2023 SUMMER ROADSIDE SURVEY

PERFORMANCE REPORT
STATEWIDE WILDLIFE RESEARCH AND SURVEYS

A Contribution of Pittman-Robertson Funds
Federal Aid in Wildlife Restoration

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Kansas Department of Wildlife and Parks

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2023 Summer Roadside Survey

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Each year since 1980, conservation officers, district biologists, public lands and parks employees, and other selected Kansas Department of Wildlife and Parks (KDWP) personnel have been asked to participate in the Summer Roadside Survey. The survey takes place between the fourth week of July and the last week of September. Participants are asked to record all furbearers observed (dead or alive) while driving during their regular duties. Observations and mileage are recorded weekly (Appendix 1), and a Roadside Index (the number of animals observed per 1000 miles traveled) is calculated.

From 1980-1985, only raccoon observations were recorded. Additional species were added in 1986, and procedures and participating personnel have remained similar since that time. Data is analyzed for statewide estimates, but also by physiographic province to assess regional variation in populations. A physiographic province is a geographic region with distinct habitat characteristics. Kansas has 12 physiographic provinces, but these are reduced to 6 for this survey to maintain respectable sample sizes in each physiographic province (Appendix 2).

In 2023, 69 department employees returned usable surveys (Appendix 3). The number of participating KDWP employees since the survey began is provided in Figure 1. Participation by physiographic province is provided in Figure 2. Total miles driven and number of each species observed since 1980 are shown in Table 1. Annual Roadside Indices calculated from this data and their associated trend lines are presented in Figure 3 for the seven furbearer species most commonly observed. Caution should be exercised in drawing conclusions about species with small sample sizes (i.e. - low indices) such as bobcat and red fox. Figure 4 shows a relative comparison of annual Roadside Indices for several groups of furbearers. Again, caution must be used in interpreting this data. This figure is not meant to be a comparison of population levels (susceptibility to roadkill and/or observation may vary by species), rather it is a comparison of the relative change in indices over time.

Mean 2023 Roadside Indices by physiographic province are presented in Table 2. Duncan's Multiple Range Test (SAS GLM procedure) was used to compare indices among regions ($\alpha = 0.05$). In 2023, raccoon, opossum, striped skunk, coyote, and badger had enough observations to show statistically significant regional variation. A comparison of annual indices for each of these species by physiographic province is presented in Figure 5.

Comments:

All species documented in the past two years saw declining indices in 2023. Much of the state suffered severe drought during the survey period, which may have impacted populations or movements and therefore susceptibility to documentation. This may have particularly impacted the semi-aquatic species (beaver, otter, mink, muskrat). Other recent changes in habitat or management that may be impacting certain populations include the loss of over half of the Conservation Reserve Program (CRP) lands in the state and the establishment of a night vision coyote hunting season.

In the long term, Roadside Survey indices indicate raccoon and coyote populations remain high, opossum and badger are generally stable, and skunk has declined in the last 15-20 years. After increasing through about the year 2000, the bobcat index has fluctuated, but the number of bobcats observed is relatively small resulting in higher likely variability in bobcats indices as well as other species with few observations.

Statistical analysis of results by physiographic province allows us to assess where in the state some species are most (or least) abundant. Raccoon and opossum populations are highest in eastern and lowest in western Kansas. Coyote populations did not statistically differ by region. Skunk populations were highest in the southeast and southcentral Kansas, and badger populations were highest in western and northcentral Kansas.

