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# **South Dakota**

## **SURVEY REPORT**

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## **Compilation of Deer Survey Methods and Results Reports**

**2021**

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PIERRE, SOUTH DAKOTA**

**WILDLIFE SURVEY REPORT 2021-06**

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## **List of Acronyms**

AF: Adult female

AM: Adult male

CI\_95: 95% confidence interval

DAU: Data Analysis Unit

harv: mortality from harvest

MD: mule deer

MDBA: mule deer buck adult

MDBF: mule deer buck fawn

MDDA: mule deer doe adult

MDDF: mule deer doe fawn

n: sample size

NRSold: nonresident firearm deer licenses sold

other: mortality from non-harvest cause

ResSold: resident firearm deer licenses sold

SD: standard deviation

SDGFP: South Dakota Game, Fish & Parks

SE: standard error

UnitType: Firearm deer hunting unit and license type

WTBA: white-tailed deer buck adult

WTBF: white-tailed buck fawn

WTD: white-tailed deer

WTDA: white-tailed doe adult

WTDF: white-tailed doe fawn

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## ESTIMATING FALL AGE AND SEX STRUCTURE FOR DEER

### INTRODUCTION

Population management objectives were established across 90 white-tailed deer (*Odocoileus virginianus*) and mule deer (*Odocoileus hemionus*) harvest management units in South Dakota (Figure 1). The South Dakota Game, Fish and Parks (SDGFP) Commission promulgates rules on a biennial schedule to determine deer hunting license allocation and season structure recommendations, and these were used as the primary management option to meet population objective goals. Estimates of the deer population and harvest effects were used to inform management recommendations across management units. Age- and sex-ratio data from pre-hunting season herd composition surveys provide 2 valuable sources of information about the deer population. Specifically, age-ratios, fawn:adult does, were used to estimate annual recruitment rates. Sex-ratios were useful for monitoring trends in buck age-structure. In addition, annual monitoring of recruitment (sex-ratios) can alert managers when fawn survival substantially deviates from normal ranges (e.g., severe drought resulting in poor survival from birth to hunting season) and provide a means for proactive management to mitigate erratic changes in deer abundance.

### METHODS

Pre-hunting season herd composition surveys were completed by driving roads during daylight hours in areas of known deer concentrations in September (mule deer) and October (mule deer and white-tailed deer). Surveys were concentrated in locations across South Dakota according to where deer were distributed and could be observed. Although there is no statistical survey design, survey efforts were designed to provide the most efficient data collection while still representing the South Dakota deer population in each DAU. Minimum sample size goals were 200 deer groups per DAU per species. Winter aerial observation surveys, when available, and SDGFP staff familiarity of deer distribution before the hunting season helped facilitate representation of the survey. All deer groups that were observed in their entirety were classified to numbers of fawns, adult does, and adult bucks. Location and date of observations were also recorded in order to reduce double-counting occurrences. However, in general efforts were made to remove surveying similar areas multiple times.

Sex ratios were calculated as adult buck:adult does. Detection probability was assumed to be similar for all cohorts during September and October. Consistency in the monitoring design was used to minimize potential bias in estimates, and intermittent pregnancy rate, fawn survival, and abundance surveys were used to validate recruitment ratios from fall roadside observation surveys.

## Model Structure

The multinomial distribution was used to model the proportion ( $\pi$ ) of observations within each of the 3 cohorts ( $k$ ); fawns, adult does, and adult bucks.

$$\pi_k = \left[ \frac{\exp(\eta_k)}{\sum_{k=1}^K \exp(\eta_k)} \right]$$

Age- and sex- ratios, were then calculated from the proportions. For example, the fawn:adult doe ratio can be calculated by dividing the proportion of fawns by the proportion of adult does. The sampling unit was treated as each individual deer observed. Markov Chain Monte Carlo iterations were used to fit models in Program R and estimate age- and sex- ratios with associated standard errors and 95% credible intervals (Plummer 2003, R Development Core Team 2016, Su and Yajima 2015).

## RESULTS

The 5-year DAU average of fawn:adult does ranged 0.66-0.99 for white-tailed deer and 0.57-84 for mule deer. The 5-year DAU average of buck:adult does ranged 0.15-0.29 for white-tailed deer and 0.36-0.56 for mule deer. Historic herd composition data and estimates are included in appendix 1 and appendix 2.

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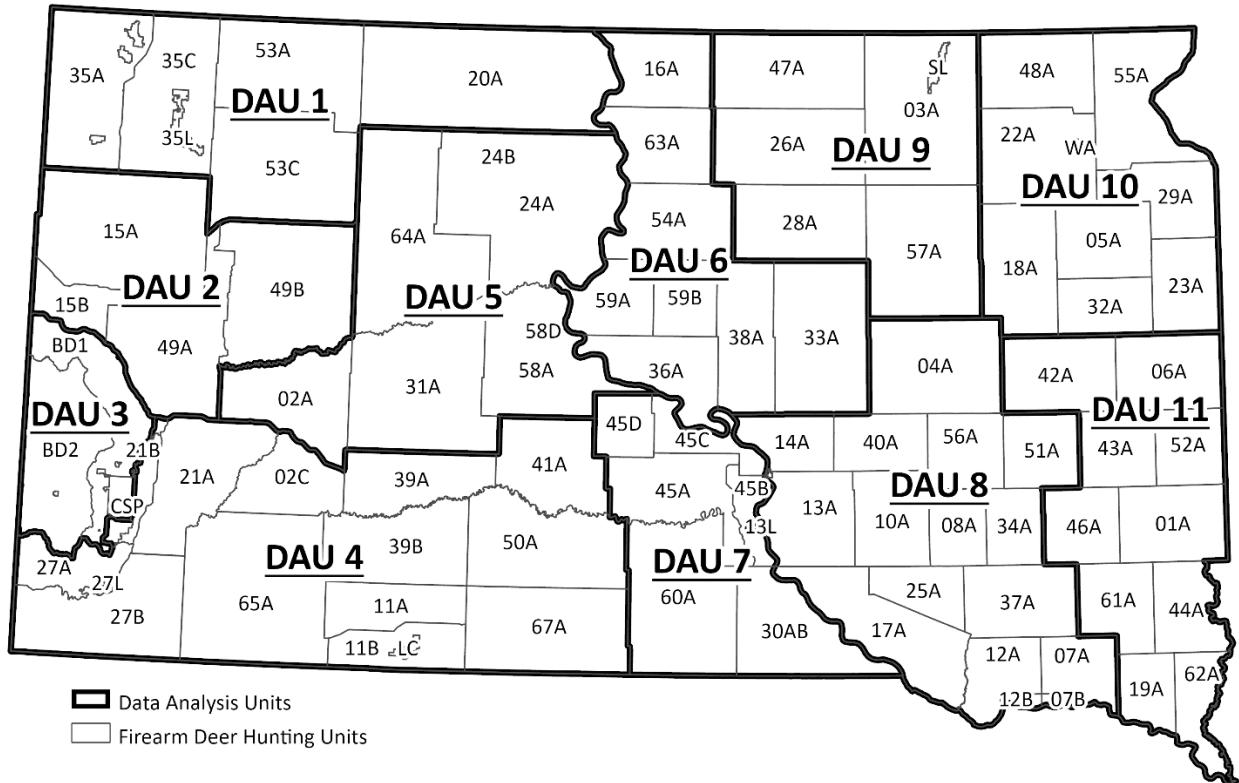


Figure 1. Ninety deer management units (thin black lines) spanning South Dakota. Deer data analysis units are indicated with thick black lines.

**APPENDIX 1. AGE-RATIOS (FAWN:ADULT DOE) BY DATA ANALYSIS UNIT FROM 2015-2020.**

Species	DAU	Year	Ratio	Mean	SD	Fawns	AF	AM	Groups
MD	1	2015	Age	0.89	0.04	NA	NA	NA	NA
MD	2	2015	Age	1.03	0.06	NA	NA	NA	NA
MD	3	2015	Age	0.71	0.07	NA	NA	NA	NA
MD	4	2015	Age	0.77	0.03	NA	NA	NA	NA
MD	5	2015	Age	0.79	0.05	NA	NA	NA	NA
MD	6	2015	Age	0.59	0.05	NA	NA	NA	NA
MD	7	2015	Age	0.68	0.05	NA	NA	NA	NA
MD	8	2015	Age	0.73	0.08	NA	NA	NA	NA
WTD	1	2015	Age	0.98	0.07	NA	NA	NA	NA
WTD	2	2015	Age	0.96	0.07	NA	NA	NA	NA
WTD	3	2015	Age	0.82	0.05	NA	NA	NA	NA
WTD	4	2015	Age	0.91	0.05	NA	NA	NA	NA
WTD	5	2015	Age	0.83	0.08	NA	NA	NA	NA
WTD	6	2015	Age	0.85	0.07	NA	NA	NA	NA
WTD	7	2015	Age	0.81	0.07	NA	NA	NA	NA
WTD	8	2015	Age	1.02	0.05	NA	NA	NA	NA
WTD	9	2015	Age	1.12	0.06	NA	NA	NA	NA
WTD	10	2015	Age	0.81	0.03	NA	NA	NA	NA
WTD	11	2015	Age	1.06	0.06	NA	NA	NA	NA
MD	1	2016	Age	0.64	0.04	352	549	238	173
MD	2	2016	Age	0.76	0.06	245	323	166	136
MD	3	2016	Age	0.55	0.11	40	73	29	37
MD	4	2016	Age	0.66	0.04	361	548	186	278
MD	5	2016	Age	0.59	0.04	279	477	177	191
MD	6	2016	Age	0.83	0.09	171	207	94	157
MD	7	2016	Age	0.57	0.08	86	151	57	99
MD	8	2016	Age	0.56	0.09	68	122	43	85
WTD	1	2016	Age	0.74	0.06	248	336	64	143
WTD	2	2016	Age	0.76	0.06	253	332	106	143
WTD	3	2016	Age	0.78	0.06	315	405	107	194
WTD	4	2016	Age	0.60	0.04	374	628	179	367
WTD	5	2016	Age	0.63	0.07	141	224	34	134
WTD	6	2016	Age	0.87	0.06	348	403	102	315
WTD	7	2016	Age	0.86	0.07	324	379	70	231
WTD	8	2016	Age	0.97	0.05	749	777	200	685
WTD	9	2016	Age	1.03	0.06	638	618	115	579
WTD	10	2016	Age	0.88	0.04	1178	1338	400	1156
WTD	11	2016	Age	0.75	0.04	523	694	183	568
MD	1	2017	Age	0.79	0.04	570	723	200	214
MD	2	2017	Age	0.77	0.05	360	469	188	154
MD	3	2017	Age	0.73	0.09	123	169	67	101

Species	DAU	Year	Ratio	Mean	SD	Fawns	AF	AM	Groups
MD	4	2017	Age	0.61	0.04	434	708	293	278
MD	5	2017	Age	0.61	0.04	440	723	262	229
MD	6	2017	Age	0.72	0.07	174	242	190	176
MD	7	2017	Age	0.50	0.06	122	244	136	166
MD	8	2017	Age	0.51	0.06	103	202	101	137
WTD	1	2017	Age	0.72	0.06	282	395	85	159
WTD	2	2017	Age	0.85	0.06	369	433	122	184
WTD	3	2017	Age	0.64	0.04	336	525	101	279
WTD	4	2017	Age	0.76	0.05	461	604	163	305
WTD	5	2017	Age	0.50	0.04	210	418	103	194
WTD	6	2017	Age	0.78	0.06	265	342	94	244
WTD	7	2017	Age	0.65	0.06	168	259	81	194
WTD	8	2017	Age	0.83	0.05	473	573	212	475
WTD	9	2017	Age	0.89	0.07	318	358	58	279
WTD	10	2017	Age	1.02	0.07	418	409	98	320
WTD	11	2017	Age	0.92	0.06	491	536	151	441
MD	1	2018	Age	0.85	0.05	580	682	252	253
MD	2	2018	Age	0.90	0.06	375	420	119	183
MD	3	2018	Age	0.64	0.07	160	249	78	117
MD	4	2018	Age	0.69	0.04	429	619	203	267
MD	5	2018	Age	0.72	0.05	414	578	262	259
MD	6	2018	Age	0.73	0.06	240	331	153	213
MD	7	2018	Age	0.58	0.05	223	386	213	249
MD	8	2018	Age	0.72	0.07	181	251	120	204
WTD	1	2018	Age	0.81	0.05	408	502	139	227
WTD	2	2018	Age	0.91	0.06	423	468	82	229
WTD	3	2018	Age	0.70	0.04	445	634	165	320
WTD	4	2018	Age	0.74	0.05	404	550	134	286
WTD	5	2018	Age	0.79	0.06	290	369	85	210
WTD	6	2018	Age	0.88	0.07	265	302	86	237
WTD	7	2018	Age	0.64	0.05	266	414	98	282
WTD	8	2018	Age	1.05	0.07	420	400	94	338
WTD	9	2018	Age	1.05	0.07	433	415	45	296
WTD	10	2018	Age	1.06	0.07	511	483	62	367
WTD	11	2018	Age	1.05	0.09	308	293	105	266
MD	1	2019	Age	0.66	0.04	413	626	255	239
MD	2	2019	Age	0.99	0.07	448	454	130	222
MD	3	2019	Age	0.59	0.07	107	181	59	102
MD	4	2019	Age	0.76	0.05	417	550	201	255
MD	5	2019	Age	0.83	0.06	413	497	214	289
MD	6	2019	Age	0.66	0.06	194	294	171	218
MD	7	2019	Age	0.81	0.11	105	130	59	120

Species	DAU	Year	Ratio	Mean	SD	Fawns	AF	AM	Groups
MD	8	2019	Age	0.58	0.07	112	195	72	110
WTD	1	2019	Age	0.78	0.05	504	644	122	221
WTD	2	2019	Age	1.01	0.06	542	540	141	253
WTD	3	2019	Age	0.58	0.04	296	515	138	277
WTD	4	2019	Age	0.93	0.06	493	529	162	342
WTD	5	2019	Age	0.85	0.06	394	467	89	251
WTD	6	2019	Age	0.76	0.06	296	390	93	297
WTD	7	2019	Age	0.96	0.07	355	371	74	243
WTD	8	2019	Age	1.02	0.07	473	463	146	433
WTD	9	2019	Age	0.98	0.07	431	441	78	321
WTD	10	2019	Age	1.05	0.07	462	442	86	352
WTD	11	2019	Age	1.07	0.07	506	474	130	416
MD	1	2020	Age	0.82	0.05	430	528	247	260
MD	2	2020	Age	0.78	0.06	343	443	190	231
MD	3	2020	Age	0.71	0.11	74	105	57	75
MD	4	2020	Age	0.73	0.05	411	566	192	278
MD	5	2020	Age	0.71	0.05	347	491	251	243
MD	6	2020	Age	0.58	0.06	158	272	135	197
MD	7	2020	Age	0.58	0.06	160	278	162	182
MD	8	2020	Age	0.47	0.06	79	168	73	120
WTD	1	2020	Age	0.86	0.06	370	432	93	243
WTD	2	2020	Age	0.69	0.04	455	664	244	241
WTD	3	2020	Age	0.61	0.05	208	341	83	229
WTD	4	2020	Age	0.78	0.05	512	659	174	380
WTD	5	2020	Age	0.70	0.05	350	501	148	257
WTD	6	2020	Age	0.64	0.05	300	472	115	266
WTD	7	2020	Age	0.61	0.05	210	348	85	220
WTD	8	2020	Age	0.90	0.06	425	474	121	393
WTD	9	2020	Age	0.98	0.07	423	434	56	309
WTD	10	2020	Age	0.94	0.06	463	495	66	339
WTD	11	2020	Age	0.96	0.05	608	635	146	414

**APPENDIX 2. SEX-RATIOS (ADULT BUCK:ADULT DOE) BY DATA ANALYSIS UNIT FROM 2015-2020.**

Species	DAU	Year	Ratio	Mean	SD	Fawns	AF	AM	Groups
MD	1	2015	Sex	0.35	0.02	NA	NA	NA	NA
MD	2	2015	Sex	0.43	0.03	NA	NA	NA	NA
MD	3	2015	Sex	0.47	0.05	NA	NA	NA	NA
MD	4	2015	Sex	0.35	0.02	NA	NA	NA	NA
MD	5	2015	Sex	0.33	0.03	NA	NA	NA	NA
MD	6	2015	Sex	0.29	0.04	NA	NA	NA	NA
MD	7	2015	Sex	0.48	0.04	NA	NA	NA	NA
MD	8	2015	Sex	0.26	0.04	NA	NA	NA	NA
WTD	1	2015	Sex	0.22	0.03	NA	NA	NA	NA
WTD	2	2015	Sex	0.25	0.03	NA	NA	NA	NA
WTD	3	2015	Sex	0.22	0.02	NA	NA	NA	NA
WTD	4	2015	Sex	0.26	0.02	NA	NA	NA	NA
WTD	5	2015	Sex	0.22	0.03	NA	NA	NA	NA
WTD	6	2015	Sex	0.29	0.03	NA	NA	NA	NA
WTD	7	2015	Sex	0.24	0.03	NA	NA	NA	NA
WTD	8	2015	Sex	0.37	0.02	NA	NA	NA	NA
WTD	9	2015	Sex	0.24	0.02	NA	NA	NA	NA
WTD	10	2015	Sex	0.32	0.02	NA	NA	NA	NA
WTD	11	2015	Sex	0.37	0.03	NA	NA	NA	NA
MD	1	2016	Sex	0.43	0.03	352	549	238	173
MD	2	2016	Sex	0.52	0.05	245	323	166	136
MD	3	2016	Sex	0.40	0.09	40	73	29	37
MD	4	2016	Sex	0.34	0.03	361	548	186	278
MD	5	2016	Sex	0.37	0.03	279	477	177	191
MD	6	2016	Sex	0.46	0.06	171	207	94	157
MD	7	2016	Sex	0.38	0.06	86	151	57	99
MD	8	2016	Sex	0.36	0.06	68	122	43	85
WTD	1	2016	Sex	0.19	0.03	248	336	64	143
WTD	2	2016	Sex	0.32	0.04	253	332	106	143
WTD	3	2016	Sex	0.26	0.03	315	405	107	194
WTD	4	2016	Sex	0.29	0.02	374	628	179	367
WTD	5	2016	Sex	0.15	0.03	141	224	34	134
WTD	6	2016	Sex	0.25	0.03	348	403	102	315
WTD	7	2016	Sex	0.19	0.02	324	379	70	231
WTD	8	2016	Sex	0.26	0.02	749	777	200	685
WTD	9	2016	Sex	0.19	0.02	638	618	115	579
WTD	10	2016	Sex	0.30	0.02	1178	1338	400	1156
WTD	11	2016	Sex	0.26	0.02	523	694	183	568
MD	1	2017	Sex	0.28	0.02	570	723	200	214
MD	2	2017	Sex	0.40	0.03	360	469	188	154

Species	DAU	Year	Ratio	Mean	SD	Fawns	AF	AM	Groups
MD	3	2017	Sex	0.40	0.06	123	169	67	101
MD	4	2017	Sex	0.41	0.03	434	708	293	278
MD	5	2017	Sex	0.36	0.03	440	723	262	229
MD	6	2017	Sex	0.79	0.08	174	242	190	176
MD	7	2017	Sex	0.56	0.06	122	244	136	166
MD	8	2017	Sex	0.50	0.06	103	202	101	137
WTD	1	2017	Sex	0.22	0.03	282	395	85	159
WTD	2	2017	Sex	0.28	0.03	369	433	122	184
WTD	3	2017	Sex	0.19	0.02	336	525	101	279
WTD	4	2017	Sex	0.27	0.02	461	604	163	305
WTD	5	2017	Sex	0.25	0.03	210	418	103	194
WTD	6	2017	Sex	0.28	0.03	265	342	94	244
WTD	7	2017	Sex	0.31	0.04	168	259	81	194
WTD	8	2017	Sex	0.37	0.03	473	573	212	475
WTD	9	2017	Sex	0.16	0.02	318	358	58	279
WTD	10	2017	Sex	0.24	0.03	418	409	98	320
WTD	11	2017	Sex	0.28	0.03	491	536	151	441
MD	1	2018	Sex	0.37	0.03	580	682	252	253
MD	2	2018	Sex	0.28	0.03	375	420	119	183
MD	3	2018	Sex	0.31	0.04	160	249	78	117
MD	4	2018	Sex	0.33	0.03	429	619	203	267
MD	5	2018	Sex	0.45	0.03	414	578	262	259
MD	6	2018	Sex	0.46	0.05	240	331	153	213
MD	7	2018	Sex	0.55	0.05	223	386	213	249
MD	8	2018	Sex	0.48	0.05	181	251	120	204
WTD	1	2018	Sex	0.28	0.03	408	502	139	227
WTD	2	2018	Sex	0.18	0.02	423	468	82	229
WTD	3	2018	Sex	0.26	0.02	445	634	165	320
WTD	4	2018	Sex	0.24	0.02	404	550	134	286
WTD	5	2018	Sex	0.23	0.03	290	369	85	210
WTD	6	2018	Sex	0.29	0.03	265	302	86	237
WTD	7	2018	Sex	0.24	0.03	266	414	98	282
WTD	8	2018	Sex	0.24	0.03	420	400	94	338
WTD	9	2018	Sex	0.11	0.02	433	415	45	296
WTD	10	2018	Sex	0.13	0.02	511	483	62	367
WTD	11	2018	Sex	0.36	0.04	308	293	105	266
MD	1	2019	Sex	0.41	0.03	413	626	255	239
MD	2	2019	Sex	0.29	0.03	448	454	130	222
MD	3	2019	Sex	0.33	0.05	107	181	59	102
MD	4	2019	Sex	0.37	0.03	417	550	201	255
MD	5	2019	Sex	0.43	0.03	413	497	214	289
MD	6	2019	Sex	0.58	0.06	194	294	171	218

Species	DAU	Year	Ratio	Mean	SD	Fawns	AF	AM	Groups
MD	7	2019	Sex	0.46	0.07	105	130	59	120
MD	8	2019	Sex	0.37	0.05	112	195	72	110
WTD	1	2019	Sex	0.19	0.02	504	644	122	221
WTD	2	2019	Sex	0.26	0.02	542	540	141	253
WTD	3	2019	Sex	0.27	0.03	296	515	138	277
WTD	4	2019	Sex	0.31	0.03	493	529	162	342
WTD	5	2019	Sex	0.19	0.02	394	467	89	251
WTD	6	2019	Sex	0.24	0.03	296	390	93	297
WTD	7	2019	Sex	0.20	0.03	355	371	74	243
WTD	8	2019	Sex	0.32	0.03	473	463	146	433
WTD	9	2019	Sex	0.18	0.02	431	441	78	321
WTD	10	2019	Sex	0.19	0.02	462	442	86	352
WTD	11	2019	Sex	0.27	0.03	506	474	130	416
MD	1	2020	Sex	0.47	0.04	430	528	247	260
MD	2	2020	Sex	0.43	0.04	343	443	190	231
MD	3	2020	Sex	0.55	0.09	74	105	57	75
MD	4	2020	Sex	0.34	0.03	411	566	192	278
MD	5	2020	Sex	0.51	0.04	347	491	251	243
MD	6	2020	Sex	0.50	0.05	158	272	135	197
MD	7	2020	Sex	0.59	0.06	160	278	162	182
MD	8	2020	Sex	0.44	0.06	79	168	73	120
WTD	1	2020	Sex	0.22	0.02	370	432	93	243
WTD	2	2020	Sex	0.37	0.03	455	664	244	241
WTD	3	2020	Sex	0.24	0.03	208	341	83	229
WTD	4	2020	Sex	0.26	0.02	512	659	174	380
WTD	5	2020	Sex	0.30	0.03	350	501	148	257
WTD	6	2020	Sex	0.24	0.03	300	472	115	266
WTD	7	2020	Sex	0.24	0.03	210	348	85	220
WTD	8	2020	Sex	0.26	0.03	425	474	121	393
WTD	9	2020	Sex	0.13	0.02	423	434	56	309
WTD	10	2020	Sex	0.13	0.02	463	495	66	339
WTD	11	2020	Sex	0.23	0.02	608	635	146	414

## ESTIMATING DEER SURVIVAL AND CAUSE-SPECIFIC MORTALITY RATES

### INTRODUCTION

Population management objectives were established across 90 white-tailed deer (*Odocoileus virginianus*) and mule deer (*Odocoileus hemionus*) harvest management units in South Dakota (Figure 1). The South Dakota Game, Fish and Parks (SDGFP) Commission promulgates rules on a biennial schedule to determine deer hunting license allocation and season structure recommendations, and these were used as the primary management option to meet population objective goals. Annual survival and cause-specific mortality estimates provide valuable sources of information about the deer population. Specifically, annual survival rates were used to reconstruct and project future deer populations. In addition, intermittent monitoring of adult female or fawn survival rates can alert managers when survival substantially deviates from normal ranges (e.g., severe winter resulting in significant starvation) and provide a means for proactive management to mitigate erratic changes in deer abundance (SDGFP 2017).

