

Wildlife Advisory Committee
Teton County, Idaho
150 Courthouse Drive
Driggs, ID 83422

December 12, 2024

Board of County Commissioners
Teton County, Idaho
150 Courthouse Drive
Driggs, ID 83422

RE: Wildlife-Vehicle Collisions on Ski Hill Road: Speed Limit Reduction Position Statement

Dear Commissioners,

The Teton County Wildlife Advisory Committee (TCWAC) is a volunteer advisory committee to the County Commissioners. Among TCWAC's assigned responsibilities are to "Recommend guidelines, practices, goals, and policies designed to protect and restore fish and wildlife habitats in Teton County" and to "Recommend regulations and resolutions that promote public safety, recreation enjoyment, and natural resource conservation". TCWAC is writing this recommendation to state our support for a speed limit reduction on Ski Hill Road.

Wildlife-vehicle collisions continue to be a major global contributor to animal mortality resulting in population reduction, especially in combination with other anthropogenic factors like habitat loss, human recreation, domestic animals (e.g., dogs and cats) and climate change (Abrahms 2023). This is especially true on rural roads where traffic is less predictable and temporary gaps between cars entice animals to cross roads when it may not actually be safe. Wildlife-vehicle collisions also threaten the health and safety of people. In the United States, there are over 200 fatal crashes annually. About 5% of all crashes in the United States are animal-vehicle collisions which are estimated to cost society over \$10 billion annually (Cramer et. al. 2022).

Teton County, Idaho, is not shielded from this issue; in fact, wildlife-vehicle collisions are high in Teton Valley, a basin that serves as an important winter range for many large mammals. Wildlife-vehicle collisions are documented in the valley by local law enforcement, state transportation and wildlife agency personnel as well as local citizen scientists. These data have provided ample evidence to outline a science-based understanding of wildlife-vehicle collision hotspots where drivers are more likely to crash into large animals (Jackson Hole Wildlife Foundation 2024). One area of concern is Ski Hill Road, east of Driggs.

Ski Hill Road bisects important deer (*Odocoileus* spp), elk (*Cervus canadensis*), and moose (*Alces alces*) habitats. To access the full habitat, these species must cross Ski Hill Road. Ski Hill Road is one of the main roads to Grand Targhee Resort, a major destination for local and visiting recreationists. On average, Ski Hill Road is driven by ~3,800 vehicles each day, more in the winter and summer months (Idaho Transportation Department [Annual Day of Week Summary](#) 2023). At times, this volume of traffic likely inhibits animals from crossing the road; at less busy times of day, the lower number of vehicles likely lures animals into crossing the road,

exposing them to collisions. This combination of factors has led to high wildlife-vehicle collisions between the Ski Hill Road intersection with Cemetery Road and the intersection with Stateline Road. The previously cited 2024 report by Jackson Hole Wildlife Foundation shows the hotspot locations throughout Teton County, Idaho and this location is among the highest for deer, elk and moose (see Jackson Hole Wildlife Foundation 2024 attached report, pages 26 through 28 for relevant hotspot maps).

In this same location, just east of the junction of Ski Hill Road with Cemetery Road, and extending east approximately 2.7 miles to the junction of Ski Hill Road with Stateline Road, the maximum speed limit increases bidirectionally from 35 to 45 miles per hour. It is the collective opinion of the TCWAC that in addition to the number of animals moving across the road and the number of cars traveling this road, an important criterion leading to the higher levels of wildlife-vehicle collisions is vehicle stopping distance. Stopping distance for drivers has been clearly demonstrated to increase as vehicle speeds increase, leading to higher likelihoods of collision (Huijser et al. 2017 and Figure 1). Stopping distance is dependent on 1) driver behavior (for example, are they attentive), and 2) vehicle speed. Add to this equation winter driving conditions such as an icy road surface and reduced visibility and it is easy to see why wildlife-vehicle collisions are high at this location.