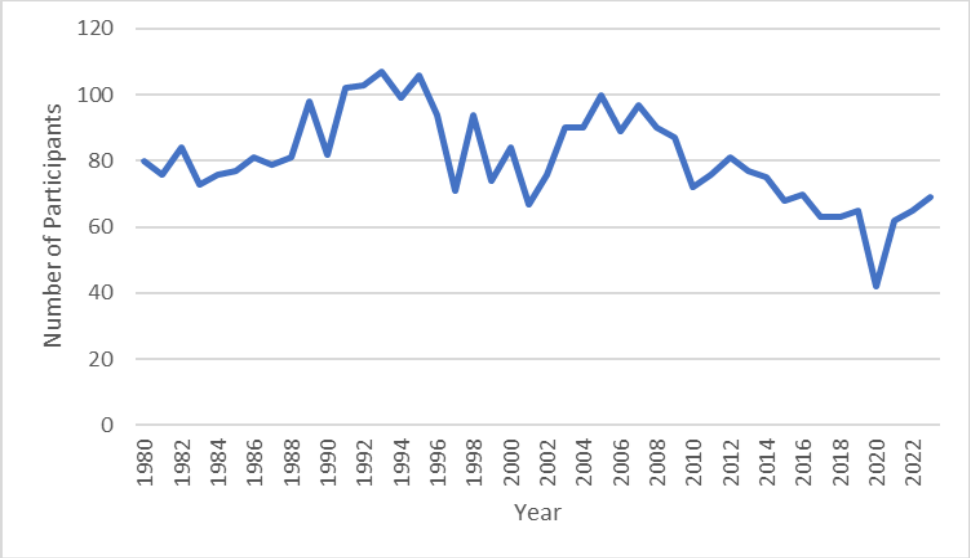


Figure 1. KDWP employee participation in the Roadside Survey since 1980.

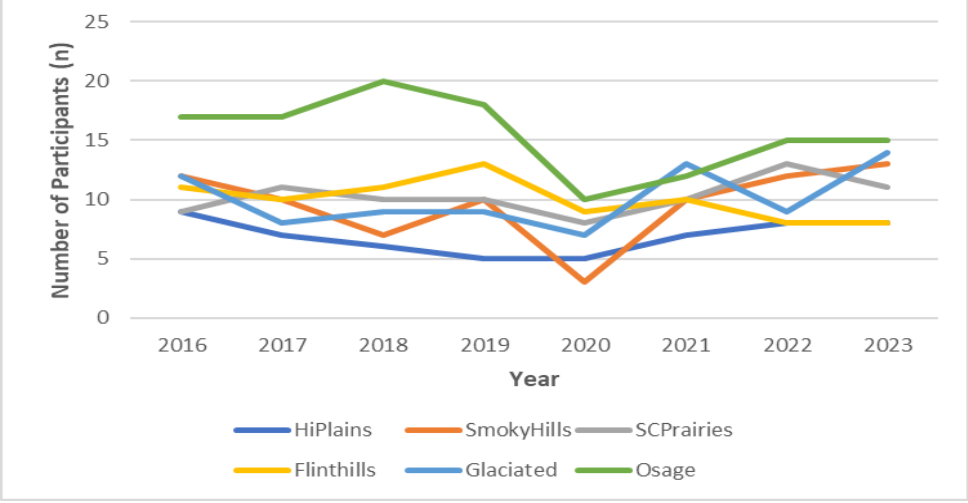
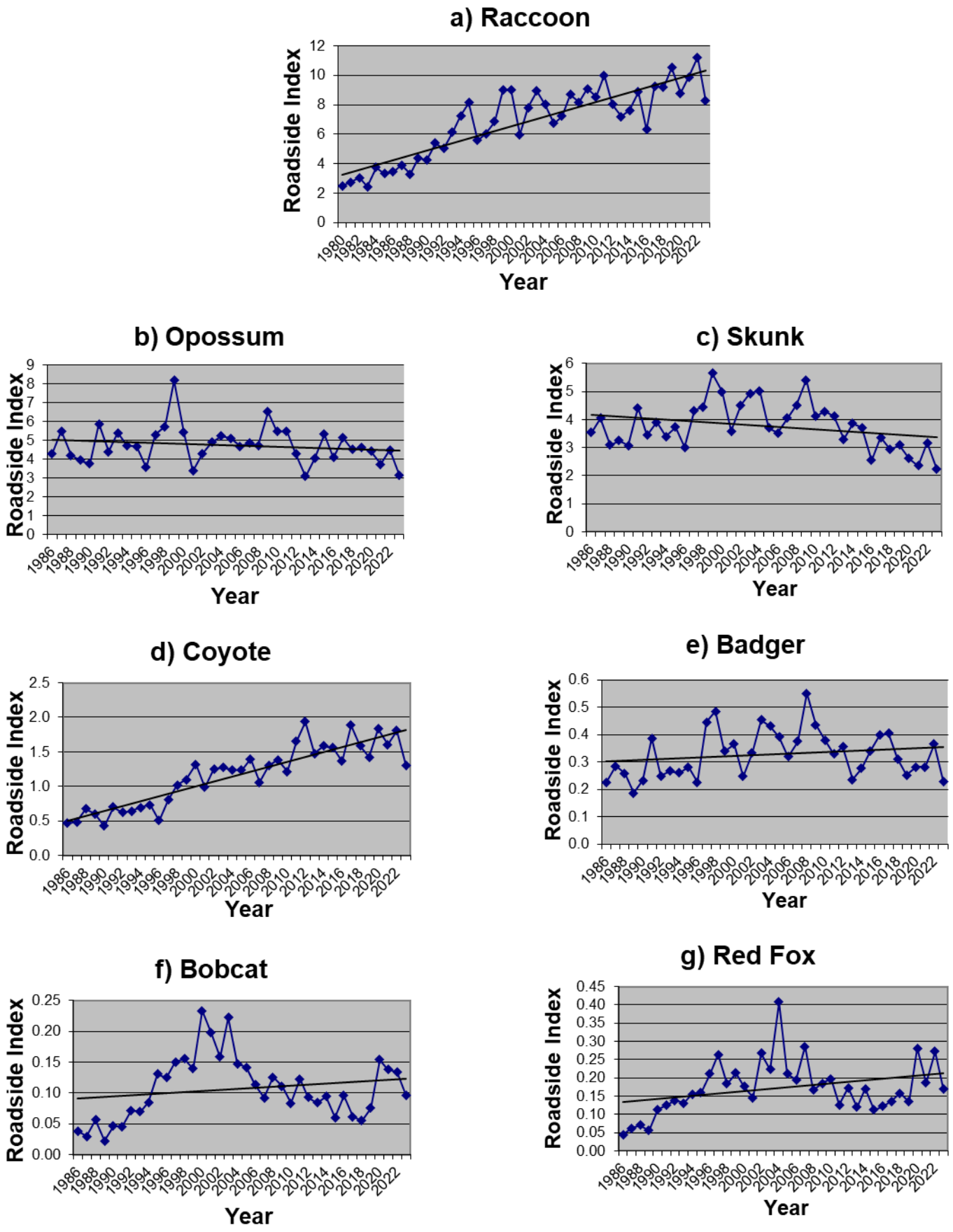