### METHODS

Adult males, adult females and young-of-the-year deer were typically captured via helicopter net gunning during the winter, but netted-cage traps were also used in some areas. Neonatal deer were captured using opportunistic ground searches when fawns were typically <1 week old. Captured animals were traditionally monitored with very high frequency (VHF) radiocollars, and since 2020, all deer were fitted with global positioning system (GPS) collars to provide additional data on movements and habitat use, and reduce staff time required to monitor deer.

Monitoring alive or dead status for winter captured deer occurred within 14 days post-capture and all mortalities (<14 days post capture) were labeled as capture-related mortalities. Neonatal deer were monitored daily or weekly during their first summer. Monitoring for all VHF collared deer then occurred one time each month. GPS collared deer were continuously monitored for movement and multiple locations were estimated each day. All mortalities were investigated to verify death of the animal via physical evidence. In most cases, cause-specific mortality was not identifiable except for vehicle collisions and hunter harvest. Hunter harvest was an important metric used in population modeling and collar reporting by hunters was a vital step in obtaining the most accurate data possible.

As of March 2021, there were 283 mule deer and 346 white-tailed deer being monitored approximately once monthly in South Dakota to assess annual survival rates and cause-specific mortality.

## Model Structure

Annual survival rates were calculated from time-to-event known fate data using either: Kaplan-Meier non-parametric estimator (KM; Kaplan and Meier 1958); interval logistic regression (LOG; White and Burnham 1999); hierarchical multinomial model (HM; Murray and Patterson 2006); or hierarchical hazard-based model (HH; Walsh et al. 2018). Cause-specific mortality was estimated using hierarchical piecewise constant hazard ( $\Lambda$ ) models, smoothed among monthly intervals, and partitioned into cause-specific mortality rates using the multinomial distribution (Walsh et al. 2018).

The likelihood for the cause-specific mortality model was the joint probability that a subject ( $i$ ) was alive through interval  $u - 1$ , died during interval  $u$ , and the cause of death was assigned to the  $k^{\text{th}}$  source of mortality:

$$Pr(t < T_i < t + \Delta, K = k | T_i > t) = \psi_{i,k,u} = \exp(-\sum_{u=1}^{u-1} \Lambda_{i,u}) \times [1 - \exp(\Lambda_{i,u})] \times \pi_{i,u,k},$$

where

$$\pi_{u,k} = \left[ \frac{\exp(\eta_{u,k})}{\sum_{k=1}^K \exp(\eta_{u,k})} \right],$$

and:  $\ln(\Lambda_u) = \gamma_u + \beta_{j,u}x_{i,j,u}$ , where  $\gamma_u$  represents the baseline log cumulative hazard for the  $u^{\text{th}}$  interval,  $x_{i,j,u}$  = the  $j^{\text{th}}$  covariate for the  $i^{\text{th}}$  subject during the  $u^{\text{th}}$  interval, and  $\beta_{j,u}$  = is the effect of the  $j^{\text{th}}$  covariate during the  $u^{\text{th}}$  interval and is the log hazard ratio.

Log cumulative hazards and multinomial probabilities were smoothed among monthly intervals. An example of the regularization structure for the intercept of the log cumulative hazard,  $\gamma_{0,u}$ , was:  $\gamma_{0,u} \sim N(\gamma_0, \sigma^2)$  where  $\gamma_0 \sim N(0, 100^2)$  and  $\sigma \sim Uniform(0, 10)$ .

Markov Chain Monte Carlo iterations were used to fit models in Program R and estimate cause-specific mortality rates with associated standard errors and 95% credible intervals (Plummer 2003, R Development Core Team 2016, Su and Yajima 2015).

## RESULTS

Historic annual or summer survival estimates for white-tailed and mule deer are included in Appendix 1 (1998-2016) and Appendix 2 (2017-2020).

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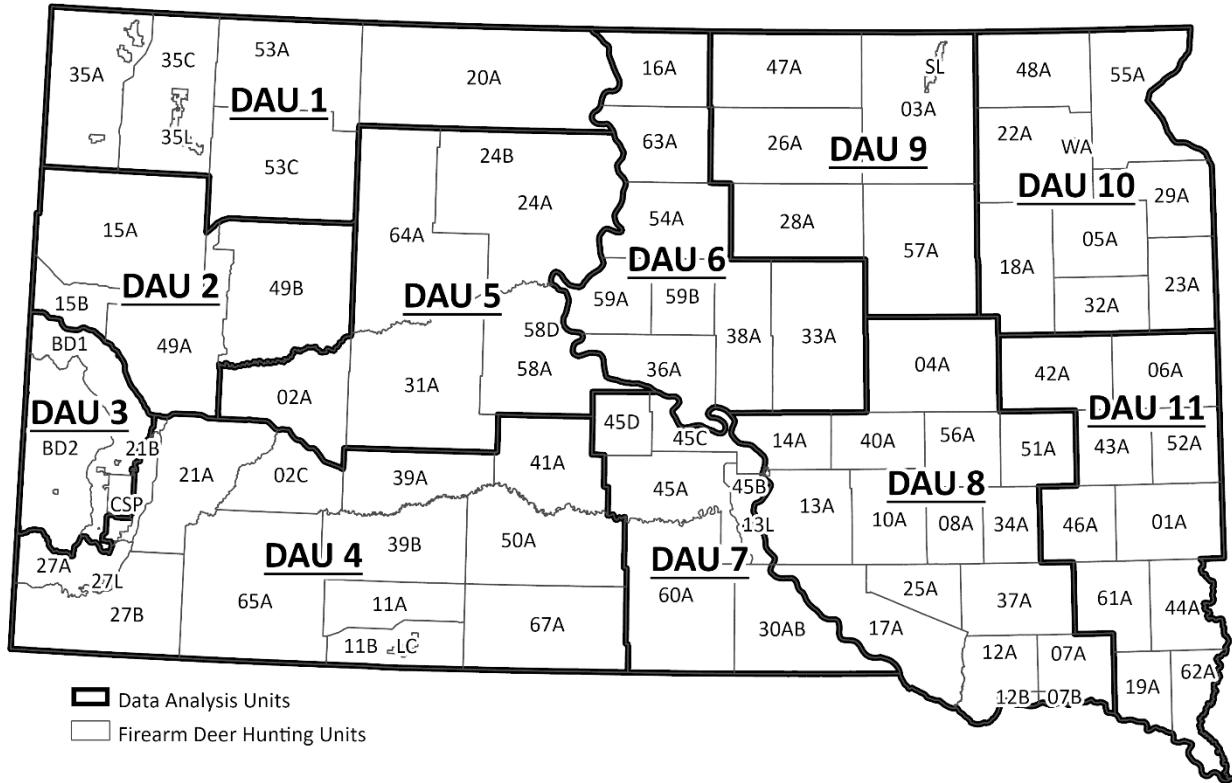


Figure 1. Ninety deer management units (thin black lines) spanning South Dakota. Deer data analysis units are indicated with thick black lines.

APPENDIX 1. HISTORIC SURVIVAL ESTIMATES FROM 1998-2016 USING KAPLAN-MEIER OR LOGISTIC REGRESSION SURVIVAL MODELS.

Species	Year	DAU	Age	Sex	Time	Survival	CI_95	SE	n
md	1998	7	A	F	annual	0.84	NA	0.04	12
md	1999	7	A	F	annual	0.9	NA	0.04	11
md	2000	3	A	F	annual	0.71	NA	0.12	14
md	2001	3	A	F	annual	0.76	NA	0.11	17
md	2002	3	A	F	annual	0.62	NA	0.13	13
md	2010	2	A	F	annual	0.78	(59-90)	NA	39
md	2010	7	A	F	annual	0.76	(56-88)	NA	48
md	2011	2	A	F	annual	0.71	(57-83)	NA	44
md	2011	7	A	F	annual	0.66	(52-78)	NA	53
md	2012	2	A	F	annual	0.82	(70-91)	NA	54
md	2012	7	A	F	annual	0.8	(67-89)	NA	38
md	2013	2	A	F	annual	0.83	(71-91)	NA	47
md	2013	2	Y	both	summer	0.54	(37-70)	NA	33
md	2013	7	A	F	annual	0.66	(49-80)	NA	32
md	2013	7	Y	both	summer	0.66	(52-78)	NA	48
md	2014	2	A	F	annual	0.83	(70-92)	NA	41
md	2014	2	J	both	annual	0.82	(62-93)	NA	19
md	2014	2	Y	both	summer	0.51	(36-66)	NA	41
md	2014	7	A	F	annual	0.66	(46-82)	NA	23
md	2014	7	J	both	annual	0.55	(36-73)	NA	32
md	2014	7	Y	both	summer	0.46	(32-60)	NA	47
md	2015	2	A	F	annual	0.92	(83-97)	NA	39
md	2015	2	J	both	annual	0.75	(56-89)	NA	21
md	2015	3	A	F	annual	0.72	(51-87)	NA	40
md	2015	3	Y	both	summer	0.59	(43-73)	NA	49
md	2015	4	A	F	annual	0.85	(70-94)	NA	50
md	2015	4	Y	both	summer	0.63	(49-75)	NA	51
md	2015	6	A	F	annual	0.85	(70-94)	NA	49
md	2015	6	Y	both	summer	0.46	(32-61)	NA	48
md	2015	7	J	both	annual	0.76	(56-90)	NA	22
md	2016	2	A	F	annual	0.86	(73-94)	NA	40
md	2016	3	A	F	annual	0.8	(76-87)	NA	108
md	2016	3	J	both	annual	0.56	(41-70)	NA	61
md	2016	3	Y	both	summer	0.6	(47-73)	NA	55
md	2016	4	A	F	annual	0.88	(80-94)	NA	105
md	2016	4	J	both	annual	0.89	(79-96)	NA	61
md	2016	4	Y	both	summer	0.55	(42-68)	NA	57
md	2016	6	A	F	annual	0.86	(77-92)	NA	115
md	2016	6	J	both	annual	0.86	(73-94)	NA	51
md	2016	6	Y	both	summer	0.66	(53-77)	NA	59

Species	Year	DAU	Age	Sex	Time	Survival	CI_95	SE	n
wtd	1994	3	A	F	annual	0.63	NA	NA	41
wtd	1995	3	A	F	annual	0.67	NA	NA	42
wtd	1996	3	A	F	annual	0.59	NA	NA	42
wtd	1997	3	A	F	annual	0.54	NA	NA	35
wtd	1999	3	A	F	annual	0.67	NA	0.12	12
wtd	1999	7	A	F	annual	1	NA	NA	14
wtd	2000	3	A	F	annual	0.58	NA	0.07	36
wtd	2000	7	A	F	annual	0.95	NA	0.04	17
wtd	2001	3	A	F	annual	0.69	NA	0.17	27
wtd	2002	3	A	F	annual	0.54	NA	0.09	37
wtd	2003	3	A	F	annual	0.8	NA	0.09	20
wtd	2004	3	A	F	annual	0.88	NA	0.08	16
wtd	2004	11	A	F	annual	0.94	NA	0.06	18
wtd	2005	10	A	F	annual	0.53	NA	0.12	17
wtd	2005	11	A	F	annual	0.67	NA	0.1	19
wtd	2006	9	A	F	annual	0.84	NA	0.08	22
wtd	2007	9	A	F	annual	0.65	NA	0.08	40
wtd	2010	8	A	F	annual	0.61	(44-76)	NA	41
wtd	2010	10	A	F	annual	0.76	(62-87)	NA	44
wtd	2011	8	A	F	annual	0.71	(54-84)	NA	30
wtd	2011	10	A	F	annual	0.57	(41-71)	NA	36
wtd	2012	8	A	F	annual	0.53	(28-75)	NA	23
wtd	2012	10	A	F	annual	0.74	(60-86)	NA	43
wtd	2013	10	A	F	annual	0.67	(54-78)	NA	65
wtd	2013	10	Y	both	summer	0.6	(45-74)	NA	47
wtd	2013	11	Y	both	summer	0.54	(38-69)	NA	38
wtd	2014	1	Y	both	summer	0.63	(47-78)	NA	35
wtd	2014	7	Y	both	summer	0.47	(32-63)	NA	39
wtd	2014	10	A	F	annual	0.74	(61-84)	NA	52
wtd	2014	10	J	both	annual	0.63	(36-84)	NA	23
wtd	2014	10	Y	both	summer	0.56	(42-69)	NA	54
wtd	2014	11	A	F	annual	0.78	(58-90)	NA	46
wtd	2014	11	J	both	annual	0.4	(17-64)	NA	21
wtd	2014	11	Y	both	summer	0.58	(43-71)	NA	47
wtd	2015	1	J	both	annual	0.67	(47-84)	NA	21
wtd	2015	1	Y	both	summer	0.82	(67-92)	NA	34
wtd	2015	3	Y	both	summer	0.63	(49-76)	NA	53
wtd	2015	7	Y	both	summer	0.58	(44-72)	NA	48
wtd	2015	9	Y	both	summer	0.65	(51-77)	NA	57
wtd	2015	10	A	F	annual	0.86	(73-94)	NA	36
wtd	2015	10	J	both	annual	0.63	(38-84)	NA	23
wtd	2015	11	A	F	annual	0.8	(68-89)	NA	50

Species	Year	DAU	Age	Sex	Time	Survival	CI_95	SE	n
wtd	2015	11	J	both	annual	0.57	(33-78)	NA	28
wtd	2015	11	Y	both	summer	0.73	(60-84)	NA	52
wtd	2016	1	A	F	annual	0.83	(71-91)	NA	48
wtd	2016	1	J	both	annual	0.83	(65-94)	NA	27
wtd	2016	3	A	F	annual	0.82	(74-89)	NA	113
wtd	2016	3	A	M	annual	0.63	(45-78)	NA	39
wtd	2016	3	J	both	annual	0.69	(55-82)	NA	54
wtd	2016	3	Y	both	summer	0.76	(64-86)	NA	56
wtd	2016	7	J	both	annual	0.83	(65-94)	NA	26
wtd	2016	9	A	F	annual	0.84	(76-91)	NA	109
wtd	2016	9	A	M	annual	0.57	(43-69)	NA	69
wtd	2016	9	J	both	annual	0.82	(70-91)	NA	63
wtd	2016	9	Y	both	summer	0.68	(54-80)	NA	55
wtd	2016	10	A	F	annual	0.77	(59-90)	NA	23
wtd	2016	11	A	F	annual	0.68	(53-79)	NA	117
wtd	2016	11	J	both	annual	0.6	(45-74)	NA	64
wtd	2016	11	Y	both	summer	0.6	(50-68)	NA	65

APPENDIX 2. HISTORIC SURVIVAL ESTIMATES FROM 2017-2020 USING KAPLAN-MEIER SURVIVAL MODELS.

Species	Year	DAU	Age	Sex	Dates	Survival	SD	n	harv	other
md	2017	3	A	Fem	9.2016_8.2017	0.83	0.05	104	4	14
md	2017	3	J	Fem_Mal	9.2016_8.2017	0.46	0.15	74	0	29
md	2017	4	A	Fem	9.2016_8.2017	0.83	0.04	121	4	16
md	2017	4	J	Fem_Mal	9.2016_8.2017	0.79	0.07	78	1	11
md	2017	6	A	Fem	9.2016_8.2017	0.80	0.05	123	5	18
md	2017	6	J	Fem_Mal	9.2016_8.2017	0.75	0.07	87	1	16
md	2018	3	A	Fem	9.2017_8.2018	0.81	0.05	101	2	16
md	2018	3	J	Fem_Mal	9.2017_8.2018	0.37	0.18	60	0	34
md	2018	4	A	Fem	9.2017_8.2018	0.92	0.03	125	0	9
md	2018	4	J	Fem_Mal	9.2017_8.2018	0.56	0.10	132	0	47
md	2018	6	A	Fem	9.2017_8.2018	0.93	0.03	118	3	5
md	2018	6	J	Fem_Mal	9.2017_8.2018	0.87	0.05	131	1	12
md	2019	1	A	Fem	1.2019_8.2019	0.91	0.03	102	0	9
md	2019	3	A	Fem	9.2018_8.2019	0.81	0.06	79	2	12
md	2019	3	J	Fem_Mal	9.2016_8.2019	0.41	0.10	172	0	84
md	2019	4	A	Fem	9.2018_8.2019	0.87	0.04	141	1	15
md	2019	6	A	Fem	9.2018_8.2019	0.83	0.04	155	4	21
md	2020	1	A	Fem	9.2019_8.2020	0.83	0.05	113	2	15
md	2020	1	J	Fem_Mal	1.2020_8.2020	0.59	0.09	92	0	38
md	2020	3	A	Fem	9.2016_8.2020	0.82	0.04	131	8	55
md	2020	3	A	Fem	9.2019_8.2020	0.77	0.07	61	0	13
md	2020	4	A	Fem	9.2019_8.2020	0.84	0.05	95	1	13
md	2020	6	A	Fem	9.2019_8.2020	0.82	0.05	114	0	19
wtd	2017	3	A	Fem	9.2016_8.2017	0.81	0.05	108	2	18
wtd	2017	3	A	Mal	9.2016_8.2017	0.70	0.10	81	4	9
wtd	2017	3	J	Fem_Mal	9.2016_8.2017	0.46	0.14	78	0	34
wtd	2017	8	A	Fem	1.2017_8.2017	0.94	0.03	102	0	6
wtd	2017	8	J	Fem_Mal	1.2017_8.2017	0.89	0.05	51	0	5
wtd	2017	9	A	Fem	9.2016_8.2017	0.89	0.03	115	4	8
wtd	2017	9	A	Mal	9.2016_8.2017	0.44	0.17	91	14	13
wtd	2017	9	J	Fem_Mal	9.2016_8.2017	0.70	0.13	74	2	8
wtd	2017	11	A	Fem	9.2016_8.2017	0.83	0.05	94	6	9
wtd	2017	11	J	Fem_Mal	9.2016_8.2017	0.78	0.08	83	1	9
wtd	2018	3	A	Fem	9.2017_8.2018	0.82	0.05	98	3	14
wtd	2018	3	A	Mal	9.2017_8.2018	0.57	0.10	104	13	20
wtd	2018	3	J	Fem_Mal	9.2017_8.2018	0.55	0.13	59	3	22
wtd	2018	8	A	Fem	9.2017_8.2018	0.85	0.04	117	7	10
wtd	2018	8	J	Fem_Mal	1.2018_8.2018	0.86	0.04	96	0	13
wtd	2018	9	A	Fem	9.2017_8.2018	0.84	0.04	124	3	15
wtd	2018	9	A	Mal	9.2017_8.2018	0.50	0.18	94	5	13

Species	Year	DAU	Age	Sex	Dates	Survival	SD	n	harv	other
wtd	2018	9	J	Fem_Mal	9.2017_8.2018	0.68	0.10	131	2	18
wtd	2018	10	A	Fem	1.2018_8.2018	0.92	0.03	102	0	8
wtd	2018	10	J	Fem_Mal	1.2018_8.2018	0.86	0.04	88	0	12
wtd	2018	11	A	Fem	9.2017_8.2018	0.86	0.05	92	2	9
wtd	2018	11	J	Fem_Mal	9.2017_8.2018	0.72	0.10	132	2	15
wtd	2019	1	A	Fem	1.2019_8.2019	0.88	0.04	100	0	12
wtd	2019	3	A	Fem	9.2018_8.2019	0.70	0.08	83	2	18
wtd	2019	3	A	Mal	9.2018_8.2019	0.67	0.10	73	12	6
wtd	2019	3	J	Fem_Mal	9.2016_8.2019	0.53	0.07	201	5	75
wtd	2019	3	J	Fem_Mal	9.2018_8.2019	0.62	0.11	65	2	19
wtd	2019	8	A	Fem	9.2018_8.2019	0.85	0.04	140	3	17
wtd	2019	8	J	Fem_Mal	1.2019_8.2019	0.88	0.04	92	0	11
wtd	2019	9	A	Fem	9.2018_8.2019	0.78	0.05	130	9	17
wtd	2019	9	A	Mal	9.2018_8.2019	0.52	0.14	77	10	15
wtd	2019	10	A	Fem	9.2018_8.2019	0.80	0.04	134	8	19
wtd	2019	10	J	Fem_Mal	1.2019_8.2019	0.72	0.07	81	0	22
wtd	2019	11	A	Fem	9.2018_8.2019	0.83	0.05	107	9	8
wtd	2020	1	A	Fem	9.2019_8.2020	0.95	0.02	102	0	5
wtd	2020	1	J	Fem_Mal	1.2020_8.2020	0.87	0.04	105	0	14
wtd	2020	3	A	Fem	9.2016_8.2020	0.82	0.04	150	9	59
wtd	2020	3	A	Fem	9.2019_8.2020	0.75	0.09	53	2	9
wtd	2020	3	A	Mal	9.2016_8.2020	0.71	0.07	162	35	39
wtd	2020	3	A	Mal	9.2019_8.2020	0.74	0.10	46	6	4
wtd	2020	8	A	Fem	9.2019_8.2020	0.73	0.05	148	7	28
wtd	2020	9	A	Fem	9.2019_8.2020	0.85	0.06	76	2	7
wtd	2020	9	A	Mal	9.2016_8.2020	0.53	0.11	177	31	45
wtd	2020	10	A	Fem	9.2019_8.2020	0.85	0.04	132	2	16
wtd	2020	11	A	Fem	9.2019_8.2020	0.85	0.05	71	1	8

# ESTIMATING DEER HARVEST

## INTRODUCTION

Population management objectives were established across 90 geographically discrete mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*) harvest management units in South Dakota (Figure 1). These units span 5 management zones, East River, West River, National Wildlife Refuge, Black Hills, and Custer State Park. The South Dakota Game, Fish and Parks (SDGFP) Commission promulgates rules on a biennial schedule to determine deer hunting license allocation and season structure recommendations, and these were used as the primary management option to meet population objective goals. Estimates of the deer population and harvest were used to inform management recommendations across management units. Additionally, the population projection model used to predict future population growth is based on expected changes to adult and juvenile cohorts for both sexes from harvest removal across various hunting seasons (SDGFP 2017).