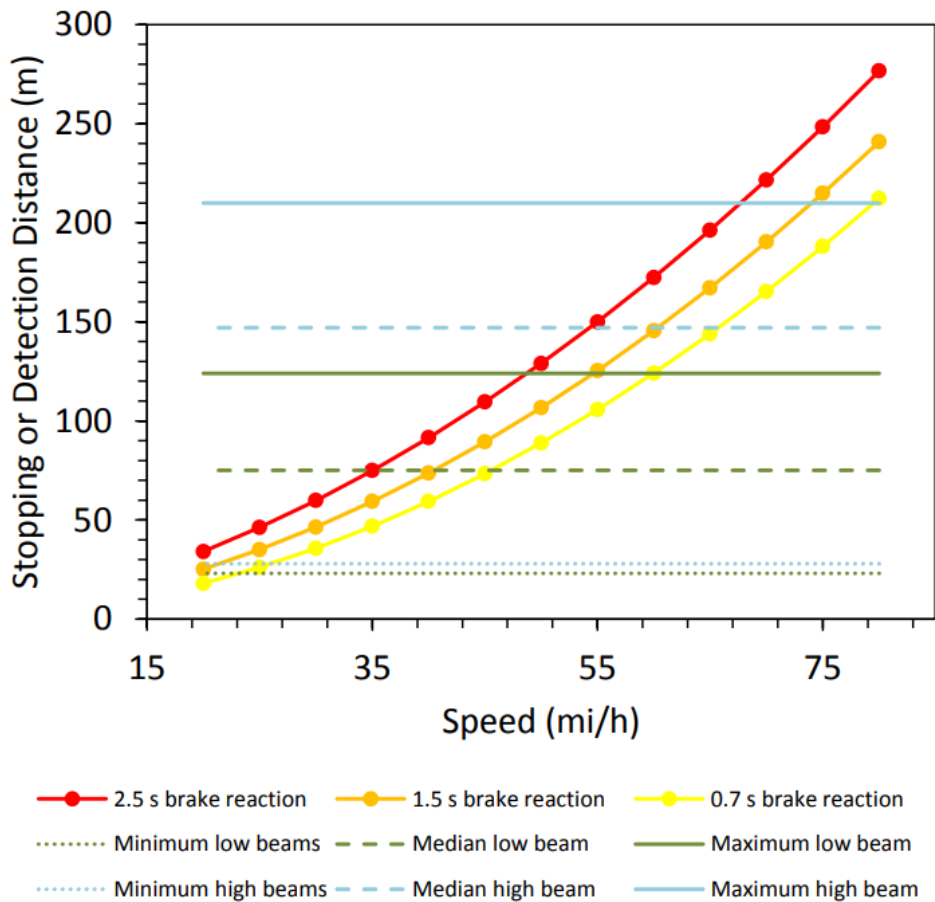


Figure 1. Stopping Distances and Detection Distances for Large Mammals (Huijser et al. 2017).

TCWAC strongly believes that a reduction in the maximum speed on Ski Hill Road from 45 to 35 miles per hour is important to help reduce the occurrence of wildlife-vehicle collisions along this road, ensuring greater safety for both wildlife and people.

We appreciate your attention on this matter and are happy to answer any questions associated with our Position Statement.

Sincerely,

Teton County Wildlife Advisory Committee

Citations:

Abrahms, B., N.H. Carter, T.J. Clark-Wolf, K.M. Gaynor, E. Johansson, A. McInturff, A.C. Nisi, K. Rafiq, and L. West. 2023. Climate change as a global amplifier of human-wildlife conflict. *Nature Climate Change* 13:224-234.

Cramer, P., J. Kintsch, J. Gagnon, N. Dodd, T. Brennan, L. Loftus-Otway, K. Andrews, P. Basting, L. Sielecki, and L. Frazier. 2022. The Final Manual for the Nevada Department of Transportation and Federal Highway Administration Pooled Fund Study: The Wildlife Vehicle Collision (WVC) Reduction and Habitat Connectivity Transportation Pooled Fund Project TPF 5(358). NDOT Research Report No. 700-18-803.

Huijser, M.P., E.R. Fairbank & F.D. Abra. 2017. The Reliability and Effectiveness of a Radar-Based Animal Detection System. Federal Highways Administration Final Report FHWA-ID-17-247.

[Jackson Hole Wildlife Foundation. 2024.](#) Teton County Wildlife-Vehicle Collision Database Summary Report (2022-2023). Jackson, WY.

Attachment: Teton County, WY and Teton County, ID Wildlife-Vehicle Collision Database Summary Report May 2022 – April 2023.