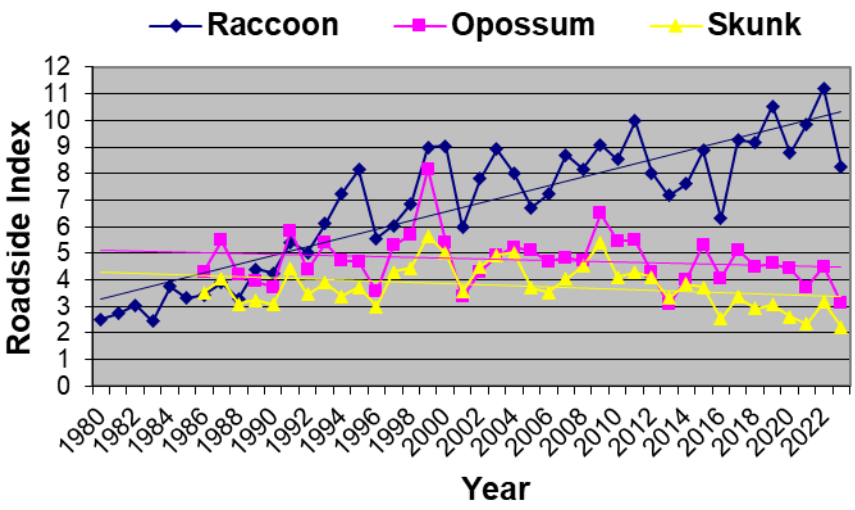
Figure 2. Employee participation in the Roadside Survey by Kansas physiographic province.