## METHODS

Adult doe, adult buck, doe fawn, and buck fawn mule and white-tailed deer harvest was estimated by annually sampling deer hunters and estimating harvest based on reporting rates by season and hunting unit. Each deer hunting season had different license types available which determined the available tag distribution. License types (Table 1) defined the type and number of deer tags available for respective licenses.

Table 1. South Dakota deer license types.

Current License Type	License Description
01	"any deer"
03	"any antlerless deer"
06	"any deer" and 2 "any antlerless deer"
07	3 "any antlerless deer"
08	"any deer" and "any antlerless deer"
09	"any antlerless deer" and "any antlerless deer"
11	"any whitetail"
13	"antlerless whitetail"
16	"any whitetail" and 2 "antlerless whitetail"
17	3 "antlerless whitetail"
18	"any whitetail" and "antlerless whitetail"
19	"antlerless whitetail" and "antlerless whitetail"

All deer license holders were surveyed. Estimation took place at the hunting unit level. For example, surveys were administered at the statewide unit level for statewide seasons such as archery and muzzleloader, whereas surveys were administered at the hunting unit level for firearm seasons. Surveys were administered using internet surveys with follow-up mail card reminders to non-respondents in order to obtain the number of hunting recreation days, species, gender and age (adult/fawn) of deer harvested, type of land hunted, geographic location of harvest, and hunter satisfaction. Beginning in 2020, although mail card reminders were sent out, all hunters were required to electronically respond.

Total harvest was estimated by dividing the reported harvest by the proportions of hunters that responded for each unit and respondents were assumed to be representative of the population of hunters in each unit. For statewide or regional unit seasons (archery, apprentice and mentored deer, special buck, muzzleloader), hunters were asked to list the firearm management unit (Figure 1) where each deer was harvested. As a result, for these seasons, harvest was estimated at the statewide or regional level and then proportionally allocated to hunting unit. The response rate goal has been established as 60%.

## RESULTS

Statewide white-tailed deer harvest was estimated at 51,637 in 2020, which was up from 2019. Statewide mule deer harvest was estimated at 7,436 in 2020, also up from 2019. Four-year average harvest by species, age, sex, season and unit is included in figures 2-23. Firearm license sales and harvest from 2020 is included in Appendix 1 and individual seasons harvest estimates by unit from 2020 are included in Appendix 2. Figures specifying youth include both apprentice and mentored deer hunting seasons. Additional harvest survey reports can be found online <https://gfp.sd.gov/hunt-surveys/> and are annually published (e.g., Huxoll 2019).

## LITERATURE CITED

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- South Dakota Department of Game, Fish and Parks. 2017. South Dakota White-tailed Deer and Mule Deer Management Plan 2017-2023. Completion Report 2017-02. South Dakota Department of Game, Fish and Parks, Pierre, SD, USA.

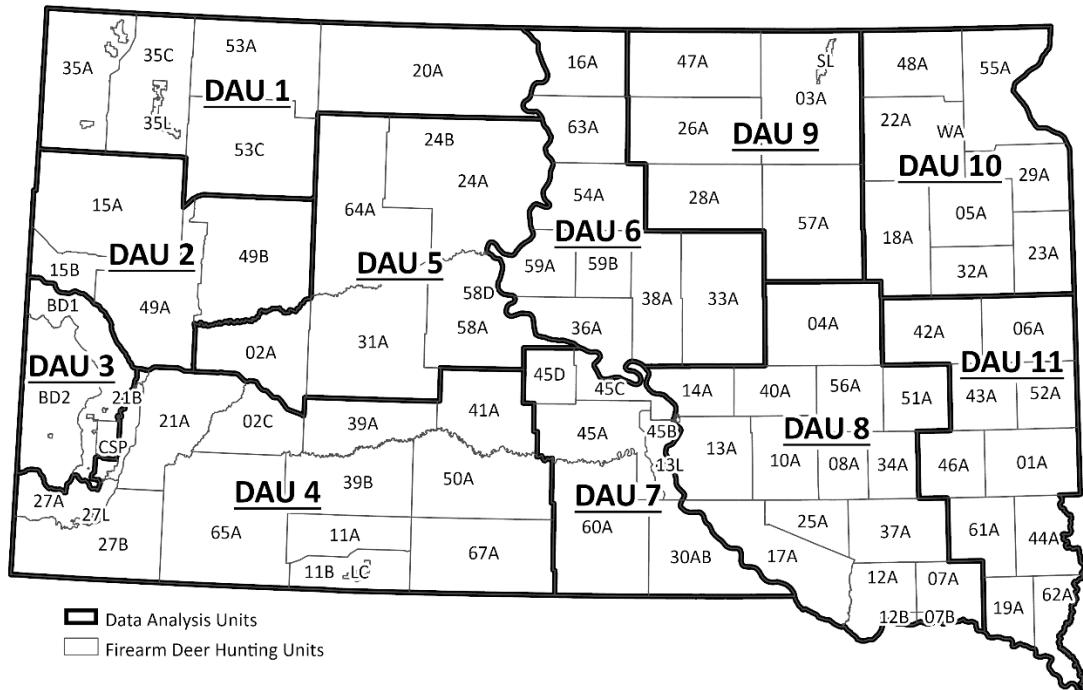


Figure 1. Ninety deer management units (thin black lines) spanning South Dakota. Deer data analysis units are indicated with thick black lines.

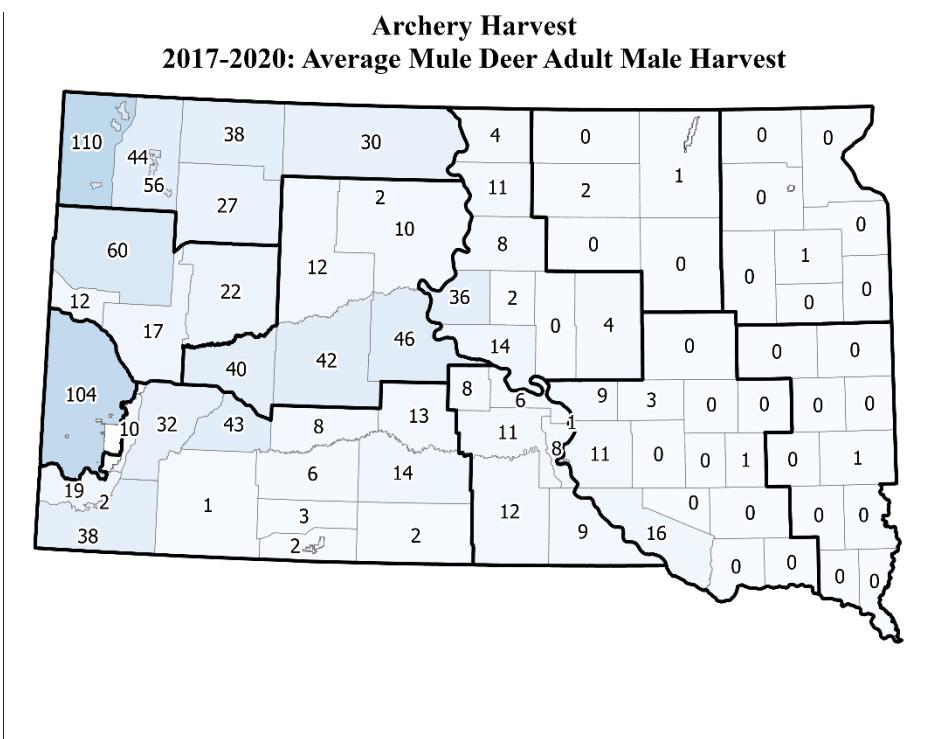


Figure 2. Adult male mule deer 2017-2020 average harvest by unit during the archery season.

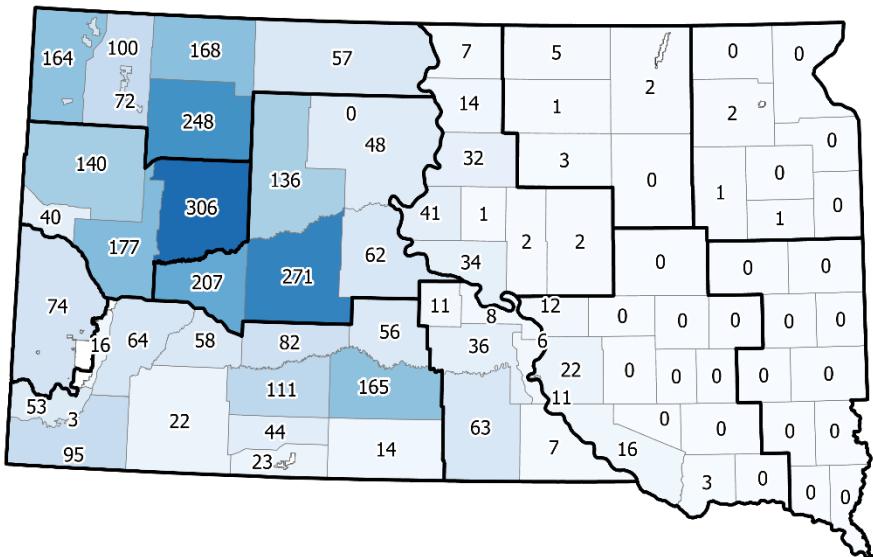


Figure 3. Adult male mule deer 2017-2020 average harvest by unit during the firearm season.

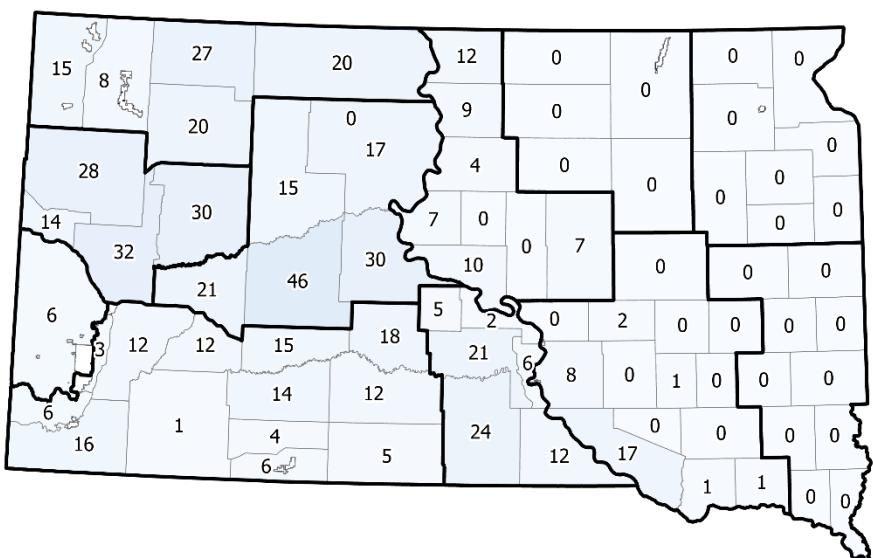


Figure 4. Adult male mule deer 2017-2020 average harvest by unit during the landowner season.

**Muzzleloader Harvest**  
**2017-2020: Average Mule Deer Adult Male Harvest**

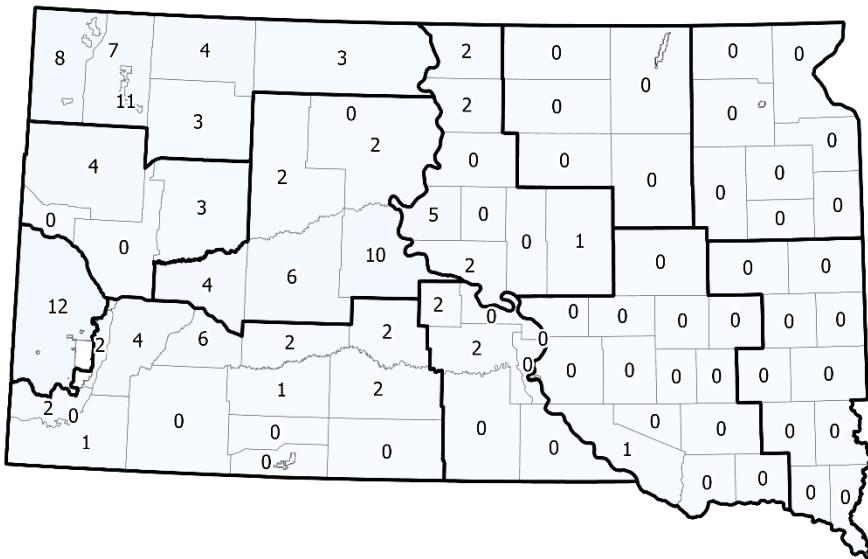


Figure 5. Adult male mule deer 2017-2020 average harvest by unit during the muzzleloader season.

**Special Buck Harvest**  
**2017-2020: Average Mule Deer Adult Male Harvest**

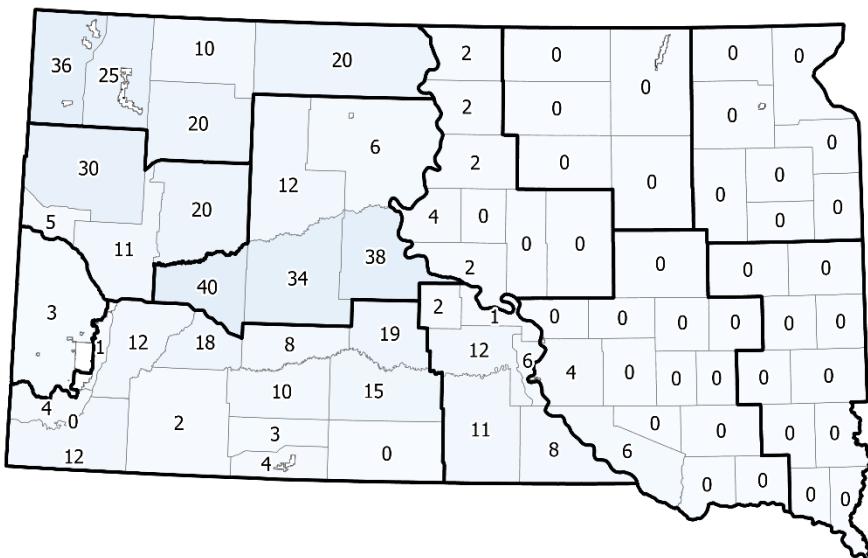


Figure 6. Adult male mule deer 2017-2020 average harvest by unit during the special buck season.

**Archery Harvest**  
**2017-2020: Average Mule Deer Female Harvest**

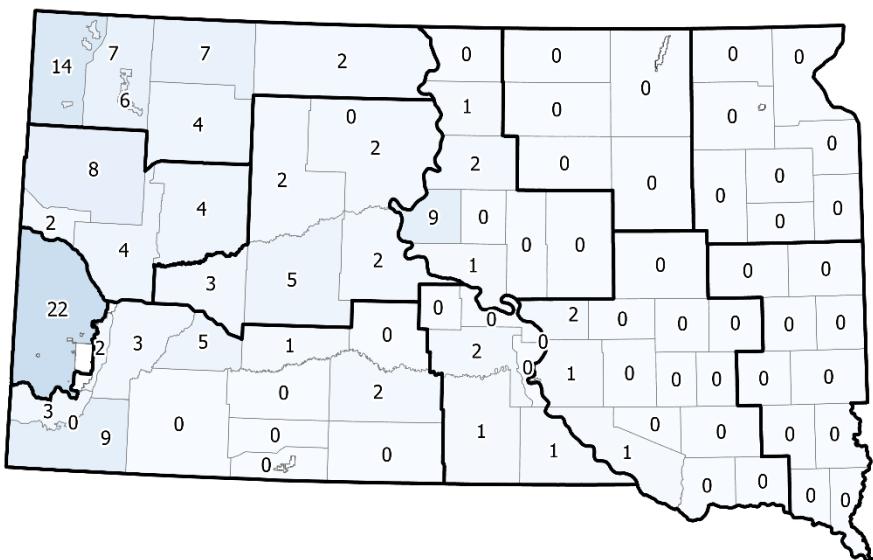


Figure 7. Female mule deer 2017-2020 average harvest by unit during the archery season.

**Firearm Harvest**  
**2017-2020: Average Mule Deer Female Harvest**

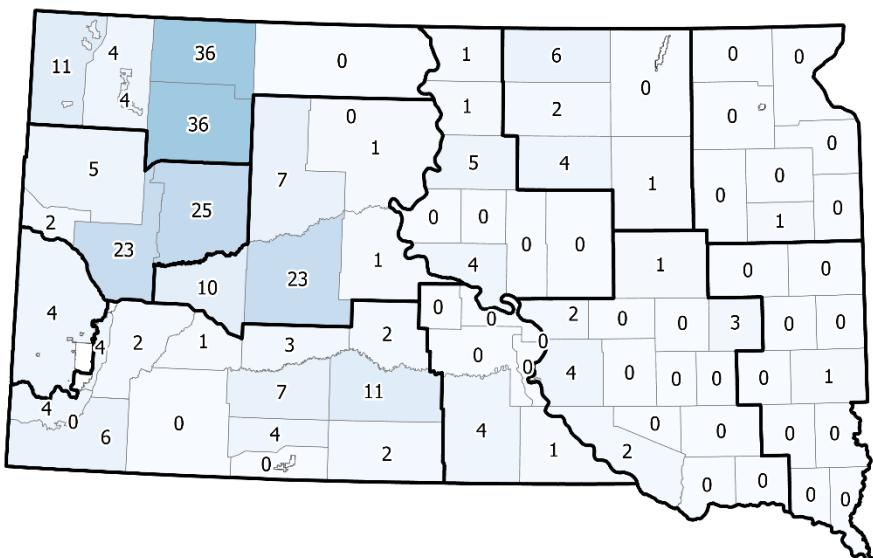


Figure 8. Female mule deer 2017-2020 average harvest by unit during the firearm season.

**Landowner Harvest**  
**2017-2020: Average Mule Deer Female Harvest**

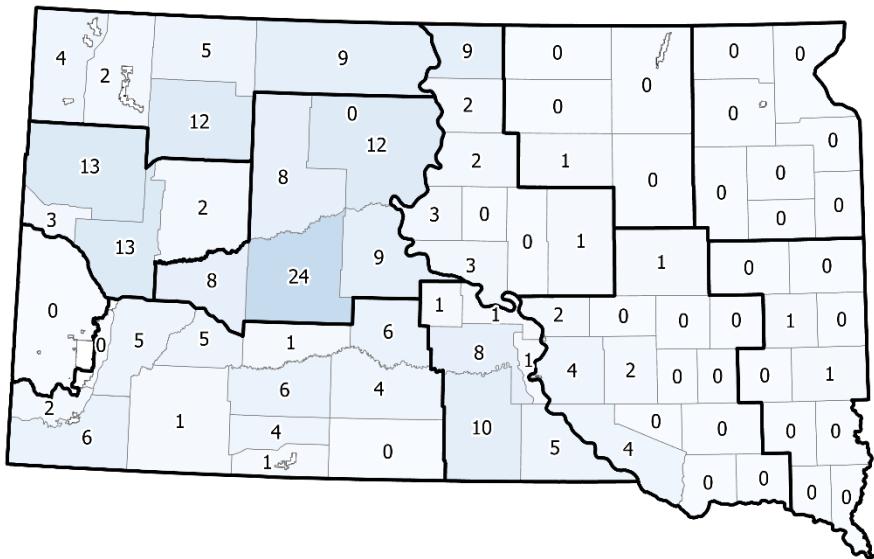


Figure 9. Female mule deer 2017-2020 average harvest by unit during the landowner season.

**Muzzleloader Harvest**  
**2017-2020: Average Mule Deer Female Harvest**

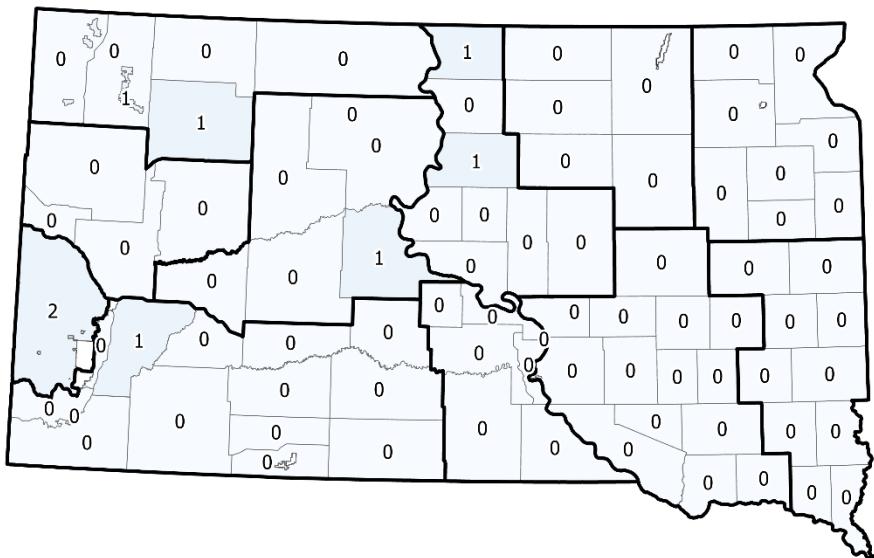
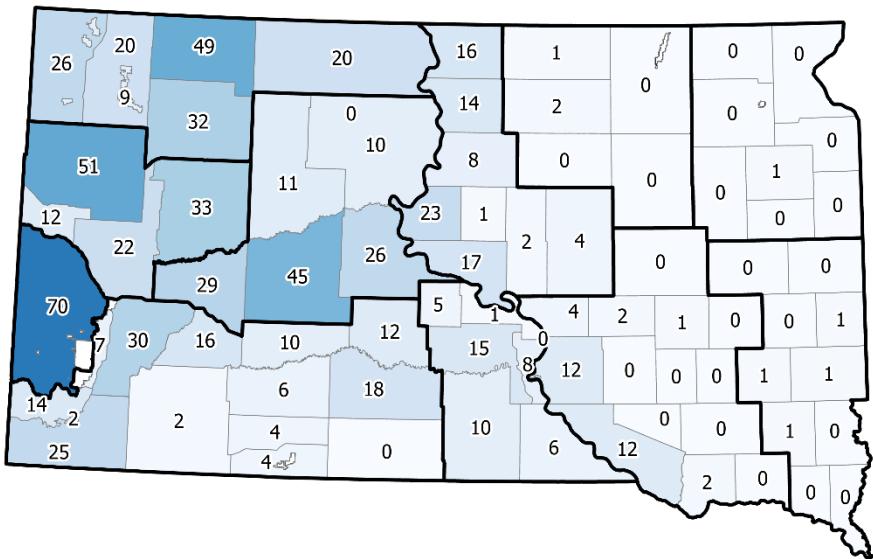


Figure 10. Female mule deer 2017-2020 average harvest by unit during the muzzleloader season.