Teton County, WY and Teton County, ID Wildlife-Vehicle Collision Database Summary Report

May 2022 – April 2023



Prepared by:
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October 30, 2024

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JACKSON HOLE



WILDLIFE
FOUNDATION

On the Cover: Moose crossing the road.

Original Photo: Mark Gocke, WGFD

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Table of Contents

Executive Summary	2
Teton County, WY.....	3
Introduction.....	3
Methods	5
Results.....	7
Discussion.....	17
Teton County, ID.....	19
Introduction.....	19
Methods	21
Results.....	22
Discussion.....	31
Combined Resources	32
Suggested Citation	32
Acknowledgements	32
References.....	32
Appendix A: WVC Summary Table - Teton County, WY WVC Species Count By WVC Years 2014-2023	33
Appendix B: WVC Summary Table - Teton County, ID WVC Species Count By WVC Years 2014-2023	34

Executive Summary

Jackson Hole Wildlife Foundation (JHWF) has collected wildlife-vehicle collision (WVC) data since the organization's inception in 1993. JHWF's WVC database serves as a data hub for use by town and county planners, wildlife managers, land managers, elected officials, transportation planners, scientific researchers and others. The database tool facilitates science-based decision making regarding WVC mitigation, wildlife connectivity and transportation management.

During WVC Yr. 2023, a total of 235 WVCs were recorded. However, given the vast underreporting of WVCs, even when rigorous survey efforts are undertaken, the actual number of WVCs were likely 470-940 or 2x to 4x higher. Mule deer represent a large portion of the recorded WVCs. Traditionally, mule deer WVC numbers are largely driven by winter severity (i.e. snow depth). However, mule deer WVC trends in Teton County, WY for 2023 (a severe winter) were lower than would be expected based on previous patterns. The fact that mule deer WVCs were lower in 2023 may have been due to a beneficial change of the new wildlife crossings projects on South 89. These wildlife crossing projects may have been displaying effectiveness as a mitigation measure even though that project was not fully complete.

Long-term trends in WVC annual and seasonal patterns can help elucidate what factors may lead to increased WVC. However, trends are less useful for targeting locations where management efforts could be focused. Mapping WVC hotspots in Teton County, WY and Teton County, ID assist to define important target areas for mitigation measures and informing agency decision-making with science.

Teton County, WY

Introduction

Jackson Hole Wildlife Foundation (JHWF) has collected wildlife-vehicle collision (WVC) data since the organization's inception in 1993. These data are collected as carcass reports from trained citizen scientists. In 2003, Biota Consulting summarized JHWF's data (Biota Research and Consulting, Inc 2003) and then in 2011 Huijser et al. wrote a comprehensive report using these data for specific sections of highway within Teton County. However, neither of these efforts comprehensively incorporated all datasets available, e.g., WYDOT crash data, or all major roadways in Teton County, WY. That same year, JHWF began developing a comprehensive WVC database for Teton County, WY with assistance from the Teton Science Schools' Teton Research Institute (TSS-TRI). The goal was to collate and standardize WVC data from citizens, Wyoming Game and Fish Department (WGFD) reports of roadside carcasses and crash reports from Wyoming Department of Transportation (WYDOT) so that these data could be viewed and utilized in a comprehensive manner. Wildlife-vehicle collision data are the combination of both carcass and crash data.

JHWF's WVC database serves as a data hub for use by town and county planners, wildlife managers, land managers, elected officials, transportation planners, scientific researchers and others. The database tool facilitates science-based decision making regarding WVC mitigation, wildlife connectivity and transportation management.

In 2015, JHWF began creating reports summarizing these data for use by government agencies and other partners. These reports focused on southern Teton County, WY (Figure 1) as Grand Teton National Park maintains its own database. Data were also collected for roads in the Alta area and Togwotee Pass. These summaries have influenced many management actions for wildlife protection along roadways in Teton County including:

- a collaborative signage program between JHWF, Wyoming Game and Fish Department, Teton County, and Wyoming Department of Transportation (WYDOT) to increase awareness near WVC hotspots;
- the creation of a county-wide plan to mitigate WVC and increase landscape permeability across roads (Huijser, et al. 2018; <https://jacksontetonplan.com/295/Wildlife-Crossings-Master-Plan>);
- reduction of the nighttime speed limit on WY 390;
- the creation of overwhelming public support for a 2019 Teton County Specific Purpose Excise Tax fund for mitigating WVC and increasing connectivity with wildlife crossings; and
- the use of WVC data to inform and design several wildlife crossing structures and fencing projects with WYDOT and Teton County including:
 - South Hwy 89 from South Park Loop/ Melody Ranch to Hoback,
 - The Snake River Bridge Project at the intersection of Highways 22/ 390
 - Wildlife crossing design projects on WY 22, US191 and North US89.