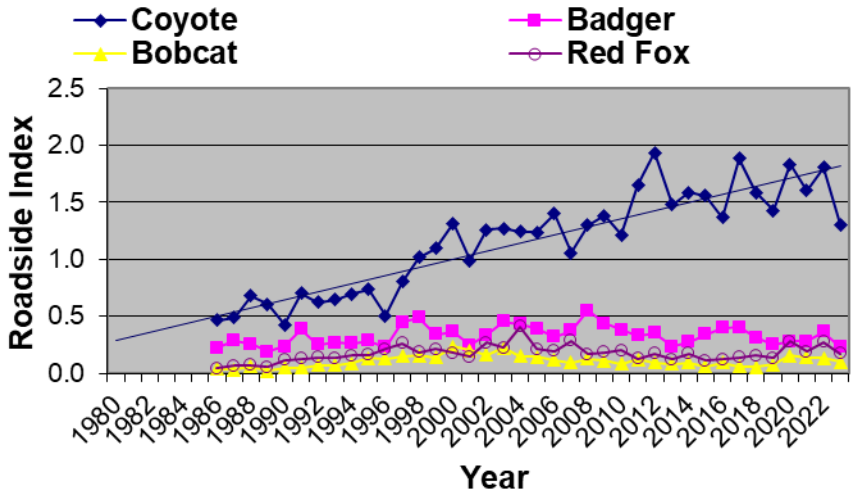
Table 1. Roadside Survey participation, mileage, and species observations since 1980.

Year	(n)	Miles	Raccoon	Opossum	Skunk	Coyote	Badger	Bobcat	Red Fox	Gray Fox	Swift Fox	Beaver	Mink	Muskrat	River Otter	Spotted Skunk	Weasel	Armadillo	Woodchuck	Porcupine
1980	80	241752	606																	
1981	76	302309	829																	
1982	84	324956	991																	
1983	73	359309	876																	
1984	76	271213	1018																	
1985	77	293312	971																	
1986	81	313547	1078	1348	1109	146	70	12	14	1	12	0	11		0	1	0	2	1	0
1987	79	305812	1192	1680	1237	149	87	9	19	0	11	1	10		0	1	0	2	2	0
1988	81	301140	989	1264	931	204	78	17	21	0	9	6	10		0	0	0	2	6	0
1989	98	359834	1580	1415	1168	217	67	8	20	0	17	9	3		0	0	0	6	2	2
1990	82	300465	1276	1122	922	128	70	14	34	3	5	5	11		0	1	0	8	3	0
1991	102	352063	1904	2063	1556	246	136	16	44	1	10	3	19		0	0	2	13	4	2
1992	103	377202	1898	1655	1301	235	94	27	52	0	23	6	10		0	0	2	21	12	2
1993	107	374677	2290	2023	1463	241	100	26	49	0	15	18	36		0	0	0	77	10	5
1994	99	353089	2562	1661	1198	245	92	30	55	2	26	8	7		0	0	1	62	7	0
1995	106	390159	3174	1826	1457	287	110	51	62	1	10	9	11		0	3	1	88	8	2
1996	94	384811	2142	1369	1159	195	87	48	81	0	1	3	10	7	0	0	0	134	10	0
1997	71	325653	1965	1726	1405	262	145	49	86	1	2	4	10	5	0	0	0	285	7	3
1998	94	385924	2648	2204	1719	393	187	60	71	6	5	6	14	15	0	0	1	260	18	3
1999	74	300904	2703	2459	1699	330	102	42	64	1	3	3	8	11	0	0	0	242	25	8
2000	84	364139	3288	1974	1820	480	133	85	64	11	1	12	13	24	1	0	0	453	13	2
2001	67	287980	1719	967	1032	284	71	57	42	0	6	4	7	6	1	0	0	257	18	8
2002	76	321335	2511	1383	1449	404	107	51	86	2	6	13	4	6	0	0	0	597	13	15
2003	90	368408	3289	1804	1819	469	167	82	82	1	22	11	6	2	1	0	0	820	12	5
2004	90	353245	2836	1845	1776	439	152	52	144	2	39	0	5	2	0	0	0	860	20	11
2005	100	388468	2615	1985	1439	481	152	55	82	3	11	6	5	1	0	0	1	816	25	9
2006	89	344109	2483	1611	1213	481	110	39	67	2	11	4	11	6	0	0	2	696	20	8
2007	97	413668	3597	2002	1674	438	155	38	118	1	13	6	3	2	0	0	0	622	18	9
2008	90	342780	2799	1619	1550	446	189	43	57	0	8	7	8	1	0	0	1	504	19	4
2009	87	341709	3105	2226	1848	473	149	38	63	1	7	8	7	7	0	0	0	587	15	5
2010	72	263043	2242	1438	1084	319	100	22	52	1	9	2	13	13	0	0	0	391	9	6
2011	76	285394	2849	1565	1223	472	94	35	36	0	14	3	5	13	0	0	0	128	11	6
2012	81	301497	2420	1290	1239	584	107	28	52	3	3	11	5	5	0	0	0		12	3
2013	77	285402	2049	880	943	422	67	24	34	0	0	5	3	0	0	0	0		3	1
2014	75	275638	2097	1108	1063	437	76	26	47	0	9	4	4	0	0	0	0		4	1
2015	68	249345	2214	1324	926	389	85	15	28	0	7	2	6	2	0	0	0		3	0
2016	70	261086	1645	1063	665	356	104	25	32	0	17	5	2	1	0	0	0		5	2
2017	63	242586	2248	1245	817	457	98	15	33	0	11	7	15	13	0	0	0		6	0
2018	63	235015	2157	1058	689	373	73	13	37	0	17	1	7	6	2	0	0		2	0
2019	65	238415	2510	1100	735	340	60	18	32	0	4	9	18	14	3	0	0		3	3
2020	42	149444	1311	660	389	274	42	23	42	0	7	3	12	9	0	0	0		4	1
2021	62	209675	2069	780	493	336	59	29	39	0	7	3	18	8	0	0	0		1	4
2022	65	238333	2672	1070	754	430	87	32	65	0	16	15	3	9	3	0	0		5	4
2023	69	258323	2132	807	574	337	59	25	44	0	5	0	1	1	3	0	0		1	1