**Youth Harvest**  
**2017-2020: Average Mule Deer Female Harvest**



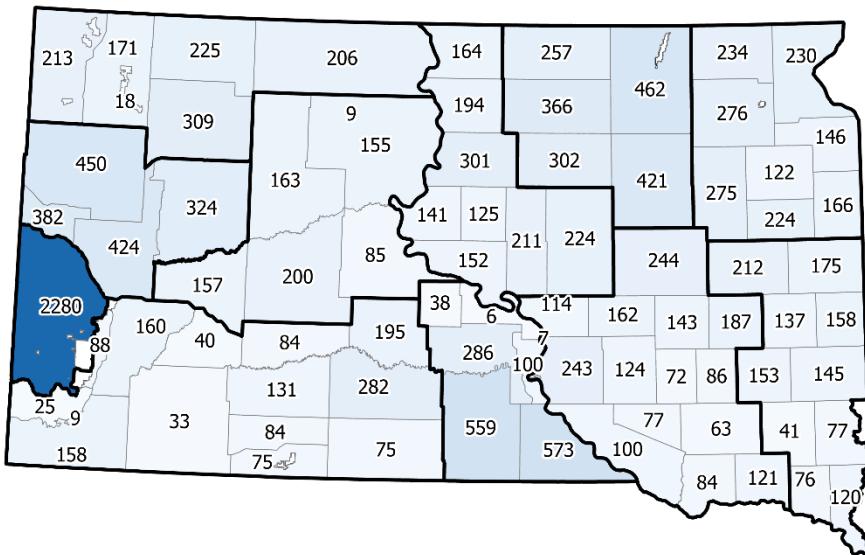


Figure 13. Adult male white-tailed deer 2017-2020 average harvest by unit during the firearm season.

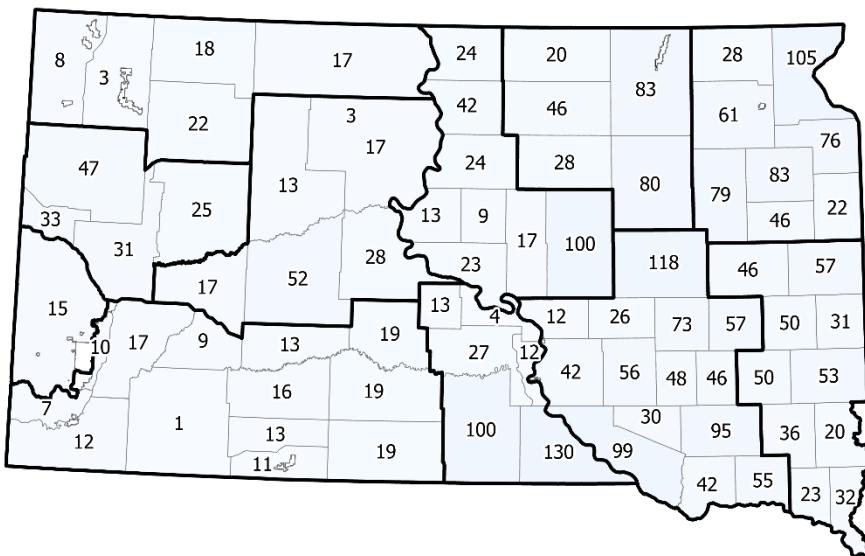


Figure 14. Adult male white-tailed deer 2017-2020 average harvest by unit during the landowner season.

**Muzzleloader Harvest**  
**2017-2020: Average Whitetail Adult Male Harvest**

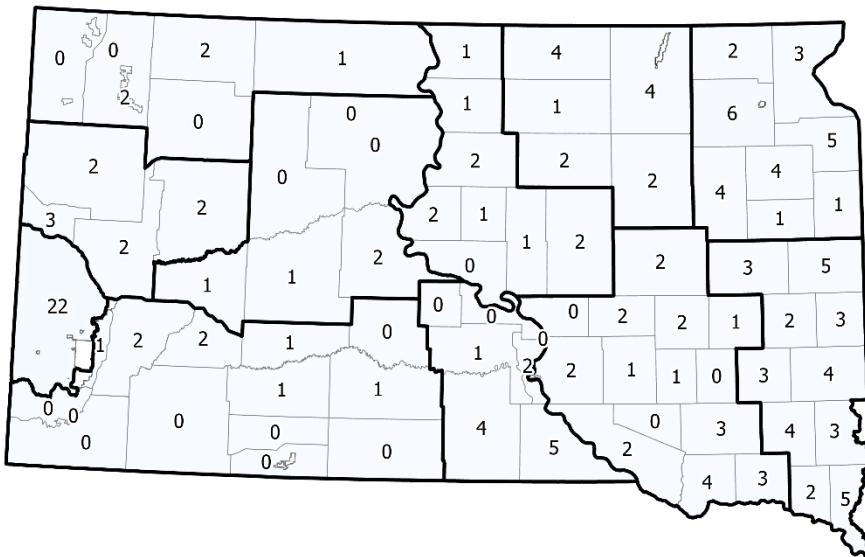


Figure 15. Adult male mule deer 2017-2020 average harvest by unit during the muzzleloader season.

**Special Buck Harvest**  
**2017-2020: Average Whitetail Adult Male Harvest**

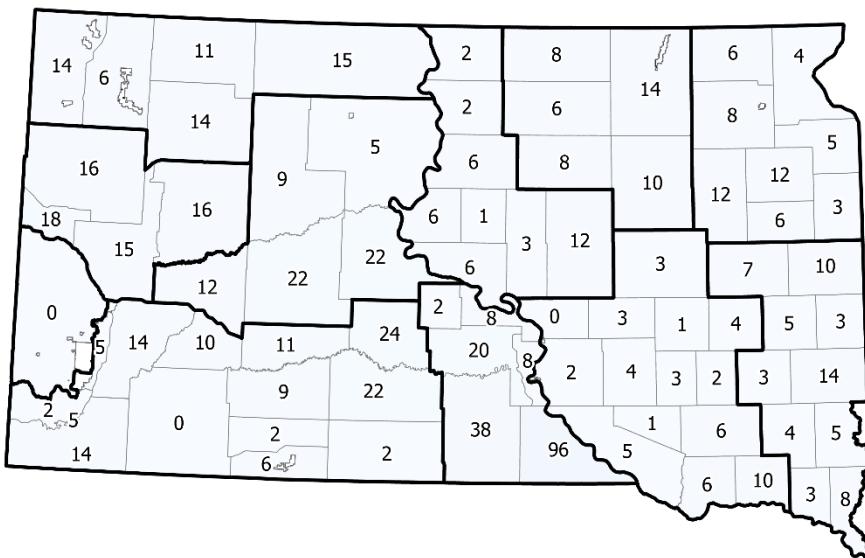


Figure 16. Adult male white-tailed deer 2017-2020 average harvest by unit during the special buck season.

**Archery Harvest**  
**2017-2020: Average Whitetail Female Harvest**

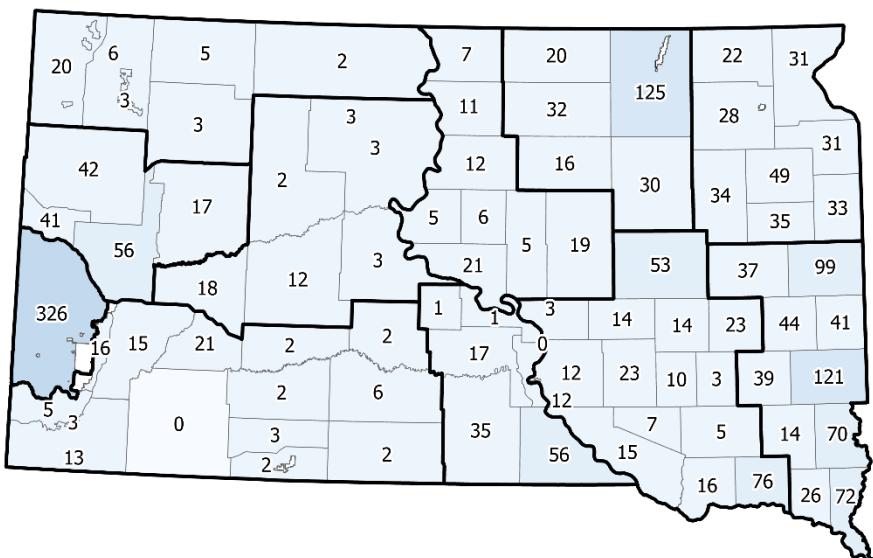


Figure 17. Female white-tailed deer 2017-2020 average harvest by unit during the archery season.

**Firearm Harvest**  
**2017-2020: Average Whitetail Female Harvest**

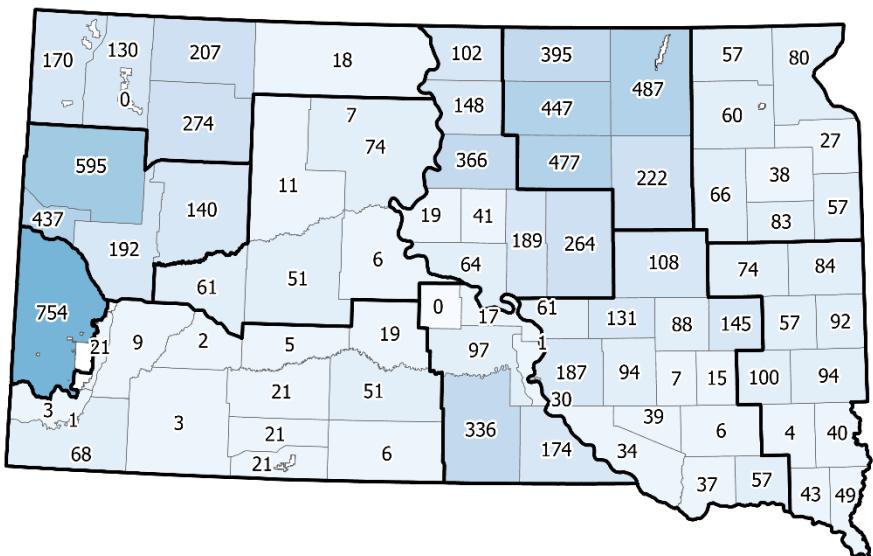


Figure 18. Female white-tailed deer 2017-2020 average harvest by unit during the firearm season.

**Landowner Harvest**  
**2017-2020: Average Whitetail Female Harvest**

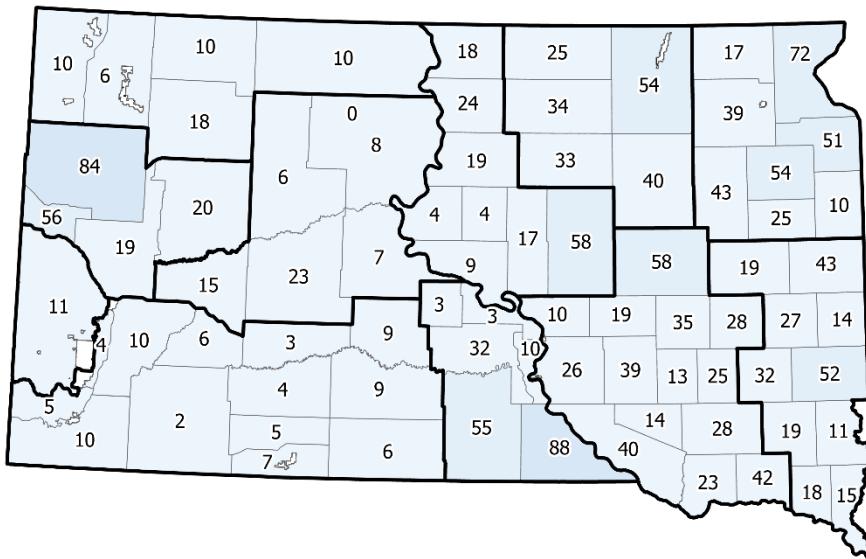


Figure 19. Female white-tailed deer 2017-2020 average harvest by unit during the landowner season.

**Muzzleloader Harvest**  
**2017-2020: Average Whitetail Female Harvest**

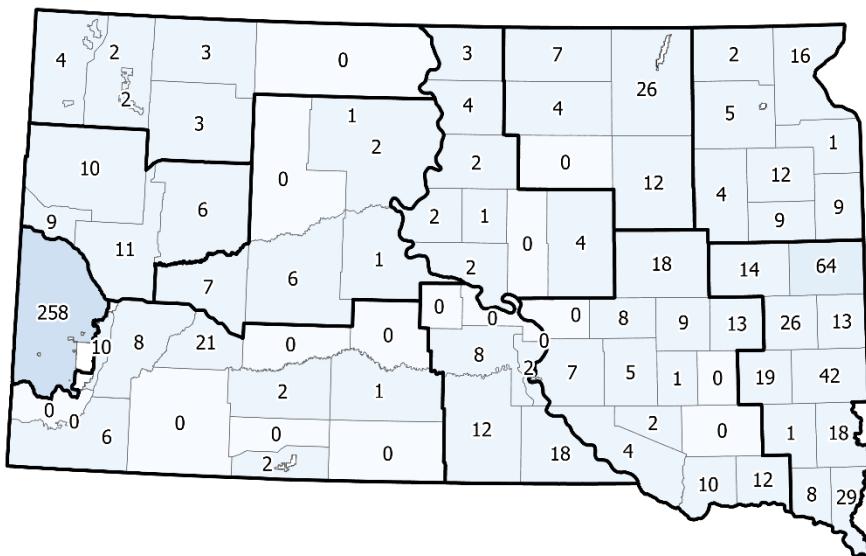


Figure 20. Female white-tailed deer 2017-2020 average harvest by unit during the muzzleloader season.

**Special Buck Harvest**  
**2017-2020: Average Whitetail Female Harvest**

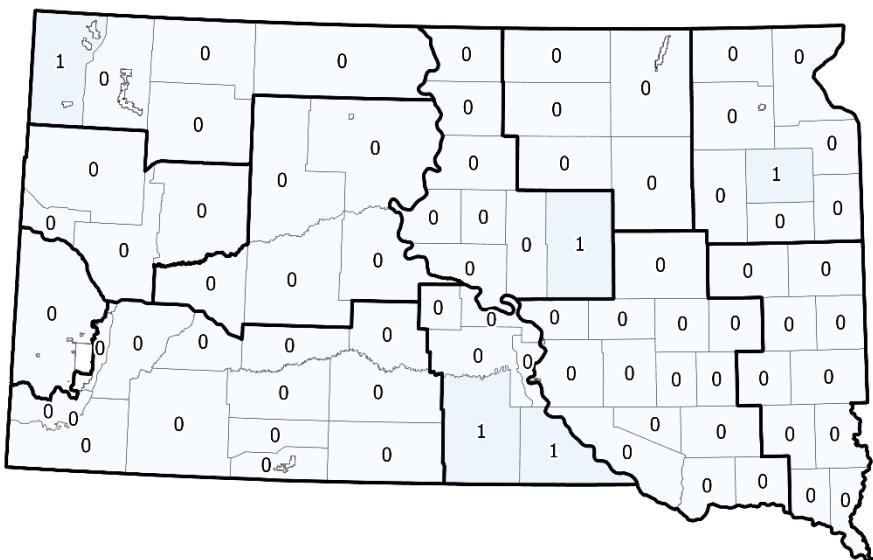


Figure 21. Female white-tailed deer 2017-2020 average harvest by unit during the special buck season.

**Youth Harvest**  
**2017-2020: Average Whitetail Female Harvest**

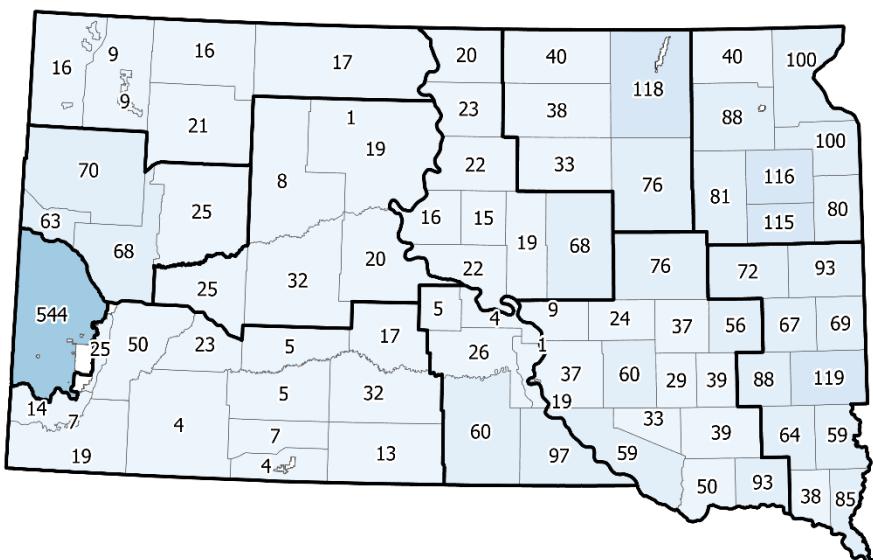


Figure 22. Female white-tailed deer 2017-2020 average harvest by unit during the apprentice and mentored deer seasons.

APPENDIX 1. FIREARM SEASON LICENSE SALES AND HARVEST (ROUNDED TO INTEGER) BY UNIT AND LICENSE TYPE FROM 2020 (BEGINNING ON NEXT PAGE).

Year	Season	UnitType	ResSold	NRSold	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	ERD	01A-01	450	0	152	5	35	3	0	0	0	0
2020	ERD	01A-13	201	0	0	3	71	5	0	0	0	0
2020	WRD	02A-01	401	30	63	0	5	0	217	0	6	2
2020	WRD	02A-18	203	16	110	6	75	4	0	0	0	0
2020	WRD	02C-01	102	8	18	0	0	0	62	0	1	0
2020	WRD	02C-11	51	3	34	0	2	0	0	0	0	0
2020	ERD	03A-01	1005	1	414	5	56	3	0	0	0	0
2020	ERD	03A-13	996	1	0	51	381	32	0	0	0	0
2020	ERD	04A-11	502	0	223	4	31	4	0	0	0	0
2020	ERD	04A-13	200	0	0	4	93	29	0	0	0	0
2020	ERD	05A-01	250	0	131	3	20	2	0	0	0	0
2020	ERD	05A-13	100	0	0	5	47	3	0	0	0	0
2020	ERD	06A-01	455	0	198	1	49	0	0	0	0	0
2020	ERD	06A-13	100	0	0	7	46	3	0	0	0	0
2020	ERD	07A-01	302	0	131	2	29	3	0	0	0	0
2020	ERD	07B-13	75	0	0	3	30	5	0	0	0	0
2020	ERD	08A-11	201	0	79	0	5	0	0	0	0	0
2020	ERD	10A-11	279	0	109	5	29	0	0	0	0	0
2020	ERD	10A-13	193	0	0	6	82	14	0	0	0	0
2020	WRD	11A-01	151	10	60	0	8	0	37	0	3	0
2020	WRD	11A-11	49	5	38	0	0	0	0	0	0	0
2020	WRD	11A-13	50	4	0	0	15	2	0	0	0	0
2020	WRD	11B-01	100	8	44	0	3	0	22	0	0	0
2020	WRD	11B-11	50	4	32	0	2	0	0	0	0	0
2020	WRD	11B-13	46	7	0	3	27	3	0	0	0	0
2020	ERD	12A-01	250	0	113	2	28	2	2	0	0	0
2020	ERD	12B-13	50	0	0	6	24	0	0	0	0	0
2020	ERD	13A-01	99	2	21	3	3	0	18	0	3	0
2020	ERD	13A-18	798	1	201	16	164	30	0	0	0	0
2020	ERD	13L-01	20	0	7	0	1	0	4	0	0	0
2020	ERD	13P-13	102	3	0	2	34	4	0	0	0	0
2020	ERD	14A-01	97	1	25	2	10	0	12	0	0	0
2020	ERD	14A-18	249	0	62	5	45	12	0	0	0	0
2020	WRD	15A-01	229	18	37	0	5	3	138	0	3	0
2020	WRD	15A-18	652	49	422	24	313	63	0	0	0	0
2020	WRD	15B-01	149	13	69	2	6	0	35	0	0	0
2020	WRD	15B-17	156	7	0	33	191	29	0	0	0	0
2020	WRD	15B-18	503	35	384	33	242	13	0	0	0	0
2020	WRD	15P-17	246	24	0	56	351	37	0	0	0	0
2020	ERD	16A-01	32	0	4	0	0	0	14	0	0	0
2020	ERD	16A-11	400	0	180	6	28	2	0	0	0	0
2020	ERD	16A-13	123	32	0	8	63	2	0	0	0	0
2020	ERD	17A-01	103	0	33	2	6	0	9	0	0	2
2020	ERD	17A-11	201	0	63	6	19	2	0	0	0	0

