	44	+18.3
1989	44	1075.0	754	0.70	42	-1.0
1990	46	1125.0	1072	0.95	44	+38.6
1991	44	1075.0	1204	1.12	44	+24.4
1992	47	1148.0	1281	1.12	44	-5.0
1993	47	1142.5	1346	1.18	46	+2.9
1994	45	1098.7	1463	1.33	40	+11.5
1995	48	1100.0	1501	1.28	45	<1.0
1996	48	1174.0	1713	1.46	48	+12.5
1997	47	1142.0	1523	1.33	47	-9.7
1998	47	1149.0	1232	1.07	41	-20.2
1999	46	1129.0	1512	1.34	44	+25.8
2000	46	1124.0	1337	1.19	45	-11.3
2001	48	1179.0	1467	1.24	46	+2.5
2002	48	1175.0	1308	1.11	48	-10.5
2003	47	1155.0	1263	1.09	47	-0.7
2004	47	1153.0	1312	1.14	47	+4.2
2005	47	1155.0	1306	1.13	47	-0.8
2006	45	1105.0	1102	1.00	45	-12.8
2007	47	1155.0	1335	1.16	45	+17.9
2008	46	1119.0	1328	1.19	46	+0.9
2009	46	1129.0	1330	1.18	46	-0.7
2010	46	1130.0	1339	1.21	45	+2.6
2011	44	1080.0	1316	1.22	43	+5.1
2012	44	1067.0	1080	1.01	41	-22.5
2013	37	907.0	1096	1.21	34	+21.3
2014	39	949.2	1192	1.26	35	+8.9
2015	41	1002.2	1314	1.31	39	+6.5
2016	41	1004.4	1405	1.40	39	+5.9
2017	41	1005.4	1467	1.46	41	+4.3
2018	40	980.4	1808	1.84	40	+24.5
2019	40	957.1	1643	1.72	39	-6.5
2020*	0	-	-	-	-	-
2021	41	1002.1	1976	1.97	N/A	N/A

[a] Based on comparable routes.

Table 3. Spotlight survey observations for selected species in Illinois, 2021.

County	Miles	Raccoons	Deer	Rabbit	Cat	Opossum	Skunk
Adams	25	40	123	10	3	3	2
Cass	25	50	122	15	1	0	2
Clark	25	60	234	15	0	1	1
Clay	24	46	77	12	6	2	0
Clinton-Washington	23	62	62	3	1	1	2
Coles	25	45	170	19	11	1	0
Cook/Busse FPD	13	28	12	5	1	2	15
Douglas	25	15	67	15	3	3	0
DuPage	21.1	43	40	2	0	1	1
Gallatin	25	24	157	16	8	6	1
Greene	25	59	177	16	3	14	5
Hamilton	25	58	198	12	3	1	1
Iroquois	25	80	115	3	3	4	3
Jackson	25	55	103	8	8	1	0
Jasper	25	128	146	4	6	1	1
Jefferson	25	44	189	7	12	1	3
JoDaviess	25	35	38	5	3	0	1
Johnson	21	14	129	22	4	2	1
Kankakee	25	32	58	7	6	1	0
Kendall	25	37	105	10	6	3	0
Lee	25	87	185	27	7	4	0
Macoupin	25	18	116	7	1	2	0
Marshall-Woodford	25	55	186	4	5	2	0
Mason	25	60	290	19	3	5	13
McHenry	25	17	102	6	3	3	2
McLean	25	45	278	6	3	0	2
Menard-Logan	25	56	155	2	2	3	2
Mercer	25	34	132	6	2	3	0
Montgomery	25	28	98	6	2	4	0
Morgan	25	54	112	3	6	1	2
Ogle	25	52	105	5	2	1	4
Piatt	25	23	150	24	7	3	2
Pike	25	109	428	12	6	6	1
Randolph #20	25	40	69	11	0	8	1
Sangamon	25	30	133	5	14	2	2
Tazewell	25	36	137	6	6	9	3
Union	25	62	273	10	4	5	0
Warren	25	49	62	5	3	1	0
Wayne	25	39	301	25	6	2	6
Whiteside	25	70	44	8	3	5	1
Will	25	57	80	9	3	3	1