Figures 3a-g. Population trend of various furbearer species based on annual Roadside Indices.





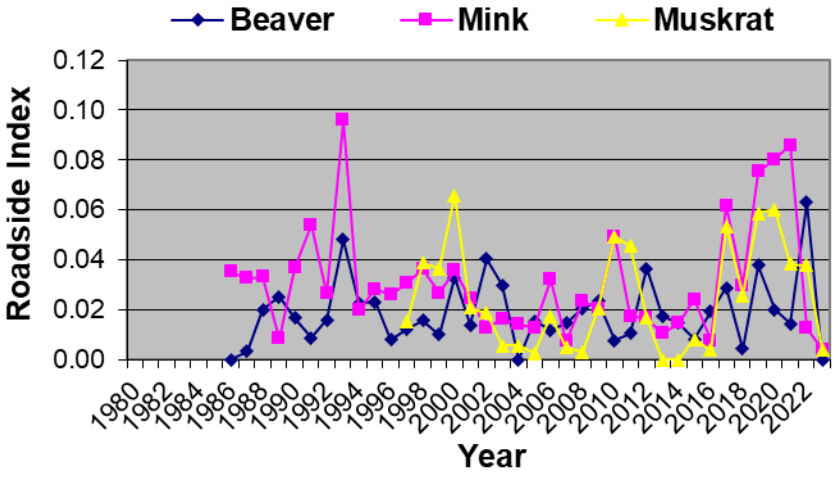


Figure 4a-c. Relative annual Roadside Indices of select furbearer species groups.

Table 2. Mean 2023 Roadside Index of selected furbearer species by physiographic province.