Year	Season	UnitType	ResSold	NRSold	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	ERD	17A-13	101	0	0	2	30	3	0	0	0	0
2020	ERD	18A-01	598	0	290	5	43	3	2	0	0	0
2020	ERD	18A-13	100	0	0	2	56	0	0	0	0	0
2020	ERD	19A-01	200	0	76	3	35	3	0	0	0	0
2020	ERD	19A-13	100	0	0	6	41	2	0	0	0	0
2020	WRD	20A-01	149	11	38	0	3	0	79	0	2	0
2020	WRD	20A-11	303	23	184	0	20	0	0	0	0	0
2020	WRD	21A-01	131	8	30	0	2	0	62	0	2	0
2020	WRD	21A-11	202	14	160	2	8	0	0	0	0	0
2020	WRD	21B-01	101	7	46	2	2	0	14	0	5	0
2020	WRD	21B-11	50	4	36	0	0	0	0	0	0	0
2020	WRD	21B-13	50	3	0	0	20	0	0	0	0	0
2020	ERD	22A-01	601	0	321	12	28	0	0	0	0	0
2020	ERD	22A-13	100	0	0	0	42	10	0	0	0	0
2020	ERD	23A-01	400	1	201	5	23	7	0	0	0	0
2020	ERD	23A-13	100	0	0	3	52	2	0	0	0	0
2020	WRD	24A-01	100	8	17	0	0	0	54	0	2	0
2020	WRD	24A-11	246	18	137	0	25	0	0	0	0	0
2020	WRD	24A-13	92	12	0	9	37	2	0	0	0	0
2020	WRD	24B-11	10	1	11	0	0	0	0	0	0	0
2020	WRD	24B-13	10	1	0	0	8	0	0	0	0	0
2020	ERD	25A-11	249	0	73	0	16	2	0	0	0	0
2020	ERD	25A-13	100	0	0	3	26	6	0	0	0	0
2020	ERD	26A-01	699	0	359	2	36	7	0	0	4	0
2020	ERD	26A-13	499	97	0	27	260	29	0	0	0	0
2020	WRD	27A-01	127	9	40	0	0	2	49	0	3	0
2020	WRD	27B-01	201	16	41	0	5	0	89	0	6	0
2020	WRD	27B-11	202	14	122	2	18	0	0	0	0	0
2020	WRD	27B-13	100	8	0	2	49	2	0	0	0	0
2020	WRD	27L-01	5	1	2	0	2	0	0	0	0	0
2020	WRD	27L-11	10	1	5	1	0	0	0	0	0	0
2020	WRD	27P-13	48	5	0	2	27	2	0	0	0	0
2020	ERD	28A-01	574	1	258	2	41	8	2	0	2	0
2020	ERD	28A-13	435	85	0	43	245	54	0	0	0	0
2020	ERD	29A-01	300	0	150	6	25	2	0	0	0	0
2020	WRD	30A-01	27	1	16	0	0	0	2	0	0	0
2020	WRD	30A-11	501	40	171	5	25	4	0	0	0	0
2020	WRD	30A-18	100	8	51	2	40	7	0	0	0	0
2020	WRD	30B-01	28	2	12	0	0	0	0	0	0	0
2020	WRD	30B-11	502	39	206	7	43	2	0	0	0	0
2020	WRD	30B-18	101	7	52	13	69	4	0	0	0	0
2020	WRD	31A-01	608	46	134	0	5	2	295	0	17	0
2020	WRD	31A-11	99	8	53	1	1	1	0	0	0	0
2020	WRD	31A-13	101	7	0	6	36	3	0	0	0	0

Year	Season	UnitType	ResSold	NRSold	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	ERD	32A-01	602	0	266	5	49	2	2	0	0	0
2020	ERD	32A-13	100	0	0	8	39	2	0	0	0	0
2020	ERD	33A-01	15	0	8	0	0	0	0	0	0	0
2020	ERD	33A-18	413	0	146	17	134	12	0	0	0	0
2020	ERD	33A-19	90	0	0	6	60	17	0	0	0	0
2020	ERD	33P-13	220	23	0	7	87	13	0	0	0	0
2020	ERD	34A-11	202	0	104	0	7	2	0	0	0	0
2020	WRD	35A-01	298	26	51	0	5	0	156	2	12	0
2020	WRD	35A-18	301	24	150	29	136	26	0	0	0	0
2020	WRD	35A-19	99	8	0	9	64	17	0	0	0	0
2020	WRD	35C-01	147	15	15	0	0	0	109	0	3	0
2020	WRD	35C-18	299	24	173	16	77	24	0	0	0	0
2020	WRD	35C-19	100	8	0	7	45	21	0	0	0	0
2020	WRD	35L-01	105	8	10	0	0	0	74	1	3	0
2020	ERD	36A-01	167	0	34	0	6	1	56	3	7	0
2020	ERD	36A-11	239	0	104	3	7	2	0	0	0	0
2020	ERD	36P-13	92	0	0	5	29	5	0	0	0	0
2020	ERD	37A-11	150	0	84	0	3	0	0	0	0	0
2020	ERD	38A-01	19	0	8	0	0	0	2	0	0	0
2020	ERD	38A-18	447	0	154	14	71	12	0	0	0	0
2020	ERD	38A-19	78	13	0	8	20	14	0	0	0	0
2020	ERD	38P-13	6	2	0	0	3	0	0	0	0	0
2020	WRD	39A-01	150	11	23	0	2	0	94	0	2	0
2020	WRD	39A-11	101	8	60	2	3	0	0	0	0	0
2020	WRD	39B-01	277	19	93	0	3	0	101	0	7	0
2020	WRD	39B-11	51	4	36	2	0	0	0	0	0	0
2020	WRD	39B-13	44	10	0	2	27	2	0	0	0	0
2020	ERD	40A-11	237	0	106	0	20	4	0	0	0	0
2020	ERD	40A-13	195	32	0	10	90	8	0	0	0	0
2020	ERD	40A-18	96	0	38	6	30	4	0	0	0	0
2020	WRD	41A-01	151	11	49	0	5	2	52	2	3	0
2020	WRD	41A-11	301	22	179	5	18	0	0	0	0	0
2020	ERD	42A-01	501	0	266	0	27	0	0	0	0	0
2020	ERD	42A-13	100	0	0	11	43	0	0	0	0	0
2020	ERD	43A-01	301	0	155	3	18	2	0	0	0	0
2020	ERD	43A-13	100	0	0	10	31	4	0	0	0	0
2020	ERD	44A-01	200	0	79	2	14	0	0	0	0	0
2020	ERD	44A-13	100	0	0	2	37	2	0	0	0	0
2020	WRD	45A-01	101	8	27	0	0	0	31	0	0	0
2020	WRD	45A-11	446	36	202	5	30	2	0	0	0	0
2020	WRD	45A-18	100	6	64	4	64	2	0	0	0	0
2020	WRD	45B-01	51	4	22	0	0	2	7	0	0	0
2020	WRD	45B-18	101	7	69	3	37	4	0	0	0	0
2020	WRD	45C-01	30	3	3	2	2	0	9	0	0	0

Year	Season	UnitType	ResSold	NRSold	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	WRD	45C-19	22	0	0	4	19	6	0	0	0	0
2020	WRD	45D-01	26	2	5	0	0	0	13	0	1	0
2020	WRD	45D-11	37	4	31	0	0	0	0	0	0	0
2020	WRD	45P-13	46	7	0	2	31	2	0	0	0	0
2020	ERD	46A-01	352	0	164	5	31	7	0	0	0	0
2020	ERD	46A-13	200	0	0	8	76	8	0	0	0	0
2020	ERD	47A-01	499	1	259	4	34	6	9	0	0	0
2020	ERD	47A-13	456	47	0	34	235	44	0	0	0	0
2020	ERD	48A-01	502	0	273	5	25	2	0	0	0	0
2020	ERD	48A-13	100	0	0	2	47	3	0	0	0	0
2020	WRD	49A-01	701	56	278	0	25	0	157	2	14	0
2020	WRD	49A-18	300	25	196	8	144	8	0	0	0	0
2020	WRD	49A-19	152	10	0	8	124	17	0	0	0	0
2020	WRD	49B-01	704	52	182	4	11	0	289	0	15	2
2020	WRD	49B-11	406	32	203	2	13	0	0	0	0	0
2020	WRD	49B-19	169	47	0	11	128	16	0	0	0	0
2020	WRD	50A-01	405	31	105	0	14	2	136	2	9	2
2020	WRD	50A-11	451	33	238	7	30	7	0	0	0	0
2020	ERD	51A-01	401	0	181	4	25	2	0	0	0	0
2020	ERD	51A-13	350	0	0	20	131	8	0	0	0	0
2020	ERD	52A-01	350	0	142	2	33	7	0	0	0	0
2020	ERD	52A-13	199	0	0	6	81	4	0	0	0	0
2020	WRD	53A-01	205	12	29	0	0	0	127	0	5	0
2020	WRD	53A-08	102	8	11	2	8	0	70	0	44	11
2020	WRD	53A-18	302	22	172	13	88	13	0	0	0	0
2020	WRD	53A-19	98	11	0	2	59	18	0	0	0	0
2020	WRD	53C-01	397	35	88	2	3	0	166	0	5	0
2020	WRD	53C-08	103	7	43	3	32	5	38	0	38	3
2020	WRD	53C-18	352	27	199	19	133	12	0	0	0	0
2020	WRD	53C-19	148	14	0	15	110	19	0	0	0	0
2020	ERD	54A-01	141	0	44	0	2	0	30	0	4	0
2020	ERD	54A-13	238	38	0	15	95	11	0	0	0	0
2020	ERD	54A-18	452	0	227	17	133	13	0	0	0	0
2020	ERD	55A-01	501	0	263	7	41	3	0	0	0	0
2020	ERD	55A-13	101	0	0	3	40	5	0	0	0	0
2020	ERD	56A-11	351	0	150	3	33	0	0	0	0	0
2020	ERD	56A-13	199	0	0	8	67	10	0	0	0	0
2020	ERD	57A-01	902	0	373	7	72	7	2	0	0	0
2020	ERD	57A-13	384	15	0	7	148	9	0	0	0	0
2020	WRD	58A-01	102	8	23	0	0	0	63	0	0	0
2020	WRD	58A-11	101	6	71	0	8	0	0	0	0	0
2020	WRD	58D-01	4	1	1	0	0	0	0	0	0	0
2020	WRD	58D-03	3	1	0	2	0	0	0	0	0	0
2020	ERD	59A-01	92	0	13	0	1	0	37	0	0	1

Year	Season	UnitType	ResSold	NRSold	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	ERD	59A-11	241	0	117	0	9	2	0	0	0	0
2020	ERD	59B-01	20	0	14	0	0	0	2	0	0	0
2020	ERD	59B-11	277	0	102	4	18	0	0	0	0	0
2020	ERD	59B-13	46	0	0	2	5	2	0	0	0	0
2020	WRD	60A-01	202	15	94	0	10	0	21	0	0	0
2020	WRD	60A-13	198	14	0	2	72	9	0	0	0	0
2020	WRD	60A-18	903	66	494	23	308	30	0	0	0	0
2020	ERD	61A-01	100	0	53	0	0	0	0	0	0	0
2020	ERD	62A-01	300	0	143	3	21	2	0	0	0	0
2020	ERD	62A-13	100	0	0	7	34	5	0	0	0	0
2020	ERD	63A-01	53	0	14	0	0	0	18	0	0	0
2020	ERD	63A-11	400	1	186	7	24	0	0	0	0	0
2020	ERD	63A-13	258	40	0	20	114	16	0	0	0	0
2020	WRD	64A-01	300	24	77	0	4	0	136	0	6	0
2020	WRD	64A-11	200	10	109	0	9	4	0	0	0	0
2020	WRD	65A-01	75	5	25	0	10	0	20	0	0	0
2020	WRD	67A-01	151	11	64	0	5	0	13	0	2	0
2020	BHD	BD1-13	1007	72	0	66	518	71	0	0	0	0
2020	BHD	BD2-13	101	7	0	9	69	3	0	0	0	0
2020	BHD	BH1-01	217	14	51	0	2	0	75	0	7	0
2020	LBD	BH1-01	17	0	0	0	0	0	3	0	0	0
2020	LBD	BH1-08	22	0	15	0	11	0	2	0	0	0
2020	BHD	BH1-11	3525	250	2132	39	217	18	0	0	0	0
2020	CUD	CU1-01	5	0	1	0	0	0	3	0	0	0
2020	CUD	CU1-11	33	0	26	0	0	0	0	0	0	0
2020	CUD	CU1-13	50	0	0	0	24	1	0	0	0	0
2020	RFD	LC1-01	9	1	8	0	0	0	0	0	0	0
2020	RFD	LC2-01	8	1	2	0	0	0	0	0	0	0
2020	RFD	SL1-01	20	2	9	0	0	0	0	0	0	0
2020	RFD	SL2-01	22	2	15	0	0	0	0	0	0	0
2020	RFD	SL3-01	21	2	2	0	1	0	0	0	0	0
2020	RFD	SL4-13	25	2	0	1	4	0	0	0	0	0
2020	RFD	SL5-01	20	2	7	0	0	0	0	0	0	0
2020	RFD	WA1-01	10	1	1	0	0	0	0	0	0	0
2020	RFD	WA3-01	10	1	4	0	0	0	0	0	0	0

APPENDIX 2. HARVEST (ROUNDED TO INTEGER) BY SEASON, UNIT AND LICENSE TYPE FROM 2020 (BEGINNING ON NEXT PAGE).