Each of these progressive efforts aim to reduce WVCs and increase landscape permeability for wildlife in Teton County, WY. The greatest protection for wildlife that allows safe movement across roadways, particularly within the context of continually increasing traffic and widening roadways, has been the installation of well-designed and accurately placed wildlife crossing structures with accompanying funnel fencing (on average, an 86% reduction in WVC; Huijser, et al. 2009).

Through past efforts and JHWF's partnership with WYDOT and Teton County, wildlife underpasses and associated fencing have recently been implemented on the US Highway 89 South (Hwy 89S) expansion project south of Jackson and are currently being implemented on the Snake River Bridge/Highway 22 project. The Hwy

390/22 intersection project includes realignment of the intersection and construction on the Snake River Bridge. This project was initiated in the summer of 2023 with an expected completion in 2025 (*B. Hammond, WYDOT, pers. commun.*). With the use of JHWF's Wildlife-Vehicle Collision Database, both projects present an opportunity to examine the effects of WVC mitigation efforts on the number of WVCs reported annually within Teton County.

Figure 1. Teton County, WY Study Area



Methods

Wildlife-Vehicle Collision Annual Data Processing and Sources

The WVC database is updated annually using an automated process in combination with human verification. This process combined all reported WVCs from multiple sources into one geodatabase in ArcMap (esri.com/en-us/arcgis/about-arcgis/overview). For the 2022-2023 data update, the processing followed the methods refined in the 2021-2022 update (see JHWF's *Teton County Wildlife-Vehicle Collision Database Summary Report: May 2019-April 2021 Two Year Summary Report* for earlier methods).

WYDOT maintains spatial datasets for all major travel routes in Wyoming. These spatial datasets use linear-referenced system (LRS) geometry containing route and measurement attributes. Once raw WVC data were combined into one database, observation within 100m of roadways were joined to the nearest WYDOT LRS route using the "Locate Feature Along Route" tool in ArcMap.

This database was then run through the Find Identical tool in ArcMap that identified duplicates based on distance (<0.25 mi) from other observations, sample date (\pm one day) and species. The addition of plus or minus one day for the sample date is a 2022 update to methods from previous years. Beginning in 2021 (calendar year), WYDOT and WGFD changed their approach to removing carcasses which resulted in less frequent removal than in previous years. Therefore, there was a greater likelihood that duplicate WVC entries could be reported on sequential days in data from 2021-2022 forward. For example, if two mule deer were reported on the same day or two sequential days 0.20 miles from each other, the data points were flagged as possible duplicates and reviewed by a local, wildlife biologist for possible removal. Animals not identified to species were eliminated from the database. Animals identified as "deer" by observers in Teton County, WY were counted as mule deer due to their habitat location and the preponderance of mule deer in Teton County, WY.

When duplicates were identified, optimal observations were selected based on the following protocol. Table 1 indicates the ranking of the data sources in the JHWF WVC database. If duplicate observations were found in multiple data sources, the record from the source with the highest rank (lowest number) and/or most complete set of attributes was retained. The rankings were based on relative spatial accuracy and species sex/age identification. Annual observations were then added to the larger database containing all years.

Table 1. Data Source Ranking and applicable years.