Physiographic Prov.	Raccoon		Opossum		Skunk		Coyote		Badger	
High Plains	2.71	b	0.65	c	1.02	b	1.35	a	0.62	a
Smoky Hills	8.10	ab	1.52	c	2.08	b	1.03	a	0.38	ab
Southcentral Prairies	9.01	ab	2.74	bc	5.12	a	2.46	a	0.21	b
Flint Hills	7.68	ab	1.87	bc	2.06	b	1.07	a	0.09	b
Glaciated Region	11.05	a	5.00	ab	2.23	b	1.24	a	0.06	b
Osage Questas	14.31	a	6.29	a	3.37	ab	2.06	a	0.07	b
STWD	8.25		3.12		2.22		1.30		0.23	

Means with the same subscript are not significantly different (Duncan's Multiple Range Test)

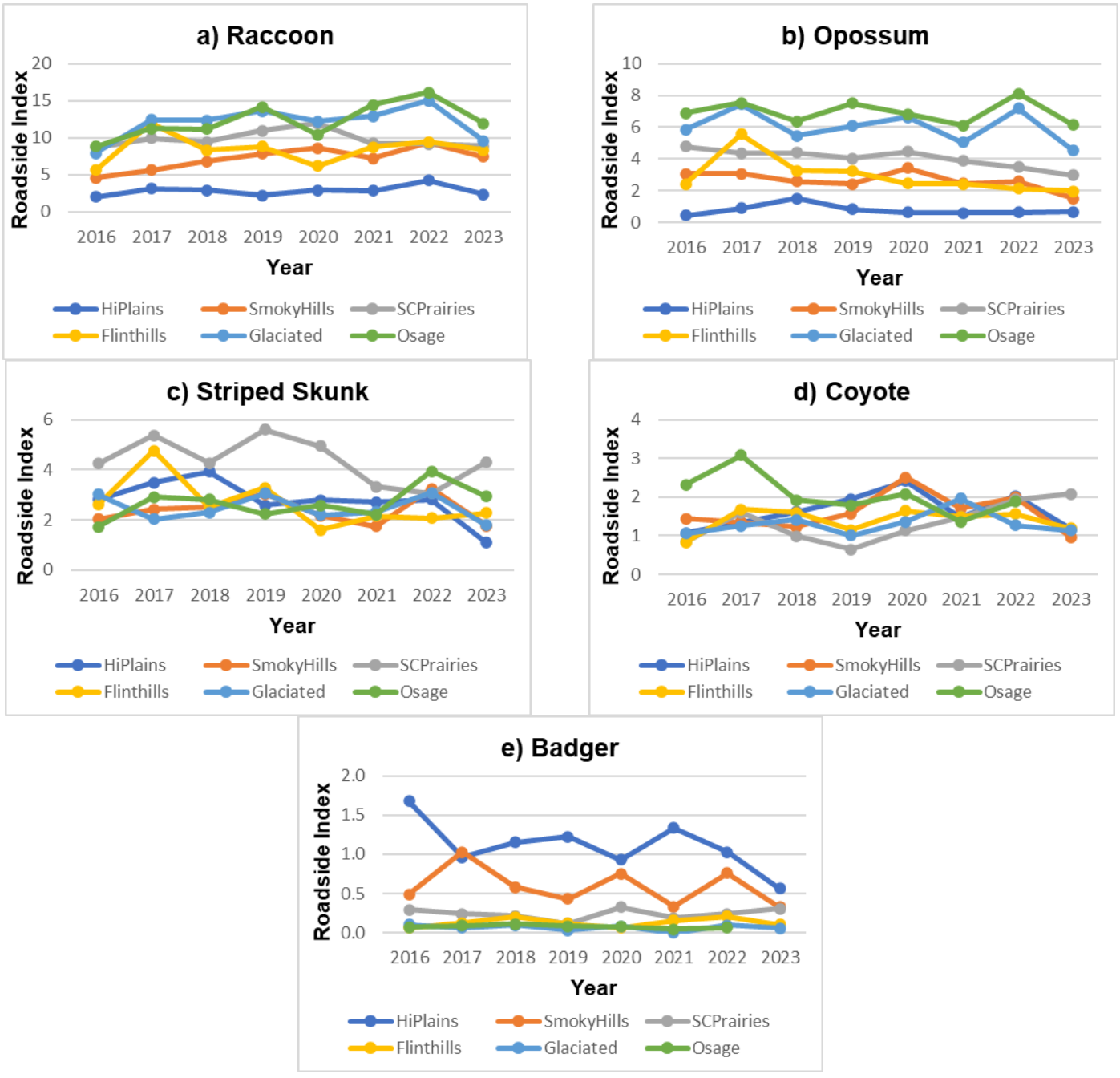


Figure 5a-e. Comparison of mean annual Roadside Indices of select furbearer species by Kansas physiographic province.