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	01A	ADN	NonResident Archery	4	0	6	0	0	0	0	0
2020	02A	ADN	NonResident Archery	2	0	0	0	30	0	0	0
2020	02C	ADN	NonResident Archery	6	0	0	0	22	2	0	0
2020	03A	ADN	NonResident Archery	60	0	12	0	0	0	0	0
2020	04A	ADN	NonResident Archery	14	0	2	0	0	0	0	0
2020	05A	ADN	NonResident Archery	12	0	4	0	0	0	0	0
2020	06A	ADN	NonResident Archery	10	0	2	0	0	0	0	0
2020	07A	ADN	NonResident Archery	10	0	0	0	0	0	0	0
2020	08A	ADN	NonResident Archery	2	0	0	0	0	0	0	0
2020	10A	ADN	NonResident Archery	14	0	6	2	0	0	0	0
2020	11A	ADN	NonResident Archery	4	0	2	0	4	0	0	0
2020	11B	ADN	NonResident Archery	6	0	0	0	2	0	0	0
2020	12A	ADN	NonResident Archery	12	0	0	0	0	0	0	0
2020	13A	ADN	NonResident Archery	6	0	2	2	0	0	0	0
2020	13L	ADN	NonResident Archery	4	0	0	0	0	0	0	0
2020	14A	ADN	NonResident Archery	2	0	0	0	10	0	6	0
2020	15A	ADN	NonResident Archery	26	0	10	0	50	0	0	0
2020	15B	ADN	NonResident Archery	24	0	12	0	6	0	0	0
2020	16A	ADN	NonResident Archery	6	0	2	0	0	0	0	0
2020	17A	ADN	NonResident Archery	24	0	2	0	8	0	0	0
2020	18A	ADN	NonResident Archery	26	0	10	0	0	0	0	0
2020	19A	ADN	NonResident Archery	4	0	2	0	0	0	0	0
2020	20A	ADN	NonResident Archery	12	0	0	0	26	2	0	0
2020	21A	ADN	NonResident Archery	12	0	0	0	14	0	0	2
2020	21B	ADN	NonResident Archery	8	0	6	0	0	0	0	0
2020	22A	ADN	NonResident Archery	36	0	4	2	0	0	0	0
2020	23A	ADN	NonResident Archery	6	0	0	0	0	0	0	0
2020	24A	ADN	NonResident Archery	4	0	0	0	8	0	0	0
2020	24B	ADN	NonResident Archery	2	0	0	0	4	0	0	0
2020	26A	ADN	NonResident Archery	16	0	6	0	0	0	0	0
2020	27A	ADN	NonResident Archery	0	0	2	0	4	0	2	0
2020	27B	ADN	NonResident Archery	6	0	0	0	10	0	0	0
2020	27L	ADN	NonResident Archery	6	0	2	0	2	0	0	0
2020	28A	ADN	NonResident Archery	12	0	6	0	0	0	0	0
2020	29A	ADN	NonResident Archery	28	0	2	0	0	0	0	0
2020	30A,B	ADN	NonResident Archery	54	2	20	0	4	0	0	0
2020	31A	ADN	NonResident Archery	20	0	4	0	14	0	2	0
2020	32A	ADN	NonResident Archery	6	0	2	0	0	0	0	0
2020	33A	ADN	NonResident Archery	18	0	0	0	4	0	0	0
2020	34A	ADN	NonResident Archery	4	0	0	0	0	0	0	0
2020	35A	ADN	NonResident Archery	42	2	4	0	92	0	6	0
2020	35C	ADN	NonResident Archery	10	0	4	0	22	0	4	0
2020	35L	ADN	NonResident Archery	14	0	0	0	24	0	0	0
2020	36A	ADN	NonResident Archery	6	2	0	0	2	0	2	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	37A	ADN	NonResident Archery	6	0	0	0	0	0	0	0
2020	38A	ADN	NonResident Archery	10	0	2	0	0	0	0	0
2020	39A	ADN	NonResident Archery	8	0	4	0	2	4	0	0
2020	39B	ADN	NonResident Archery	2	0	0	0	4	0	0	0
2020	40A	ADN	NonResident Archery	6	0	2	0	0	0	0	0
2020	41A	ADN	NonResident Archery	14	0	0	0	10	0	0	0
2020	42A	ADN	NonResident Archery	12	0	0	0	0	0	0	0
2020	43A	ADN	NonResident Archery	8	0	0	0	0	0	0	0
2020	44A	ADN	NonResident Archery	10	0	0	0	0	0	0	0
2020	45A	ADN	NonResident Archery	14	0	0	0	2	0	0	0
2020	45B	ADN	NonResident Archery	8	4	8	0	4	0	2	0
2020	45C	ADN	NonResident Archery	2	0	0	0	2	0	0	0
2020	45D	ADN	NonResident Archery	0	0	0	0	2	0	0	0
2020	46A	ADN	NonResident Archery	0	0	2	0	0	0	0	0
2020	47A	ADN	NonResident Archery	16	0	6	0	0	0	2	0
2020	48A	ADN	NonResident Archery	28	0	10	0	0	0	0	0
2020	49A	ADN	NonResident Archery	22	0	14	0	4	0	0	0
2020	49B	ADN	NonResident Archery	10	0	6	2	12	0	0	0
2020	50A	ADN	NonResident Archery	6	0	2	0	6	0	0	0
2020	51A	ADN	NonResident Archery	4	0	2	0	0	0	0	0
2020	52A	ADN	NonResident Archery	2	0	0	0	0	0	0	0
2020	53A	ADN	NonResident Archery	6	4	4	0	30	2	4	0
2020	53C	ADN	NonResident Archery	10	0	2	0	22	0	0	0
2020	54A	ADN	NonResident Archery	4	0	4	0	4	0	0	2
2020	55A	ADN	NonResident Archery	34	8	4	0	0	0	0	0
2020	56A	ADN	NonResident Archery	8	2	8	0	0	0	0	0
2020	57A	ADN	NonResident Archery	36	2	0	2	0	0	0	0
2020	58A	ADN	NonResident Archery	8	0	0	0	14	0	0	0
2020	59A	ADN	NonResident Archery	12	0	2	0	10	0	6	0
2020	59B	ADN	NonResident Archery	6	0	0	0	2	0	0	0
2020	60A	ADN	NonResident Archery	20	0	10	0	4	0	0	0
2020	61A	ADN	NonResident Archery	2	0	0	0	0	0	0	0
2020	62A	ADN	NonResident Archery	22	0	2	0	0	0	0	0
2020	63A	ADN	NonResident Archery	28	0	2	0	6	0	2	0
2020	64A	ADN	NonResident Archery	0	0	0	0	4	0	0	0
2020	65A	ADN	NonResident Archery	2	0	0	0	0	0	0	0
2020	67A	ADN	NonResident Archery	8	0	0	0	0	0	0	0
2020	BH1	ADN	NonResident Archery	98	2	58	0	24	0	8	0
2020	01A	APPD	Apprentice	0	6	56	4	0	0	0	0
2020	02A	APPD	Apprentice	0	0	4	0	0	0	13	0
2020	02C	APPD	Apprentice	0	0	15	0	0	0	13	2
2020	03A	APPD	Apprentice	0	4	52	2	0	0	0	0
2020	04A	APPD	Apprentice	0	6	37	15	0	0	0	0
2020	05A	APPD	Apprentice	0	6	54	13	0	0	0	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	06A	APD	Apprentice	0	12	52	2	0	0	0	0
2020	07A	APD	Apprentice	0	4	37	2	0	0	0	0
2020	08A	APD	Apprentice	0	0	6	0	0	0	0	0
2020	10A	APD	Apprentice	0	2	30	4	0	0	0	0
2020	11A	APD	Apprentice	0	0	6	0	0	0	2	0
2020	11B	APD	Apprentice	0	0	0	0	0	0	2	0
2020	12A	APD	Apprentice	0	6	17	4	0	0	0	0
2020	13A	APD	Apprentice	0	0	11	2	0	0	2	0
2020	13L	APD	Apprentice	0	0	2	0	0	0	0	0
2020	14A	APD	Apprentice	0	0	2	0	0	0	2	0
2020	15A	APD	Apprentice	0	8	26	6	0	0	13	5
2020	15B	APD	Apprentice	0	2	11	4	0	0	2	0
2020	16A	APD	Apprentice	0	0	6	2	0	0	7	0
2020	17A	APD	Apprentice	0	4	9	4	0	0	2	0
2020	18A	APD	Apprentice	0	0	26	2	0	0	2	0
2020	19A	APD	Apprentice	0	4	19	0	0	0	0	0
2020	20A	APD	Apprentice	0	4	0	0	0	0	11	0
2020	21A	APD	Apprentice	0	0	11	0	0	0	13	0
2020	21B	APD	Apprentice	0	0	9	0	0	0	2	0
2020	22A	APD	Apprentice	0	4	35	2	0	0	0	0
2020	23A	APD	Apprentice	0	12	39	4	0	0	0	0
2020	24A	APD	Apprentice	0	4	9	0	0	0	2	0
2020	24B	APD	Apprentice	0	2	0	0	0	0	0	0
2020	25A	APD	Apprentice	0	0	9	0	0	0	0	0
2020	26A	APD	Apprentice	0	0	19	2	0	0	0	0
2020	27A	APD	Apprentice	0	0	0	0	0	2	7	0
2020	27B	APD	Apprentice	0	2	11	0	0	2	11	2
2020	27L	APD	Apprentice	0	0	4	0	0	0	0	0
2020	28A	APD	Apprentice	0	2	11	4	0	0	0	0
2020	29A	APD	Apprentice	0	12	43	4	0	0	0	0
2020	30A,B	APD	Apprentice	0	0	39	10	0	0	2	2
2020	31A	APD	Apprentice	0	0	9	0	0	0	20	2
2020	32A	APD	Apprentice	0	10	41	6	0	0	0	0
2020	33A	APD	Apprentice	0	4	17	4	0	0	0	0
2020	34A	APD	Apprentice	0	2	4	0	0	0	0	0
2020	35A	APD	Apprentice	0	2	11	4	0	0	18	2
2020	35C	APD	Apprentice	0	2	4	0	0	0	11	2
2020	35L	APD	Apprentice	0	0	4	0	0	0	4	2
2020	36A	APD	Apprentice	0	0	9	0	0	2	4	0
2020	37A	APD	Apprentice	0	2	15	0	0	0	0	0
2020	38A	APD	Apprentice	0	0	4	2	0	0	0	0
2020	39A	APD	Apprentice	0	0	0	0	0	0	2	0
2020	39B	APD	Apprentice	0	0	4	2	0	0	2	0
2020	40A	APD	Apprentice	0	0	2	2	0	0	0	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	41A	APD	Apprentice	0	0	2	2	0	2	7	0
2020	42A	APD	Apprentice	0	10	39	4	0	0	0	0
2020	43A	APD	Apprentice	0	4	28	4	0	0	0	0
2020	44A	APD	Apprentice	0	4	26	2	0	0	0	0
2020	45A	APD	Apprentice	0	0	9	4	0	0	0	0
2020	45B	APD	Apprentice	0	2	4	0	0	0	0	0
2020	45C	APD	Apprentice	0	0	0	0	0	2	0	0
2020	45D	APD	Apprentice	0	0	0	0	0	0	4	0
2020	46A	APD	Apprentice	0	8	50	13	0	0	0	0
2020	47A	APD	Apprentice	0	8	22	2	0	0	0	0
2020	48A	APD	Apprentice	0	0	6	2	0	0	0	0
2020	49A	APD	Apprentice	0	2	19	4	0	0	9	0
2020	49B	APD	Apprentice	0	2	11	0	0	0	11	0
2020	50A	APD	Apprentice	0	4	13	8	0	0	4	0
2020	51A	APD	Apprentice	0	2	26	2	0	0	0	0
2020	52A	APD	Apprentice	0	8	28	2	0	0	0	0
2020	53A	APD	Apprentice	0	2	2	0	0	7	29	0
2020	53C	APD	Apprentice	0	0	13	0	0	0	11	7
2020	54A	APD	Apprentice	0	2	6	2	0	0	4	0
2020	55A	APD	Apprentice	0	6	48	6	0	0	0	0
2020	56A	APD	Apprentice	0	0	15	0	0	0	0	0
2020	57A	APD	Apprentice	0	2	35	8	0	0	0	0
2020	58A	APD	Apprentice	0	0	9	0	0	2	11	5
2020	59A	APD	Apprentice	0	4	0	2	0	2	7	0
2020	59B	APD	Apprentice	0	0	2	2	0	0	2	0
2020	60A	APD	Apprentice	0	2	17	0	0	0	2	0
2020	61A	APD	Apprentice	0	12	17	0	0	0	2	0
2020	62A	APD	Apprentice	0	2	30	4	0	0	0	0
2020	63A	APD	Apprentice	0	4	6	0	0	2	4	0
2020	64A	APD	Apprentice	0	0	4	0	0	0	2	0
2020	65A	APD	Apprentice	0	0	0	0	0	0	2	0
2020	67A	APD	Apprentice	0	0	4	0	0	0	2	0
2020	BH1	APD	Apprentice	0	25	288	31	0	0	51	2
2020	01A	ARD	Resident Archery	247	10	138	4	0	0	0	0
2020	02A	ARD	Resident Archery	25	4	10	0	10	0	2	0
2020	02C	ARD	Resident Archery	25	0	8	2	27	0	2	0
2020	03A	ARD	Resident Archery	172	14	125	8	0	0	0	0
2020	04A	ARD	Resident Archery	115	8	62	4	0	0	0	0
2020	05A	ARD	Resident Archery	161	6	53	6	0	0	0	0
2020	06A	ARD	Resident Archery	197	8	119	0	0	0	0	0
2020	07A	ARD	Resident Archery	153	10	90	4	0	0	0	0
2020	08A	ARD	Resident Archery	84	2	8	6	0	0	0	0
2020	10A	ARD	Resident Archery	36	0	21	2	0	0	0	0
2020	11A	ARD	Resident Archery	4	0	8	0	4	0	0	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	11B	ARD	Resident Archery	15	0	4	0	0	0	0	0
2020	12A	ARD	Resident Archery	50	6	18	2	0	0	0	0
2020	13A	ARD	Resident Archery	21	2	12	0	0	0	0	0
2020	13L	ARD	Resident Archery	4	0	0	0	0	0	0	0
2020	14A	ARD	Resident Archery	8	0	4	0	6	0	0	0
2020	15A	ARD	Resident Archery	50	0	31	2	19	4	4	0
2020	15B	ARD	Resident Archery	71	2	45	2	8	0	0	0
2020	16A	ARD	Resident Archery	21	2	10	0	4	0	0	0
2020	17A	ARD	Resident Archery	59	2	29	2	4	0	0	0
2020	18A	ARD	Resident Archery	134	2	45	4	0	0	0	0
2020	19A	ARD	Resident Archery	109	2	45	0	0	0	0	0
2020	20A	ARD	Resident Archery	19	0	4	0	27	4	2	0
2020	21A	ARD	Resident Archery	59	2	25	0	15	0	4	0
2020	21B	ARD	Resident Archery	21	0	14	0	4	0	0	0
2020	22A	ARD	Resident Archery	92	4	37	2	0	0	0	0
2020	23A	ARD	Resident Archery	76	0	51	2	0	0	0	0
2020	24A	ARD	Resident Archery	10	0	4	0	8	0	2	0
2020	24B	ARD	Resident Archery	6	0	4	0	0	0	0	0
2020	25A	ARD	Resident Archery	21	2	12	0	0	0	0	0
2020	26A	ARD	Resident Archery	67	8	25	2	0	0	0	0
2020	27A	ARD	Resident Archery	15	0	4	0	8	0	2	0
2020	27B	ARD	Resident Archery	31	8	10	2	27	0	16	0
2020	27L	ARD	Resident Archery	2	0	4	4	2	0	0	0
2020	28A	ARD	Resident Archery	42	2	6	0	0	0	0	0
2020	29A	ARD	Resident Archery	120	6	31	8	0	0	0	0
2020	30A,B	ARD	Resident Archery	57	4	39	2	2	0	0	0
2020	31A	ARD	Resident Archery	31	0	8	0	52	0	6	0
2020	32A	ARD	Resident Archery	109	10	66	2	0	0	0	0
2020	33A	ARD	Resident Archery	23	2	8	6	4	0	0	0
2020	34A	ARD	Resident Archery	40	0	4	0	0	0	0	0
2020	35A	ARD	Resident Archery	21	6	16	0	41	2	12	4
2020	35C	ARD	Resident Archery	6	0	6	2	21	4	0	0
2020	35L	ARD	Resident Archery	6	0	0	0	25	0	4	0
2020	36A	ARD	Resident Archery	57	10	27	6	15	2	0	0
2020	37A	ARD	Resident Archery	48	0	8	0	0	0	0	0
2020	38A	ARD	Resident Archery	10	0	0	0	2	0	0	0
2020	39A	ARD	Resident Archery	15	0	0	0	12	0	4	0
2020	39B	ARD	Resident Archery	13	0	4	0	4	0	0	0
2020	40A	ARD	Resident Archery	19	2	4	2	4	0	0	0
2020	41A	ARD	Resident Archery	4	2	8	0	12	0	0	0
2020	42A	ARD	Resident Archery	109	6	31	4	0	0	0	0
2020	43A	ARD	Resident Archery	132	8	62	4	0	0	0	0
2020	44A	ARD	Resident Archery	132	20	72	11	0	0	0	0
2020	45A	ARD	Resident Archery	19	4	18	2	17	2	2	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	45B	ARD	Resident Archery	17	0	10	2	2	0	0	0
2020	45C	ARD	Resident Archery	4	0	0	0	4	0	0	0
2020	45D	ARD	Resident Archery	4	2	2	0	10	0	0	0
2020	46A	ARD	Resident Archery	105	4	51	4	0	0	0	0
2020	47A	ARD	Resident Archery	34	2	18	4	0	0	0	0
2020	48A	ARD	Resident Archery	69	0	16	0	0	0	0	0
2020	49A	ARD	Resident Archery	105	2	49	2	15	4	0	0
2020	49B	ARD	Resident Archery	17	0	21	0	17	0	2	0
2020	50A	ARD	Resident Archery	21	0	2	2	12	0	2	0
2020	51A	ARD	Resident Archery	44	2	23	2	0	0	0	0
2020	52A	ARD	Resident Archery	82	0	47	4	0	0	0	0
2020	53A	ARD	Resident Archery	17	2	6	0	19	0	4	2
2020	53C	ARD	Resident Archery	6	0	4	0	19	0	4	0
2020	54A	ARD	Resident Archery	19	0	4	0	4	0	0	0
2020	55A	ARD	Resident Archery	88	10	47	6	0	0	0	0
2020	56A	ARD	Resident Archery	42	2	10	0	0	0	0	0
2020	57A	ARD	Resident Archery	52	0	25	0	0	0	0	0
2020	58A	ARD	Resident Archery	34	0	4	0	50	0	2	0
2020	59A	ARD	Resident Archery	23	4	8	0	39	0	8	0
2020	59B	ARD	Resident Archery	6	0	8	2	4	0	0	0
2020	60A	ARD	Resident Archery	46	0	27	2	0	0	0	0
2020	61A	ARD	Resident Archery	76	2	14	0	0	0	0	0
2020	62A	ARD	Resident Archery	115	12	82	11	2	0	0	0
2020	63A	ARD	Resident Archery	27	2	8	0	8	2	0	0
2020	64A	ARD	Resident Archery	4	0	2	0	4	0	0	0
2020	65A	ARD	Resident Archery	2	0	0	0	0	0	0	0
2020	67A	ARD	Resident Archery	4	4	0	0	0	0	0	0
2020	BH1	ARD	Resident Archery	621	18	343	17	75	0	14	0
2020	BD1	BHD	Black Hills Firearms	0	66	518	71	0	0	0	0
2020	BD2	BHD	Black Hills Firearms	0	9	69	3	0	0	0	0
2020	BH1	BHD	Black Hills Firearms	51	0	2	0	75	0	7	0
2020	BH1	BHD	Black Hills Firearms	2132	39	217	18	0	0	0	0
2020	CU1	CUD	Custer State Park	1	0	0	0	3	0	0	0
2020	CU1	CUD	Custer State Park	26	0	0	0	0	0	0	0
2020	CU1	CUD	Custer State Park	0	0	24	1	0	0	0	0
2020	01A	ERD	East River Firearms	152	5	35	3	0	0	0	0
2020	01A	ERD	East River Firearms	0	3	71	5	0	0	0	0
2020	03A	ERD	East River Firearms	414	5	56	3	0	0	0	0
2020	03A	ERD	East River Firearms	0	51	381	32	0	0	0	0
2020	04A	ERD	East River Firearms	223	4	31	4	0	0	0	0
2020	04A	ERD	East River Firearms	0	4	93	29	0	0	0	0
2020	05A	ERD	East River Firearms	131	3	20	2	0	0	0	0
2020	05A	ERD	East River Firearms	0	5	47	3	0	0	0	0
2020	06A	ERD	East River Firearms	198	1	49	0	0	0	0	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	06A	ERD	East River Firearms	0	7	46	3	0	0	0	0
2020	07A	ERD	East River Firearms	131	2	29	3	0	0	0	0
2020	07B	ERD	East River Firearms	0	3	30	5	0	0	0	0
2020	08A	ERD	East River Firearms	79	0	5	0	0	0	0	0
2020	10A	ERD	East River Firearms	109	5	29	0	0	0	0	0
2020	10A	ERD	East River Firearms	0	6	82	14	0	0	0	0
2020	12A	ERD	East River Firearms	113	2	28	2	2	0	0	0
2020	12B	ERD	East River Firearms	0	6	24	0	0	0	0	0
2020	13A	ERD	East River Firearms	21	3	3	0	18	0	3	0
2020	13A	ERD	East River Firearms	201	16	164	30	0	0	0	0
2020	13L	ERD	East River Firearms	7	0	1	0	4	0	0	0
2020	13P	ERD	East River Firearms	0	2	34	4	0	0	0	0
2020	14A	ERD	East River Firearms	25	2	10	0	12	0	0	0
2020	14A	ERD	East River Firearms	62	5	45	12	0	0	0	0
2020	16A	ERD	East River Firearms	4	0	0	0	14	0	0	0
2020	16A	ERD	East River Firearms	180	6	28	2	0	0	0	0
2020	16A	ERD	East River Firearms	0	8	63	2	0	0	0	0
2020	17A	ERD	East River Firearms	33	2	6	0	9	0	0	2
2020	17A	ERD	East River Firearms	63	6	19	2	0	0	0	0
2020	17A	ERD	East River Firearms	0	2	30	3	0	0	0	0
2020	18A	ERD	East River Firearms	290	5	43	3	2	0	0	0
2020	18A	ERD	East River Firearms	0	2	56	0	0	0	0	0
2020	19A	ERD	East River Firearms	76	3	35	3	0	0	0	0
2020	19A	ERD	East River Firearms	0	6	41	2	0	0	0	0
2020	22A	ERD	East River Firearms	321	12	28	0	0	0	0	0
2020	22A	ERD	East River Firearms	0	0	42	10	0	0	0	0
2020	23A	ERD	East River Firearms	201	5	23	7	0	0	0	0
2020	23A	ERD	East River Firearms	0	3	52	2	0	0	0	0
2020	25A	ERD	East River Firearms	73	0	16	2	0	0	0	0
2020	25A	ERD	East River Firearms	0	3	26	6	0	0	0	0
2020	26A	ERD	East River Firearms	359	2	36	7	0	0	4	0
2020	26A	ERD	East River Firearms	0	27	260	29	0	0	0	0
2020	28A	ERD	East River Firearms	258	2	41	8	2	0	2	0
2020	28A	ERD	East River Firearms	0	43	245	54	0	0	0	0
2020	29A	ERD	East River Firearms	150	6	25	2	0	0	0	0
2020	32A	ERD	East River Firearms	266	5	49	2	2	0	0	0
2020	32A	ERD	East River Firearms	0	8	39	2	0	0	0	0
2020	33A	ERD	East River Firearms	8	0	0	0	0	0	0	0
2020	33A	ERD	East River Firearms	146	17	134	12	0	0	0	0
2020	33A	ERD	East River Firearms	0	6	60	17	0	0	0	0
2020	33P	ERD	East River Firearms	0	7	87	13	0	0	0	0
2020	34A	ERD	East River Firearms	104	0	7	2	0	0	0	0
2020	36A	ERD	East River Firearms	34	0	6	1	56	3	7	0
2020	36A	ERD	East River Firearms	104	3	7	2	0	0	0	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	36P	ERD	East River Firearms	0	5	29	5	0	0	0	0
2020	37A	ERD	East River Firearms	84	0	3	0	0	0	0	0
2020	38A	ERD	East River Firearms	8	0	0	0	2	0	0	0
2020	38A	ERD	East River Firearms	154	14	71	12	0	0	0	0
2020	38A	ERD	East River Firearms	0	8	20	14	0	0	0	0
2020	38P	ERD	East River Firearms	0	0	3	0	0	0	0	0
2020	40A	ERD	East River Firearms	106	0	20	4	0	0	0	0
2020	40A	ERD	East River Firearms	0	10	90	8	0	0	0	0
2020	40A	ERD	East River Firearms	38	6	30	4	0	0	0	0
2020	42A	ERD	East River Firearms	266	0	27	0	0	0	0	0
2020	42A	ERD	East River Firearms	0	11	43	0	0	0	0	0
2020	43A	ERD	East River Firearms	155	3	18	2	0	0	0	0
2020	43A	ERD	East River Firearms	0	10	31	4	0	0	0	0
2020	44A	ERD	East River Firearms	79	2	14	0	0	0	0	0
2020	44A	ERD	East River Firearms	0	2	37	2	0	0	0	0
2020	46A	ERD	East River Firearms	164	5	31	7	0	0	0	0
2020	46A	ERD	East River Firearms	0	8	76	8	0	0	0	0
2020	47A	ERD	East River Firearms	259	4	34	6	9	0	0	0
2020	47A	ERD	East River Firearms	0	34	235	44	0	0	0	0
2020	48A	ERD	East River Firearms	273	5	25	2	0	0	0	0
2020	48A	ERD	East River Firearms	0	2	47	3	0	0	0	0
2020	51A	ERD	East River Firearms	181	4	25	2	0	0	0	0
2020	51A	ERD	East River Firearms	0	20	131	8	0	0	0	0
2020	52A	ERD	East River Firearms	142	2	33	7	0	0	0	0
2020	52A	ERD	East River Firearms	0	6	81	4	0	0	0	0
2020	54A	ERD	East River Firearms	44	0	2	0	30	0	4	0
2020	54A	ERD	East River Firearms	0	15	95	11	0	0	0	0
2020	54A	ERD	East River Firearms	227	17	133	13	0	0	0	0
2020	55A	ERD	East River Firearms	263	7	41	3	0	0	0	0
2020	55A	ERD	East River Firearms	0	3	40	5	0	0	0	0
2020	56A	ERD	East River Firearms	150	3	33	0	0	0	0	0
2020	56A	ERD	East River Firearms	0	8	67	10	0	0	0	0
2020	57A	ERD	East River Firearms	373	7	72	7	2	0	0	0
2020	57A	ERD	East River Firearms	0	7	148	9	0	0	0	0
2020	59A	ERD	East River Firearms	13	0	1	0	37	0	0	1
2020	59A	ERD	East River Firearms	117	0	9	2	0	0	0	0
2020	59B	ERD	East River Firearms	14	0	0	0	2	0	0	0
2020	59B	ERD	East River Firearms	102	4	18	0	0	0	0	0
2020	59B	ERD	East River Firearms	0	2	5	2	0	0	0	0
2020	61A	ERD	East River Firearms	53	0	0	0	0	0	0	0
2020	62A	ERD	East River Firearms	143	3	21	2	0	0	0	0
2020	62A	ERD	East River Firearms	0	7	34	5	0	0	0	0
2020	63A	ERD	East River Firearms	14	0	0	0	18	0	0	0
2020	63A	ERD	East River Firearms	186	7	24	0	0	0	0	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	63A	ERD	East River Firearms	0	20	114	16	0	0	0	0
2020	01A	ESD	Special Buck East River	19	0	0	0	0	0	0	0
2020	03A	ESD	Special Buck East River	16	0	0	0	0	0	0	0
2020	04A	ESD	Special Buck East River	2	1	0	0	2	0	0	0
2020	05A	ESD	Special Buck East River	6	0	0	0	0	0	0	0
2020	06A	ESD	Special Buck East River	19	0	1	0	0	0	0	0
2020	07A	ESD	Special Buck East River	6	0	1	0	0	0	0	0
2020	08A	ESD	Special Buck East River	3	0	0	0	0	0	0	0
2020	10A	ESD	Special Buck East River	5	0	0	0	0	0	0	0
2020	12A	ESD	Special Buck East River	2	0	0	0	0	0	0	0
2020	13A	ESD	Special Buck East River	3	0	0	0	2	0	0	0
2020	16A	ESD	Special Buck East River	5	0	0	0	5	0	0	0
2020	17A	ESD	Special Buck East River	5	0	0	0	3	0	0	0
2020	18A	ESD	Special Buck East River	13	0	0	0	0	0	0	0
2020	19A	ESD	Special Buck East River	2	0	0	0	0	0	0	0
2020	22A	ESD	Special Buck East River	11	0	0	0	0	0	0	0
2020	23A	ESD	Special Buck East River	2	0	1	0	0	0	0	0
2020	26A	ESD	Special Buck East River	6	1	0	0	0	0	0	0
2020	28A	ESD	Special Buck East River	11	0	0	0	0	0	0	0
2020	29A	ESD	Special Buck East River	3	0	0	0	0	0	0	0
2020	33A	ESD	Special Buck East River	5	0	1	0	0	0	0	0
2020	36A	ESD	Special Buck East River	5	0	0	0	0	0	0	0
2020	37A	ESD	Special Buck East River	8	0	0	0	0	0	0	0
2020	40A	ESD	Special Buck East River	6	0	0	0	0	0	0	0
2020	42A	ESD	Special Buck East River	10	0	0	0	0	0	0	0
2020	43A	ESD	Special Buck East River	6	0	0	0	0	0	0	0
2020	44A	ESD	Special Buck East River	10	0	0	0	0	0	0	0
2020	46A	ESD	Special Buck East River	3	0	0	0	0	0	0	0
2020	47A	ESD	Special Buck East River	10	0	0	0	0	0	0	0
2020	48A	ESD	Special Buck East River	5	0	0	0	0	0	0	0
2020	51A	ESD	Special Buck East River	5	0	0	0	0	0	0	0
2020	52A	ESD	Special Buck East River	5	0	0	0	0	0	0	0
2020	54A	ESD	Special Buck East River	3	0	0	0	2	0	0	0
2020	55A	ESD	Special Buck East River	5	0	0	0	0	0	0	0
2020	56A	ESD	Special Buck East River	3	0	0	0	0	0	0	0
2020	59A	ESD	Special Buck East River	5	0	0	0	3	0	0	0
2020	59B	ESD	Special Buck East River	2	0	0	0	0	0	0	0
2020	61A	ESD	Special Buck East River	2	0	0	0	0	0	0	0
2020	62A	ESD	Special Buck East River	11	0	0	0	0	0	0	0
2020	63A	ESD	Special Buck East River	2	0	0	0	2	0	0	0
2020	BH1	LBD	Landowner Black Hills	0	0	0	0	3	0	0	0
2020	BH1	LBD	Landowner Black Hills	15	0	11	0	2	0	0	0
2020	01A	LED	Landowner East River	83	11	50	3	0	0	0	0
2020	03A	LED	Landowner East River	93	3	66	11	0	0	0	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	04A	LED	Landowner East River	158	8	103	3	0	0	0	0
2020	05A	LED	Landowner East River	106	5	61	11	0	0	0	0
2020	06A	LED	Landowner East River	96	11	69	8	0	0	0	0
2020	07A	LED	Landowner East River	65	3	50	3	0	0	0	0
2020	08A	LED	Landowner East River	54	0	24	3	0	0	0	2
2020	10A	LED	Landowner East River	47	3	26	5	0	0	0	2
2020	12A	LED	Landowner East River	44	0	26	0	0	0	0	0
2020	13A	LED	Landowner East River	34	0	26	5	12	0	0	0
2020	14A	LED	Landowner East River	13	0	8	3	2	0	3	0
2020	16A	LED	Landowner East River	31	3	8	3	12	0	3	0
2020	17A	LED	Landowner East River	93	5	37	3	10	3	6	2
2020	18A	LED	Landowner East River	116	5	34	3	2	0	0	0
2020	19A	LED	Landowner East River	36	3	24	0	0	0	0	0
2020	22A	LED	Landowner East River	83	0	63	0	2	0	0	0
2020	23A	LED	Landowner East River	41	8	16	0	0	0	0	0
2020	25A	LED	Landowner East River	31	0	11	0	0	0	0	0
2020	26A	LED	Landowner East River	54	3	32	5	2	0	0	0
2020	28A	LED	Landowner East River	23	0	40	0	0	0	0	0
2020	29A	LED	Landowner East River	90	5	58	5	0	3	0	0
2020	32A	LED	Landowner East River	57	3	24	5	0	0	0	0
2020	33A	LED	Landowner East River	78	0	66	5	12	0	0	0
2020	34A	LED	Landowner East River	72	3	29	5	0	0	0	0
2020	36A	LED	Landowner East River	16	0	11	0	10	0	3	0
2020	37A	LED	Landowner East River	109	5	53	0	0	0	0	0
2020	38A	LED	Landowner East River	8	0	5	5	0	0	0	0
2020	40A	LED	Landowner East River	34	3	18	3	0	0	0	0
2020	42A	LED	Landowner East River	72	3	18	3	0	0	0	0
2020	43A	LED	Landowner East River	83	5	48	3	0	0	0	0
2020	44A	LED	Landowner East River	36	0	18	3	2	0	0	0
2020	46A	LED	Landowner East River	65	5	32	0	0	0	0	0
2020	47A	LED	Landowner East River	31	0	26	0	0	0	0	0
2020	48A	LED	Landowner East River	26	0	11	0	0	0	0	0
2020	51A	LED	Landowner East River	57	5	26	3	0	0	0	0
2020	52A	LED	Landowner East River	36	5	24	0	0	0	0	0
2020	54A	LED	Landowner East River	13	0	13	0	2	0	3	0
2020	55A	LED	Landowner East River	150	5	87	8	0	0	0	0
2020	56A	LED	Landowner East River	80	3	48	0	0	3	0	0
2020	57A	LED	Landowner East River	83	3	45	16	0	3	0	0
2020	59A	LED	Landowner East River	13	0	8	0	5	0	3	0
2020	59B	LED	Landowner East River	23	3	5	0	2	0	0	0
2020	61A	LED	Landowner East River	47	0	16	8	0	0	0	0
2020	62A	LED	Landowner East River	49	3	24	0	0	0	0	0
2020	63A	LED	Landowner East River	44	8	24	3	7	3	6	2