DATA SOURCE	Source Rank
Jackson Hole Wildlife Foundation Nature Mapping Observations (2010-2023)	1
Jackson Hole Wildlife Foundation Roadkill Hotline (2012)	2
Wyoming Game and Fish Department Wildlife Observation System (2014-2023)	2
Wyoming Department of Transportation Crash Data (1994-2023)	3
Wyoming Department of Transportation Carcass Pick-Up Data (1999-2023)	4
Jackson Hole Wildlife Foundation Roadkill Hotline, Other Data Sources (1990-2009)	5
Roadkill 511 Data (2022-2023)	5
Wyoming Game and Fish Department Wildlife Observation System (1976-2013)	6

Important Qualifications of the Database

- No records were included within Grand Teton National Park at the Park’s request. The Park maintains a separate database.
- The database combined a mix of data collected under different protocols with different accuracies.
- Some observers were trained biologists while others were not (e.g., volunteers).
- Annually, there was a large effort to remove potential duplicates by data-vetting biologists.
- Date/time was not a record of actual time of death, but rather the observation time of the dead animal.
- The database was likely heavily biased by ungulates. These were the main species that WYDOT picked up and that caused WVCs large enough to report to the authorities. Large mammals were also more readily observed by citizen scientists.
- Recorded observations were likely a significant underestimate of WVC occurrences in even for ungulates. Many WVCs go unreported or hit animals die out of sight from roads (Huijser, et al. 2008).
- The database was likely biased by larger roads (more observers and higher traffic volumes).
- Documentation and interest have improved in recent years. These data were likely biased by year. WYDOT has collected data since 1990, but other groups started later.
- WVC numbers were likely influenced by winter conditions; higher collision rates likely occurred during more severe winters when ungulates were concentrated close to roads.

WVC Hot Spot Mapping

Hotspots were identified using the Kernel Density tool in ArcMap. The colors in the figures represent the probability density of WVCs occurring based on the search radius; hotter colors indicate higher WVC reports.

For the purposes of this report, a WVC year was May 1 – April 30 (e.g., WVC Year 2023: May 1, 2022-April 30, 2023). This time period better demonstrated the seasonal trends associated with WVCs than a calendar year. All years mentioned in this report were in reference to the WVC Yr not the calendar year, unless clearly stated otherwise. Data used for raster creation included the previous 10 years of WVC data inclusive of WVC years 2014 through 2023 (i.e., May 1, 2013 – April 30, 2023). These 10 years of WVC data correspond to this report’s figures and Appendix A’s “WVC Summary Table - Count of WVC Species by Year”.

Two raster layers (50 m pixel resolution) were created for each of three analyses: all species recorded, moose, mule deer and elk. The first raster layers identified WVC hotspots within a 300m search radius (stretch symbology using 2.5 standard deviations with a raster processing extent of Teton County’s boundary). These 300m search radius layers were used in this report as the layers provide more generalized hotspots. The second set of layers identified WVC hotspots within a 100 m search radius resulting in a more precise hotspot depiction and, while not included in this report, were created for the JHWF Team and may prove useful for future management decisions. All raster layers were clipped to 100m on either side of major roadways in southern Teton County, WY using the Extract by Mask tool in ArcMap. Only major roadways were chosen to display hotspot maps because of their higher traffic levels or proposed future roadway projects (e.g., South Park Loop). WVCs reported on roadways outside of those depicted were not represented in these maps.

Roadway Names

Highway segments summarized in this report and displayed in figures were defined as the following:

- WY 22 – From the intersection with Highway 89 to the Idaho and Wyoming state line.
- WY 390 – From the intersection with Highway 22 north to the Grand Teton National Park boundary
- Highway US 191/ US 26/ US 89 – From the intersection with Highway 22 east to center of the Town of Jackson and north to the Gros Ventre River/Grand Teton National Park boundary. This section of roadway is commonly referred to as “Town to North 89”.

- Highway US 189/US 191/US 26/ US 89 - From the intersection with Highway 22 south to Hoback Junction. This section of roadway is commonly referred to as “South 89.”

These highway segments correspond with those used in the 2021-2022 report but differ from those used in previous reports (i.e. WVC Yr 2021 and before). The change was made to provide more clarity around WVC analysis segments and to correspond with typical highway segment descriptions.

Results

2022-2023 Data Update

There were 235 total reported WVCs in Teton County, WY during WVC Year 2023 (Figure 2). The 2021-2023 three-year average (203) was down from the previous year and 2015-2017 high mark (306, Figure 3). This high 2015-2017 average was heavily influenced by a severe winter in 2016-2017 and may have caused many animals to concentrate near roads. The number of reported WVCs in WVC Year 2023 (235) was slightly below the ten-year average of 241 WVCs per year.