APPENDIX 1. 2023 Roadside Survey Form.

2023 SUMMER ROADSIDE SURVEY OF FURBEARERS AND OTHER MAMMALS

WEEK	RACCOON	OPOSSUM	STRIPED SKUNK	Coyote	Badger	Bobcat	Fox (specify: red, gray or swift)	Beaver	Mink	OTHER (SPECIFY)	Miles Driven
July 16 – July 22											
July 23 – July 29											
July 30 - Aug 5											
Aug 6 – 12											
Aug 13 – 19											
Aug 20 – 26											
Aug 27 – Sept 2											
Sept 3 – 9											
Sept 10 – 16											
Sept 17 – 23											

NAME (please print)_____ **Circle one**: NRO DB/tech PL Other **County used most:** _____ **Physiographic Province used most (1-6)**: _____

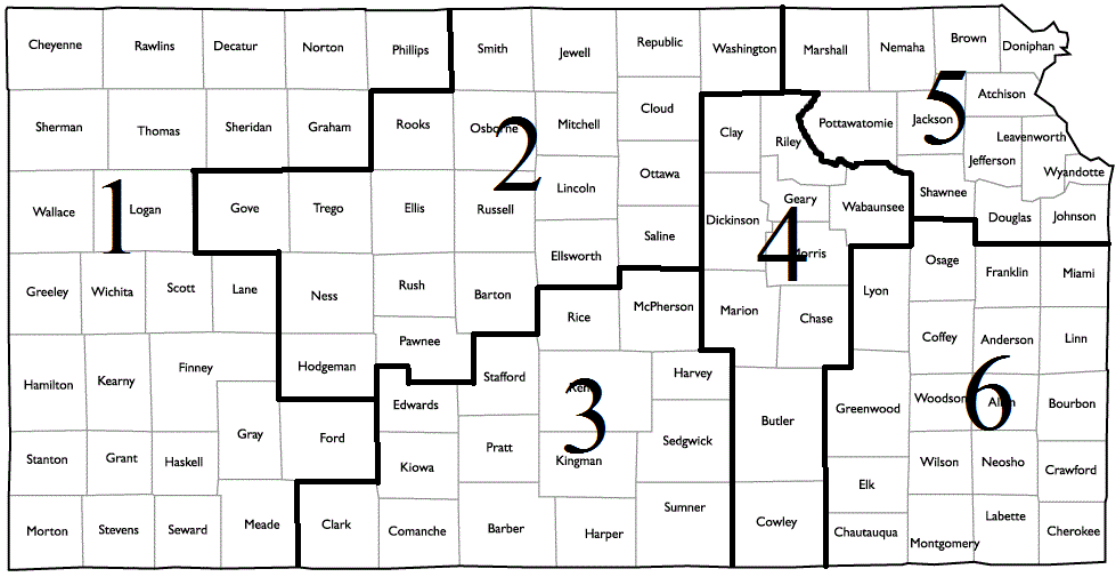
Comments (continue on back): _____

_____

_____

Return to Matt Peek, KDWPT, P.O. Box 1525, Emporia, KS 66801, by **September 30.**

APPENDIX 2. Regions used to assess Roadside Survey data based on Kansas Physiographic Provinces.



1. High Plains
2. Smoky Hills
3. Southcentral Prairies
4. Flint Hills
5. Glaciated Region
6. Osage Questas

APPENDIX 3. 2023 Roadside Survey Participants by Physiographic Province and KDWP Division.