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	01A	LFD	Landowner Free Antlerless	0	0	3	0	0	0	0	0
2020	02A	LFD	Landowner Free Antlerless	0	0	3	0	0	0	0	0
2020	02C	LFD	Landowner Free Antlerless	0	0	3	0	0	0	0	0
2020	15A	LFD	Landowner Free Antlerless	0	0	42	11	0	0	0	0
2020	15B	LFD	Landowner Free Antlerless	0	0	36	4	0	0	0	0
2020	24A	LFD	Landowner Free Antlerless	0	0	6	0	0	0	0	0
2020	33A	LFD	Landowner Free Antlerless	0	0	6	0	0	0	0	0
2020	35A	LFD	Landowner Free Antlerless	0	0	10	0	0	0	0	0
2020	35C	LFD	Landowner Free Antlerless	0	5	6	0	0	0	0	0
2020	38A	LFD	Landowner Free Antlerless	0	0	3	0	0	0	0	0
2020	45A	LFD	Landowner Free Antlerless	0	0	23	0	0	0	0	0
2020	45B	LFD	Landowner Free Antlerless	0	0	6	0	0	0	0	0
2020	45C	LFD	Landowner Free Antlerless	0	0	3	0	0	0	0	0
2020	49A	LFD	Landowner Free Antlerless	0	0	13	0	0	0	0	0
2020	49B	LFD	Landowner Free Antlerless	0	0	13	0	0	0	0	0
2020	53A	LFD	Landowner Free Antlerless	0	0	3	0	0	0	0	0
2020	53C	LFD	Landowner Free Antlerless	0	5	3	4	0	0	0	0
2020	57A	LFD	Landowner Free Antlerless	0	0	3	0	0	0	0	0
2020	64A	LFD	Landowner Free Antlerless	0	0	6	0	0	0	0	0
2020	02A	LWD	Landowner West River	22	3	20	0	19	0	9	0
2020	02C	LWD	Landowner West River	11	0	9	0	13	0	6	0
2020	11A	LWD	Landowner West River	25	0	0	3	3	0	6	0
2020	11B	LWD	Landowner West River	14	0	6	0	5	0	0	0
2020	15A	LWD	Landowner West River	55	3	51	0	29	0	12	0
2020	15B	LWD	Landowner West River	36	3	51	3	8	0	3	0
2020	20A	LWD	Landowner West River	11	0	11	0	24	0	15	3
2020	21A	LWD	Landowner West River	14	0	9	0	8	3	0	0
2020	21B	LWD	Landowner West River	14	0	6	0	0	0	0	0
2020	24A	LWD	Landowner West River	25	0	9	0	19	5	18	0
2020	24B	LWD	Landowner West River	3	0	0	0	0	0	0	0
2020	27A	LWD	Landowner West River	11	6	6	0	11	0	3	0
2020	27B	LWD	Landowner West River	19	0	23	0	19	0	6	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	30A,B	LWD	Landowner West River	105	3	100	3	3	0	3	0
2020	31A	LWD	Landowner West River	64	0	23	3	64	0	30	3
2020	35A	LWD	Landowner West River	6	0	11	0	27	0	6	0
2020	35C	LWD	Landowner West River	3	0	11	0	5	0	3	0
2020	39A	LWD	Landowner West River	8	0	3	0	19	0	0	0
2020	39B	LWD	Landowner West River	22	0	6	0	8	0	6	3
2020	41A	LWD	Landowner West River	25	0	11	0	32	0	9	0
2020	45A	LWD	Landowner West River	36	0	29	0	11	3	12	0
2020	45B	LWD	Landowner West River	19	0	11	0	5	0	0	0
2020	45C	LWD	Landowner West River	6	0	0	0	0	0	3	0
2020	45D	LWD	Landowner West River	14	0	0	3	8	0	0	0
2020	49A	LWD	Landowner West River	41	0	11	0	24	0	9	9
2020	49B	LWD	Landowner West River	25	0	11	0	27	0	3	0
2020	50A	LWD	Landowner West River	30	0	11	0	13	0	0	0
2020	53A	LWD	Landowner West River	19	0	9	0	37	0	0	0
2020	53C	LWD	Landowner West River	33	3	14	0	16	0	6	0
2020	58A	LWD	Landowner West River	30	0	6	0	29	0	12	0
2020	60A	LWD	Landowner West River	108	3	43	6	8	3	9	0
2020	64A	LWD	Landowner West River	14	0	3	0	13	0	6	0
2020	67A	LWD	Landowner West River	25	0	11	0	8	0	0	0
2020	01A	MHD	Mentored	0	12	75	10	0	0	2	0
2020	02A	MHD	Mentored	0	2	15	2	0	2	26	0
2020	02C	MHD	Mentored	0	2	4	0	0	2	11	0
2020	03A	MHD	Mentored	0	17	69	10	0	0	0	0
2020	04A	MHD	Mentored	0	10	38	4	0	0	0	0
2020	05A	MHD	Mentored	0	15	73	12	0	0	0	0
2020	06A	MHD	Mentored	0	15	65	10	0	0	0	0
2020	07A	MHD	Mentored	0	6	56	12	0	0	0	0
2020	08A	MHD	Mentored	0	8	25	12	0	0	0	0
2020	10A	MHD	Mentored	0	2	46	12	0	0	0	0
2020	11A	MHD	Mentored	0	2	0	0	0	0	2	0
2020	11B	MHD	Mentored	0	0	2	0	0	0	6	0
2020	12A	MHD	Mentored	0	8	36	0	0	0	0	0
2020	13A	MHD	Mentored	0	6	19	2	0	0	4	0
2020	14A	MHD	Mentored	0	2	4	0	0	0	4	0
2020	15A	MHD	Mentored	0	4	54	14	0	2	28	2
2020	15B	MHD	Mentored	0	2	44	4	0	0	6	0
2020	16A	MHD	Mentored	0	4	8	2	0	2	19	2
2020	17A	MHD	Mentored	0	14	36	6	0	0	4	0
2020	18A	MHD	Mentored	0	10	38	12	0	0	0	0
2020	19A	MHD	Mentored	0	0	31	8	0	0	0	0
2020	20A	MHD	Mentored	0	6	11	0	0	2	15	4
2020	21A	MHD	Mentored	0	4	29	2	0	0	15	0
2020	21B	MHD	Mentored	0	0	13	2	0	0	0	2

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	22A	MHD	Mentored	0	10	50	8	0	0	0	0
2020	23A	MHD	Mentored	0	6	48	17	0	0	0	0
2020	24A	MHD	Mentored	0	0	10	4	0	0	7	2
2020	25A	MHD	Mentored	0	4	23	0	0	0	0	0
2020	26A	MHD	Mentored	0	4	29	4	0	0	0	0
2020	27A	MHD	Mentored	0	0	10	0	0	0	6	0
2020	27B	MHD	Mentored	0	2	10	4	0	0	11	2
2020	27L	MHD	Mentored	0	0	8	0	0	0	0	0
2020	28A	MHD	Mentored	0	2	31	4	0	0	0	0
2020	29A	MHD	Mentored	0	4	52	8	0	0	0	0
2020	30A,B	MHD	Mentored	0	4	61	17	0	0	2	0
2020	31A	MHD	Mentored	0	2	29	8	0	0	33	8
2020	32A	MHD	Mentored	0	8	75	6	0	0	0	0
2020	33A	MHD	Mentored	0	0	27	6	0	0	2	0
2020	34A	MHD	Mentored	0	8	34	8	0	0	0	0
2020	35A	MHD	Mentored	0	2	4	4	0	0	13	2
2020	35C	MHD	Mentored	0	0	11	2	0	0	13	4
2020	35L	MHD	Mentored	0	2	0	2	0	0	2	0
2020	36A	MHD	Mentored	0	2	11	2	0	0	0	2
2020	37A	MHD	Mentored	0	8	19	2	0	0	0	0
2020	38A	MHD	Mentored	0	0	6	4	0	0	0	2
2020	39A	MHD	Mentored	0	4	2	0	0	2	7	0
2020	39B	MHD	Mentored	0	0	4	0	0	0	2	0
2020	40A	MHD	Mentored	0	0	10	6	0	0	4	0
2020	41A	MHD	Mentored	0	2	19	2	0	0	11	0
2020	42A	MHD	Mentored	0	6	40	2	0	0	0	0
2020	43A	MHD	Mentored	0	6	48	6	0	0	0	0
2020	44A	MHD	Mentored	0	6	48	6	0	0	0	0
2020	45A	MHD	Mentored	0	2	25	0	0	0	0	15
2020	45B	MHD	Mentored	0	2	11	0	0	0	0	0
2020	45C	MHD	Mentored	0	0	2	0	0	2	0	0
2020	46A	MHD	Mentored	0	14	59	2	0	0	0	2
2020	47A	MHD	Mentored	0	2	25	0	0	0	2	0
2020	48A	MHD	Mentored	0	2	17	2	0	0	0	0
2020	49A	MHD	Mentored	0	10	36	0	0	0	13	2
2020	49B	MHD	Mentored	0	4	15	2	0	0	28	2
2020	50A	MHD	Mentored	0	0	15	2	0	0	4	4
2020	51A	MHD	Mentored	0	2	38	6	0	0	2	0
2020	52A	MHD	Mentored	0	10	42	12	0	0	0	0
2020	53A	MHD	Mentored	0	0	8	0	0	0	24	6
2020	53C	MHD	Mentored	0	2	19	2	0	0	6	2
2020	54A	MHD	Mentored	0	2	13	0	0	0	6	0
2020	55A	MHD	Mentored	0	12	42	6	0	0	0	0
2020	56A	MHD	Mentored	0	4	25	2	0	0	0	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	57A	MHD	Mentored	0	4	34	8	0	0	0	0
2020	58A	MHD	Mentored	0	0	19	4	0	0	13	2
2020	59A	MHD	Mentored	0	2	10	2	0	0	7	2
2020	59B	MHD	Mentored	0	2	21	2	0	0	2	0
2020	60A	MHD	Mentored	0	4	31	2	0	0	2	0
2020	61A	MHD	Mentored	0	10	33	8	0	0	0	2
2020	62A	MHD	Mentored	0	12	75	8	0	0	0	0
2020	63A	MHD	Mentored	0	2	10	6	0	0	11	0
2020	64A	MHD	Mentored	0	0	4	2	0	0	11	0
2020	65A	MHD	Mentored	0	0	4	0	0	0	2	0
2020	67A	MHD	Mentored	0	2	8	2	0	0	0	0
2020	BH1	MHD	Mentored	0	31	236	48	0	6	17	0
2020	01A	MZD	Muzzleloader	4	3	33	4	0	0	0	0
2020	02A	MZD	Muzzleloader	1	0	2	0	8	0	0	0
2020	02C	MZD	Muzzleloader	4	0	5	0	7	0	0	0
2020	03A	MZD	Muzzleloader	3	3	16	2	0	0	0	0
2020	04A	MZD	Muzzleloader	1	3	16	2	0	0	0	0
2020	05A	MZD	Muzzleloader	6	3	23	2	0	0	0	0
2020	06A	MZD	Muzzleloader	7	3	65	9	0	0	0	0
2020	07A	MZD	Muzzleloader	0	0	10	0	0	0	0	0
2020	10A	MZD	Muzzleloader	0	2	5	0	0	0	0	0
2020	11A	MZD	Muzzleloader	1	0	0	0	0	0	0	0
2020	11B	MZD	Muzzleloader	0	0	3	0	0	0	0	0
2020	12A	MZD	Muzzleloader	1	0	3	2	0	0	0	0
2020	13A	MZD	Muzzleloader	3	2	3	0	0	0	0	0
2020	13L	MZD	Muzzleloader	0	0	2	0	0	0	0	0
2020	15A	MZD	Muzzleloader	1	0	7	0	3	1	1	0
2020	15B	MZD	Muzzleloader	4	2	0	0	1	0	0	0
2020	16A	MZD	Muzzleloader	0	0	2	2	4	0	0	0
2020	17A	MZD	Muzzleloader	3	2	7	2	1	0	0	0
2020	18A	MZD	Muzzleloader	6	2	7	0	0	0	0	0
2020	19A	MZD	Muzzleloader	4	2	15	0	0	0	0	0
2020	20A	MZD	Muzzleloader	0	0	0	0	1	0	1	0
2020	21A	MZD	Muzzleloader	1	0	8	2	3	0	1	0
2020	21B	MZD	Muzzleloader	1	2	3	0	1	0	0	0
2020	22A	MZD	Muzzleloader	7	0	7	0	0	0	0	0
2020	23A	MZD	Muzzleloader	1	3	15	0	0	0	0	0
2020	24A	MZD	Muzzleloader	0	0	2	0	4	0	0	0
2020	24B	MZD	Muzzleloader	1	2	2	0	0	0	0	0
2020	25A	MZD	Muzzleloader	1	0	2	0	0	0	0	0
2020	26A	MZD	Muzzleloader	1	0	8	0	0	0	0	0
2020	27A	MZD	Muzzleloader	1	0	0	0	1	0	0	0
2020	27B	MZD	Muzzleloader	1	0	5	2	1	0	0	0
2020	27L	MZD	Muzzleloader	0	0	0	2	0	0	0	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	28A	MZD	Muzzleloader	1	0	0	0	0	0	0	0
2020	29A	MZD	Muzzleloader	6	0	0	2	0	0	0	0
2020	30A,B	MZD	Muzzleloader	4	2	7	0	0	0	0	0
2020	31A	MZD	Muzzleloader	1	0	5	2	11	0	0	0
2020	32A	MZD	Muzzleloader	0	2	21	0	0	0	0	0
2020	33A	MZD	Muzzleloader	1	0	2	0	1	0	0	0
2020	34A	MZD	Muzzleloader	1	0	0	0	0	0	0	0
2020	35A	MZD	Muzzleloader	0	2	8	0	14	1	0	0
2020	35C	MZD	Muzzleloader	1	2	2	4	10	0	1	0
2020	35L	MZD	Muzzleloader	3	0	0	0	22	0	1	0
2020	36A	MZD	Muzzleloader	0	3	3	0	1	0	0	0
2020	37A	MZD	Muzzleloader	4	0	0	0	0	0	0	0
2020	39A	MZD	Muzzleloader	3	0	0	0	3	0	0	0
2020	39B	MZD	Muzzleloader	0	0	8	0	1	0	0	0
2020	40A	MZD	Muzzleloader	0	0	5	0	0	0	0	0
2020	41A	MZD	Muzzleloader	0	0	0	0	1	0	0	0
2020	42A	MZD	Muzzleloader	6	5	13	0	0	0	0	0
2020	43A	MZD	Muzzleloader	3	3	23	9	0	0	0	0
2020	44A	MZD	Muzzleloader	1	3	13	2	0	0	0	0
2020	45A	MZD	Muzzleloader	1	0	10	0	3	0	0	0
2020	45B	MZD	Muzzleloader	3	0	3	0	0	0	0	0
2020	45D	MZD	Muzzleloader	0	0	0	0	8	0	1	0
2020	46A	MZD	Muzzleloader	3	3	13	5	0	0	0	0
2020	47A	MZD	Muzzleloader	0	2	5	2	0	0	0	0
2020	48A	MZD	Muzzleloader	1	0	7	0	0	0	0	0
2020	49A	MZD	Muzzleloader	4	0	8	0	0	0	0	0
2020	49B	MZD	Muzzleloader	4	2	3	0	4	0	0	0
2020	50A	MZD	Muzzleloader	1	0	0	0	0	0	0	0
2020	51A	MZD	Muzzleloader	1	2	11	2	0	0	0	0
2020	52A	MZD	Muzzleloader	3	0	16	0	0	0	0	0
2020	53A	MZD	Muzzleloader	1	2	8	0	4	0	0	0
2020	53C	MZD	Muzzleloader	1	0	7	0	6	0	1	0
2020	54A	MZD	Muzzleloader	1	0	2	0	1	0	3	0
2020	55A	MZD	Muzzleloader	3	5	29	2	0	0	0	0
2020	56A	MZD	Muzzleloader	1	0	7	0	0	0	0	0
2020	57A	MZD	Muzzleloader	0	0	20	2	0	0	0	0
2020	58A	MZD	Muzzleloader	3	0	0	0	14	0	0	0
2020	59A	MZD	Muzzleloader	0	0	0	0	6	0	0	0
2020	60A	MZD	Muzzleloader	4	0	13	0	0	0	0	0
2020	61A	MZD	Muzzleloader	4	0	0	2	0	0	0	0
2020	62A	MZD	Muzzleloader	4	5	15	7	1	0	0	0
2020	63A	MZD	Muzzleloader	0	0	5	0	1	0	0	0
2020	64A	MZD	Muzzleloader	0	0	0	0	3	0	0	0
2020	BH1	MZD	Muzzleloader	18	20	239	14	11	0	4	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	LC1	RFD	Refuge	8	0	0	0	0	0	0	0
2020	LC2	RFD	Refuge	2	0	0	0	0	0	0	0
2020	SL1	RFD	Refuge	9	0	0	0	0	0	0	0
2020	SL2	RFD	Refuge	15	0	0	0	0	0	0	0
2020	SL3	RFD	Refuge	2	0	1	0	0	0	0	0
2020	SL4	RFD	Refuge	0	1	4	0	0	0	0	0
2020	SL5	RFD	Refuge	7	0	0	0	0	0	0	0
2020	WA1	RFD	Refuge	1	0	0	0	0	0	0	0
2020	WA3	RFD	Refuge	4	0	0	0	0	0	0	0
2020	02A	WRD	West River Firearms	63	0	5	0	217	0	6	2
2020	02A	WRD	West River Firearms	110	6	75	4	0	0	0	0
2020	02C	WRD	West River Firearms	18	0	0	0	62	0	1	0
2020	02C	WRD	West River Firearms	34	0	2	0	0	0	0	0
2020	11A	WRD	West River Firearms	60	0	8	0	37	0	3	0
2020	11A	WRD	West River Firearms	38	0	0	0	0	0	0	0
2020	11A	WRD	West River Firearms	0	0	15	2	0	0	0	0
2020	11B	WRD	West River Firearms	44	0	3	0	22	0	0	0
2020	11B	WRD	West River Firearms	32	0	2	0	0	0	0	0
2020	11B	WRD	West River Firearms	0	3	27	3	0	0	0	0
2020	15A	WRD	West River Firearms	37	0	5	3	138	0	3	0
2020	15A	WRD	West River Firearms	422	24	313	63	0	0	0	0
2020	15B	WRD	West River Firearms	69	2	6	0	35	0	0	0
2020	15B	WRD	West River Firearms	0	33	191	29	0	0	0	0
2020	15B	WRD	West River Firearms	384	33	242	13	0	0	0	0
2020	15P	WRD	West River Firearms	0	56	351	37	0	0	0	0
2020	20A	WRD	West River Firearms	38	0	3	0	79	0	2	0
2020	20A	WRD	West River Firearms	184	0	20	0	0	0	0	0
2020	21A	WRD	West River Firearms	30	0	2	0	62	0	2	0
2020	21A	WRD	West River Firearms	160	2	8	0	0	0	0	0
2020	21B	WRD	West River Firearms	46	2	2	0	14	0	5	0
2020	21B	WRD	West River Firearms	36	0	0	0	0	0	0	0
2020	21B	WRD	West River Firearms	0	0	20	0	0	0	0	0
2020	24A	WRD	West River Firearms	17	0	0	0	54	0	2	0
2020	24A	WRD	West River Firearms	137	0	25	0	0	0	0	0
2020	24A	WRD	West River Firearms	0	9	37	2	0	0	0	0
2020	24B	WRD	West River Firearms	11	0	0	0	0	0	0	0
2020	24B	WRD	West River Firearms	0	0	8	0	0	0	0	0
2020	27A	WRD	West River Firearms	40	0	0	2	49	0	3	0
2020	27B	WRD	West River Firearms	41	0	5	0	89	0	6	0
2020	27B	WRD	West River Firearms	122	2	18	0	0	0	0	0
2020	27B	WRD	West River Firearms	0	2	49	2	0	0	0	0
2020	27L	WRD	West River Firearms	2	0	2	0	0	0	0	0
2020	27L	WRD	West River Firearms	5	1	0	0	0	0	0	0
2020	27P	WRD	West River Firearms	0	2	27	2	0	0	0	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	30A	WRD	West River Firearms	16	0	0	0	2	0	0	0
2020	30A	WRD	West River Firearms	171	5	25	4	0	0	0	0
2020	30A	WRD	West River Firearms	51	2	40	7	0	0	0	0
2020	30B	WRD	West River Firearms	12	0	0	0	0	0	0	0
2020	30B	WRD	West River Firearms	206	7	43	2	0	0	0	0
2020	30B	WRD	West River Firearms	52	13	69	4	0	0	0	0
2020	31A	WRD	West River Firearms	134	0	5	2	295	0	17	0
2020	31A	WRD	West River Firearms	53	1	1	1	0	0	0	0
2020	31A	WRD	West River Firearms	0	6	36	3	0	0	0	0
2020	35A	WRD	West River Firearms	51	0	5	0	156	2	12	0
2020	35A	WRD	West River Firearms	150	29	136	26	0	0	0	0
2020	35A	WRD	West River Firearms	0	9	64	17	0	0	0	0
2020	35C	WRD	West River Firearms	15	0	0	0	109	0	3	0
2020	35C	WRD	West River Firearms	173	16	77	24	0	0	0	0
2020	35C	WRD	West River Firearms	0	7	45	21	0	0	0	0
2020	35L	WRD	West River Firearms	10	0	0	0	74	1	3	0
2020	39A	WRD	West River Firearms	23	0	2	0	94	0	2	0
2020	39A	WRD	West River Firearms	60	2	3	0	0	0	0	0
2020	39B	WRD	West River Firearms	93	0	3	0	101	0	7	0
2020	39B	WRD	West River Firearms	36	2	0	0	0	0	0	0
2020	39B	WRD	West River Firearms	0	2	27	2	0	0	0	0
2020	41A	WRD	West River Firearms	49	0	5	2	52	2	3	0
2020	41A	WRD	West River Firearms	179	5	18	0	0	0	0	0
2020	45A	WRD	West River Firearms	27	0	0	0	31	0	0	0
2020	45A	WRD	West River Firearms	202	5	30	2	0	0	0	0
2020	45A	WRD	West River Firearms	64	4	64	2	0	0	0	0
2020	45B	WRD	West River Firearms	22	0	0	2	7	0	0	0
2020	45B	WRD	West River Firearms	69	3	37	4	0	0	0	0
2020	45C	WRD	West River Firearms	3	2	2	0	9	0	0	0
2020	45C	WRD	West River Firearms	0	4	19	6	0	0	0	0
2020	45D	WRD	West River Firearms	5	0	0	0	13	0	1	0
2020	45D	WRD	West River Firearms	31	0	0	0	0	0	0	0
2020	45P	WRD	West River Firearms	0	2	31	2	0	0	0	0
2020	49A	WRD	West River Firearms	278	0	25	0	157	2	14	0
2020	49A	WRD	West River Firearms	196	8	144	8	0	0	0	0
2020	49A	WRD	West River Firearms	0	8	124	17	0	0	0	0
2020	49B	WRD	West River Firearms	182	4	11	0	289	0	15	2
2020	49B	WRD	West River Firearms	203	2	13	0	0	0	0	0
2020	49B	WRD	West River Firearms	0	11	128	16	0	0	0	0
2020	50A	WRD	West River Firearms	105	0	14	2	136	2	9	2
2020	50A	WRD	West River Firearms	238	7	30	7	0	0	0	0
2020	53A	WRD	West River Firearms	29	0	0	0	127	0	5	0
2020	53A	WRD	West River Firearms	11	2	8	0	70	0	44	11
2020	53A	WRD	West River Firearms	172	13	88	13	0	0	0	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	53A	WRD	West River Firearms	0	2	59	18	0	0	0	0
2020	53C	WRD	West River Firearms	88	2	3	0	166	0	5	0
2020	53C	WRD	West River Firearms	43	3	32	5	38	0	38	3
2020	53C	WRD	West River Firearms	199	19	133	12	0	0	0	0
2020	53C	WRD	West River Firearms	0	15	110	19	0	0	0	0
2020	58A	WRD	West River Firearms	23	0	0	0	63	0	0	0
2020	58A	WRD	West River Firearms	71	0	8	0	0	0	0	0
2020	58D	WRD	West River Firearms	1	0	0	0	0	0	0	0
2020	58D	WRD	West River Firearms	0	2	0	0	0	0	0	0
2020	60A	WRD	West River Firearms	94	0	10	0	21	0	0	0
2020	60A	WRD	West River Firearms	0	2	72	9	0	0	0	0
2020	60A	WRD	West River Firearms	494	23	308	30	0	0	0	0
2020	64A	WRD	West River Firearms	77	0	4	0	136	0	6	0
2020	64A	WRD	West River Firearms	109	0	9	4	0	0	0	0
2020	65A	WRD	West River Firearms	25	0	10	0	20	0	0	0
2020	67A	WRD	West River Firearms	64	0	5	0	13	0	2	0
2020	02A	WSD	Special Buck West River	28	0	0	0	45	0	0	0
2020	02C	WSD	Special Buck West River	21	0	0	0	17	0	1	0
2020	11A	WSD	Special Buck West River	3	0	0	0	6	0	0	0
2020	11B	WSD	Special Buck West River	16	0	0	0	2	0	0	0
2020	15A	WSD	Special Buck West River	37	0	0	0	25	0	0	0
2020	15B	WSD	Special Buck West River	31	0	0	0	6	0	0	0
2020	20A	WSD	Special Buck West River	34	0	2	0	23	0	0	0
2020	21A	WSD	Special Buck West River	31	0	0	0	16	0	0	0
2020	21B	WSD	Special Buck West River	10	0	0	0	3	0	0	0
2020	24A	WSD	Special Buck West River	11	0	0	1	6	0	0	0
2020	27A	WSD	Special Buck West River	6	0	0	0	5	0	0	0
2020	27B	WSD	Special Buck West River	28	0	0	0	12	0	0	0
2020	27L	WSD	Special Buck West River	5	0	0	0	0	0	0	0
2020	30A,B	WSD	Special Buck West River	180	0	2	0	5	0	0	0
2020	31A	WSD	Special Buck West River	36	0	2	0	36	0	0	0
2020	35A	WSD	Special Buck West River	16	0	2	0	45	0	0	0
2020	35C	WSD	Special Buck West River	15	0	0	0	25	0	1	0
2020	39A	WSD	Special Buck West River	21	0	0	0	8	0	0	0
2020	39B	WSD	Special Buck West River	21	0	0	0	9	0	0	0
2020	41A	WSD	Special Buck West River	52	0	0	1	23	0	0	0
2020	45A	WSD	Special Buck West River	36	0	2	0	12	0	0	0
2020	45B	WSD	Special Buck West River	11	0	0	0	2	0	0	0
2020	45C	WSD	Special Buck West River	18	0	0	0	0	0	0	0
2020	45D	WSD	Special Buck West River	2	0	0	0	0	0	1	0
2020	49A	WSD	Special Buck West River	28	0	0	0	3	0	0	0
2020	49B	WSD	Special Buck West River	28	0	0	0	11	0	0	0
2020	50A	WSD	Special Buck West River	42	0	0	0	17	0	0	0
2020	53A	WSD	Special Buck West River	23	0	0	0	8	0	0	0