YEAR	PHYSIOGRAPHIC PROVINCE	DIVISION	NAME
2023	1. High Plains	Law Enforcement	Jeff Sutton
2023	1. High Plains	PF	Scott Kluge
2023	1. High Plains	Public Lands	Luke Winge
2023	1. High Plains	Wildlife	Aaron Baugh
2023	1. High Plains	Wildlife	Abby McGuire
2023	1. High Plains	Wildlife	Jared King
2023	1. High Plains	Wildlife	Kraig Schultz
2023	1. High Plains	Wildlife	Kurtis Meier
2023	2. Smoky Hills	Fisheries	Travis Riley
2023	2. Smoky Hills	Law Enforcement	Colter Silhan
2023	2. Smoky Hills	Law Enforcement	Jake Brooke
2023	2. Smoky Hills	Law Enforcement	Scott Skucius
2023	2. Smoky Hills	Law Enforcement	Shane Zeigler
2023	2. Smoky Hills	Public Lands	Cale Hedges
2023	2. Smoky Hills	Wildlife	Brandon Tritsch
2023	2. Smoky Hills	Wildlife	Eric Wiens
2023	2. Smoky Hills	Wildlife	James Svaty
2023	2. Smoky Hills	Wildlife	Kevin Klag
2023	2. Smoky Hills	Wildlife	Lucas Kramer
2023	2. Smoky Hills	Wildlife	Mark Shaw
2023	2. Smoky Hills	Wildlife	Pat Riese
2023	3. SC Prairies	Law Enforcement	Chris Stout
2023	3. SC Prairies	Law Enforcement	Clark Besthorn
2023	3. SC Prairies	Law Enforcement	Clinton Lee
2023	3. SC Prairies	Law Enforcement	Jason Harrold
2023	3. SC Prairies	Law Enforcement	Matt Hanvey
2023	3. SC Prairies	Public Lands	Cliff Peterson
2023	3. SC Prairies	Public Lands	Jason Black
2023	3. SC Prairies	Public Lands	Todd Gatton
2023	3. SC Prairies	Wildlife	Charles Cope
2023	3. SC Prairies	Wildlife	Jon Beckman
2023	3. SC Prairies	Wildlife	Steve Adams
2023	4. Flint Hills	Law Enforcement	Amanda Alexander
2023	4. Flint Hills	Public Lands	Brent Konen
2023	4. Flint Hills	Public Lands	Justin Wren
2023	4. Flint Hills	Public Lands	Kurt Grimm
2023	4. Flint Hills	Public Lands	Scott Amos
2023	4. Flint Hills	Public Lands	Tyler Burt
2023	4. Flint Hills	Wildlife	Clint Thornton
2023	4. Flint Hills	Wildlife	Jeff Rue
2023	5. Glaciated Region	Law Enforcement	Jeff Clouser
2023	5. Glaciated Region	Law Enforcement	Jon Entwhistle
2023	5. Glaciated Region	Law Enforcement	Matthew Cook
2023	5. Glaciated Region	Law Enforcement	Ryan Smidt
2023	5. Glaciated Region	Law Enforcement	Zachary Porterfield
2023	5. Glaciated Region	Public Lands	Nathan Henry
2023	5. Glaciated Region	Wildlife	Andy Friesen
2023	5. Glaciated Region	Wildlife	Ben Couchman
2023	5. Glaciated Region	Wildlife	Brad Rueschhoff
2023	5. Glaciated Region	Wildlife	Corey Alderson
2023	5. Glaciated Region	Wildlife	Darin Porter
2023	5. Glaciated Region	Wildlife	Megan Smith
2023	5. Glaciated Region	Wildlife	Tim Urban
2023	5. Glaciated Region	Wildlife	Tyler Warner
2023	6. Osage Questas	Fisheries	Don George
2023	6. Osage Questas	Law Enforcement	Aaron Scheve
2023	6. Osage Questas	Law Enforcement	Austin Sievert
2023	6. Osage Questas	Law Enforcement	Jonathan Rather
2023	6. Osage Questas	Law Enforcement	Ross Urhmacher
2023	6. Osage Questas	Law Enforcement	Ryan Twellmann
2023	6. Osage Questas	Law Enforcement	Ty Jaquess
2023	6. Osage Questas	Public Lands	Rob Riggin
2023	6. Osage Questas	Public Lands	Ryan Lies
2023	6. Osage Questas	Wildlife	Alex Lyon
2023	6. Osage Questas	Wildlife	Cassie Wells
2023	6. Osage Questas	Wildlife	Justin Harbit
2023	6. Osage Questas	Wildlife	Logan Martin
2023	6. Osage Questas	Wildlife	Matt Peek
2023	6. Osage Questas	Wildlife	Vickie Cikanek