Year	Unit	Season	UserGroup	WTBA	WTBF	WTDA	WTDF	MDBA	MDBF	MDDA	MDDF
2020	53C	WSD	Special Buck West River	36	0	2	0	20	1	0	0
2020	58A	WSD	Special Buck West River	45	0	0	0	45	0	0	0
2020	60A	WSD	Special Buck West River	76	0	3	0	9	0	0	0
2020	64A	WSD	Special Buck West River	19	0	0	0	14	0	0	0
2020	67A	WSD	Special Buck West River	2	0	0	0	0	0	0	0
2020	BH1	WSD	Special Buck West River	0	0	0	0	3	0	0	0

## DEER POPULATION ESTIMATION

### INTRODUCTION

Population management objectives were established across 90 white-tailed deer (*Odocoileus virginianus*) and mule deer (*Odocoileus hemionus*) harvest management units in South Dakota (Figure 1). Harvest reconstruction and population projection models were used to annually estimate abundance and project future populations and growth rates at data analysis unit (DAUs; Figure 1) levels using harvest, survival monitoring, and herd composition data. Changes in hunting license allocation and season structure across 90 hunting units were biennially recommended that align population objectives and growth rates. Reconstruction estimates and projections were validated with winter fixed-wing aerial survey or fall roadside spotlight survey population estimates when available. Aerial survey models rely on data collected from intermittent aerial observation surveys in northeastern South Dakota (SDGFP 2017) and roadsides surveys were annually conducted in the Black Hills.

### METHODS

#### Fixed-wing Aerial Survey

A winter fixed-wing aircraft inventory of white-tailed deer populations in DAU 10 and 9 was conducted in 2017 and 2019, respectively.

Winter surveys were conducted anytime between January and March, when consistent snow conditions were present to maximize detection probability. A minimum of 6 inches of snow was required across the entire survey unit. A fixed-wing aircraft is flown at speeds <100 miles per hour, and altitudes between 100 to 200 feet above ground level. Aerial strip transects were flown 0.5 miles apart. Two observers, not including the pilot, record and classify all deer observed ≤0.25 miles of each side of the aircraft.

During the most recent survey in 2019, parameter estimates for the sightability model were used from Robling (2011).

$$\text{logit}(\rho_i) = 3.06418 - 1.12647 \times \text{canopy cover}_i + 0.04396 \times \text{group size}_i$$

The associated variance-covariance matrix used was:

$$\begin{bmatrix} 0.372804380 & -0.119976389 & -0.003728446 \\ -0.119976389 & 0.056642097 & -0.000497386 \\ -0.003728446 & -0.000497386 & 0.000388440 \end{bmatrix}$$

Total population, variance and confidence intervals (Wong 1996) from observation data were estimated from the logistic model using the SightabilityModel package (Fieberg 2012) in Program R.

### **Roadside Spotlight Survey**

Fall roadside transect surveys have been conducted annually in DAU 3 beginning in 2012. In 2015, no surveys were conducted.

Fall surveys were conducted during the last 2 weeks of August across approximately 60 transect routes of varying lengths of 3.5-16 kilometers. Surveys were conducted beginning  $\frac{1}{2}$  hour after sunset and generally last <5 hours. Surveys were not conducted in rain, fog, or sleet. Two observers, one including the driver use 4-million candle powered spotlights to scan for deer while travelling at speed <15 miles per hour. Once a white-tailed deer is detected, group size and distance from transect were recorded (SDGFP 2017). Distance sampling methods were used to estimate abundance (Buckland et al. 2004, Cudmore 2017) and data were fit using the Distance package (Miller et al. 2019) in Program R. Akaike's Information Criterion, corrected for small sample sizes, was used to select among competing model including hazard and half-normal detection functions and group size and habitat (meadow and tree) covariates (Burnham and Anderson 2002).

### **Population Reconstruction (model structure A) and Future Projection (model structure B)**

Two different harvest-based models were used to estimate the deer population for each DAU. The first model estimated a pre-fall deer abundance in the previous year and the second model was used to project abundance into future years as a function of proposed hunting season recommendations.

#### *Model Structure A pre-fall year 1 to pre-fall year 2*

The model used to estimate previous years abundance initiated by reconstructing the adult buck and adult female pre-fall population by dividing each cohort's estimated harvest by an estimate of the associated harvest rate (i.e., percent of pre-fall season population that is legally harvested). The first stage of the projection estimated pre-fall fawns by multiplying pre-fall adult females by fawns per adult female (age ratio), calculated from the most recent 3-year average of herd composition data. As an example, new fawns were recruited into the pre-fall population by multiplying fall adult does by the number of fawns observed divided by the number of adult females observed from herd composition surveys. This completes the first stage of the projection model, accounting for fall fawn recruitment into the pre-hunt population (Figure 3).

The second stage projected pre-fall abundance of adults to the current year (year 2 pre-fall in Figure 3) by multiplying cohort-specific abundance by estimates of annual non-harvest survival rates and subtracting harvest. Non-harvest survival rates represented deer deaths related to multiple causes, the majority include wounding loss, predation, vehicle accidents, starvation, and disease. The fawn cohort in each projection is then aged into the adult population assuming a 50:50 sex ratio (Figure 3).

#### *Model Structure B: project abundance to future years (starting at pre-fall year 2)*

The 2<sup>nd</sup> model used to predict future abundance also has two stages within each year. The population projection was repeated across multiple years to evaluate changes in deer abundance as a function of proposed hunting season changes (Figure 3).

The 1<sup>st</sup> stage of the model representing recruitment of new fawns was the same as model A, described above, and multiplied pre-fall adult female abundance by estimates of fawns per adult females based on fall herd composition surveys.

The 2<sup>nd</sup> stage removed all deaths that were expected to occur annually from September 1 to August 31. Like model structure A, non-harvest deaths were accounted for by multiplying cohort-specific abundance by estimates of annual non-harvest survival rates. Because we do not know the future harvest, 5-year averages of harvest were subtracted, but they were scaled up or down based on population change from the previous year. This assumed average harvest success will increase or decrease proportionally as a function of the population. Because changes to hunting licenses were used to increase or decrease annual mortality rates of bucks, does and fawns, the model adjusted harvest based on increases or decreases to firearm deer licenses. Assuming additive harvest mortality as a linear function of firearm license change, changes in license type allocations from the previous year were multiplied by 5-year average license type success rates, and the resulting harvest difference for adult bucks, adult does and fawns was added to or subtracted from each cohort. Fawns were then aged into the adult cohort, assuming a 50:50 sex ratio. This completed the annual cycle resulting in a pre-recruitment population. The process for model structure B was repeated for subsequent years.

## RESULTS

Aerial survey estimates in DAU 9 in 2019 was 32,359 (95% CI = 31,078 – 34,824) and the DAU 10 in 2017 was 19,655 (95% CI = 19,121 – 20,780). Since 2012, population estimates from roadside spotlight surveys in DAU 3 have ranged between 30,000-60,000 white-tailed deer resulting in the highest DAU white-tailed deer density in South Dakota (Figure 2).

Population reconstruction resulted in a statewide population estimate in the fall of 2020 of ~400,000 white-tailed deer and ~80,000 mule deer in South Dakota. Importantly, the population reconstruction estimate is sensitive to harvest rate estimates, especially for adult does because harvest rates were generally low for this cohort and difficult to estimate using radiocollared deer. As an example, in 2020, DAU 1 mule deer adult doe harvest was estimated at 371 and a 3.9% harvest rate was used to reconstruct the adult doe cohort to 9,513 (371 divided by 3.9%). If there was only a 1.9% error in estimating the harvest rate and only 2% of adult does were harvested, the reconstruction estimate would be 18,550 (371 divided by 2%), nearly double the current estimate.

For each DAU, fawns were recruited into the fall population by multiplying the harvest reconstruction estimate of adult does by the 5-year average of fawns:100 adult does which ranged 0.66-0.99 for white-tailed deer and 0.57-0.84 for mule deer. For white-tailed deer, annual (Sep. 1 to Aug. 31) juvenile non-harvest survival (range 74-78%), adult female non-

harvest survival (82-87%) and adult buck non-harvest survival (65-74%), was used to project each DAU population cohort to the next year. For mule deer, annual (Sep. 1 to Aug. 31) juvenile non-harvest survival (range 47-71%), adult female non-harvest survival (85-86%) and adult buck non-harvest survival (68-72%), was used to project each DAU population cohort to the next year. Population projections, similar to reconstruction, are sensitive to errors in survival rates used to project the population. It is especially important to note that future weather events, such as severe winter or drought, or disease outbreaks (e.g., epizootic hemorrhagic disease) cannot be predicted and they will result in deviations from projections using population averages.

This type of sensitivity is common with harvest-based reconstruction and projection models. Because of this, SDGFP uses multiple sources of information to validate population trends produced from reconstruction and projection models including: (1) aerial and roadside survey data, (2) harvest trends, (3) fawn to doe ratio trends, (4) depredation complaints, and (5) staff observations and opinions.

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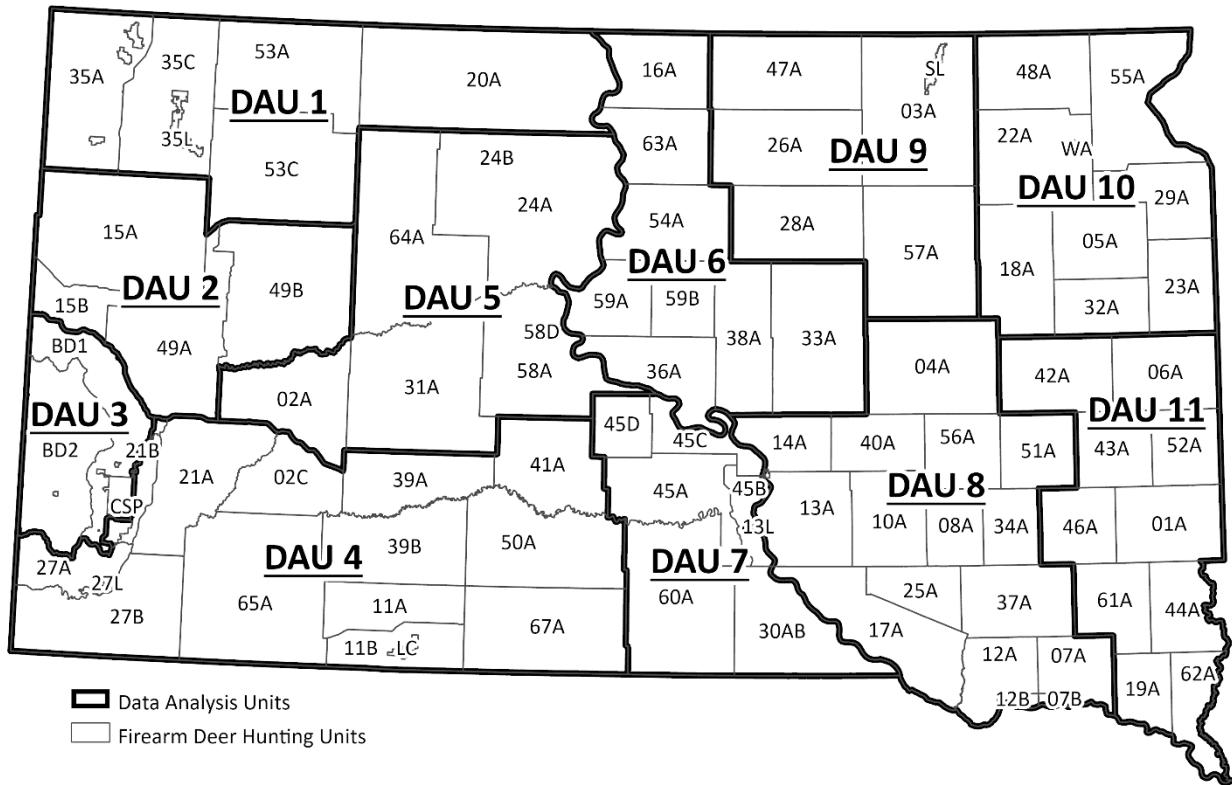


Figure 1. Ninety deer management units (thin black lines) spanning South Dakota. Deer data analysis units are indicated with thick black lines.

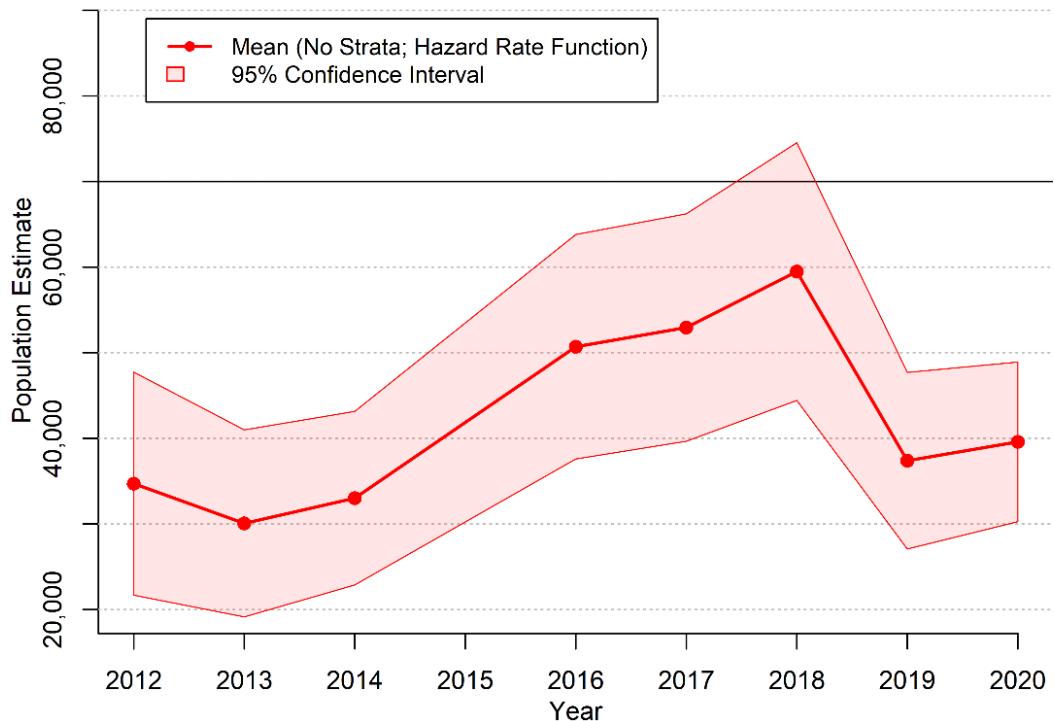


Figure 2. Annual white-tailed deer population estimates from roadside observation surveys in DAU 3, excluding 2015 when no surveys was conducted.

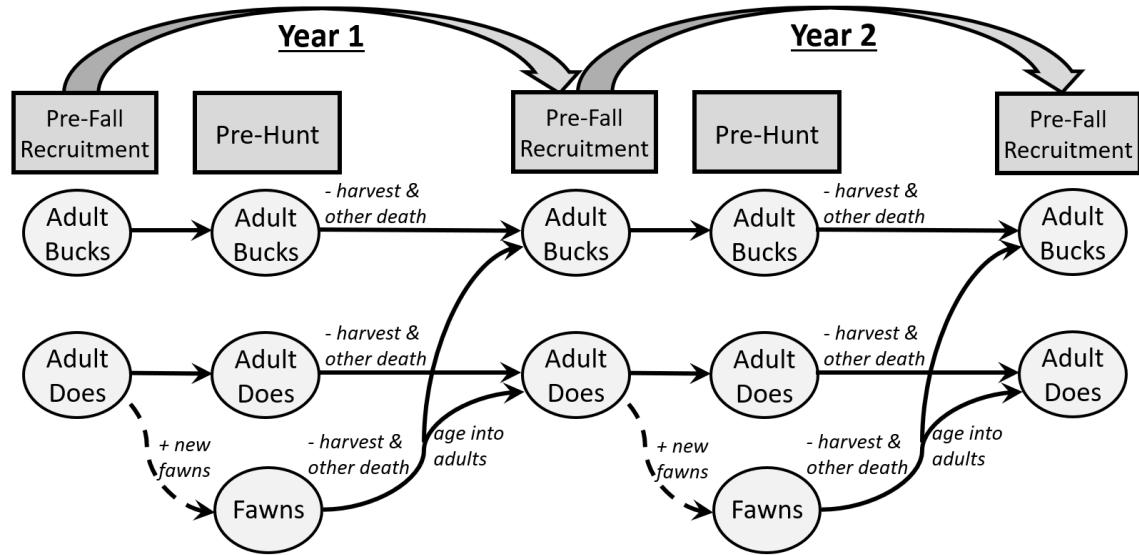


Figure 3. Graphical illustration of the deer population projection model used to predict population abundance.