Since WVC Year 2014, the dataset has been heavily weighted by ungulate species. Elk represented 16%, moose 7% and mule deer 67% of the total WVCs reported. Six other species each represented 1-2% of the WVCs counted during these ten years. These six species included coyote, North American porcupine, northern racoon, red fox, striped skunk (2%) and white-tailed deer. Notably, in 2023, there were five coyote WVCs reported. All five of these coyote WVCs took place in October 2022 and January 2023 and were located across the study area. In 2023, there were ten striped skunk WVCs reported (up from seven in 2022) out of 51 total for the ten-year period. The striped skunk WVC locations were located across the study area with 60% on South 89. The remaining species each represented less than 1% of the ten-year dataset (Appendix A).

Figure 2. Total Annual WVCs in Teton County, WY

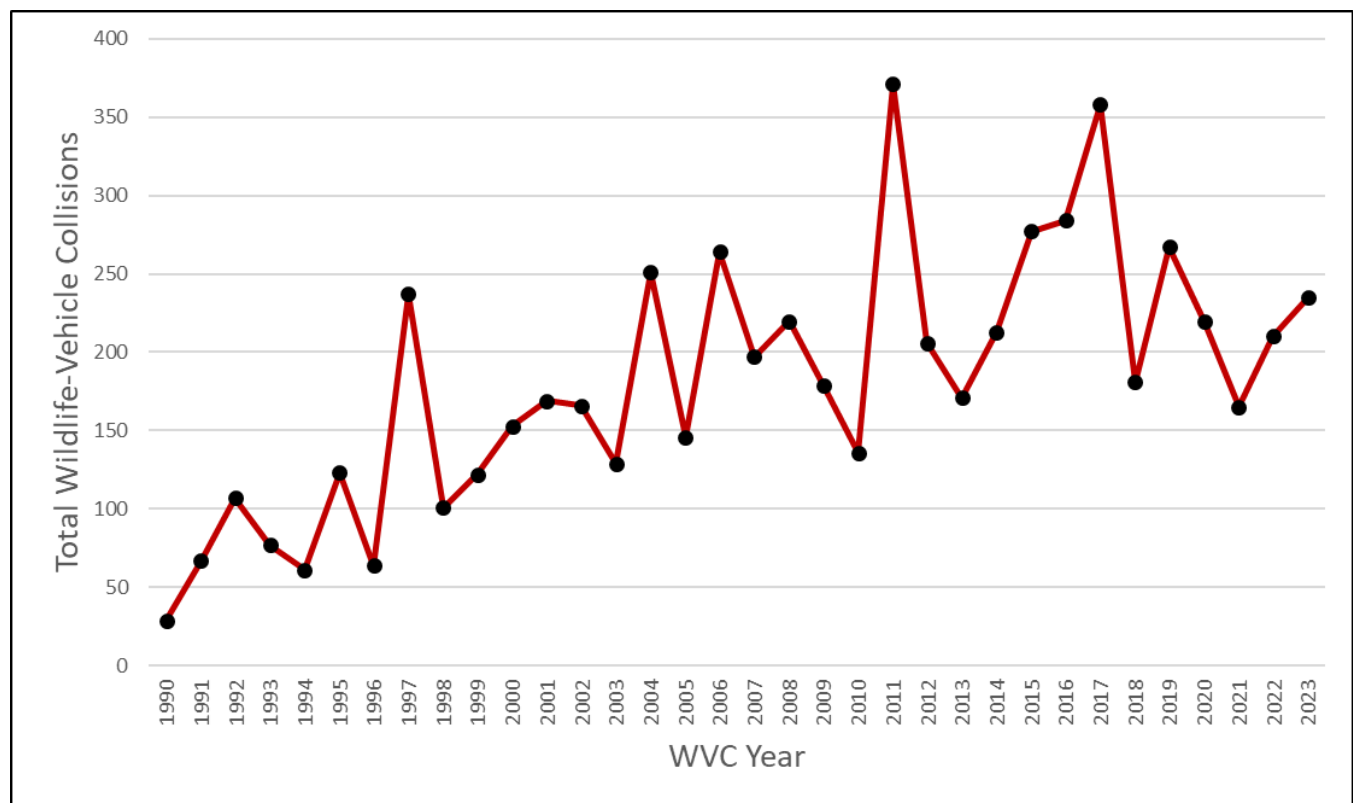
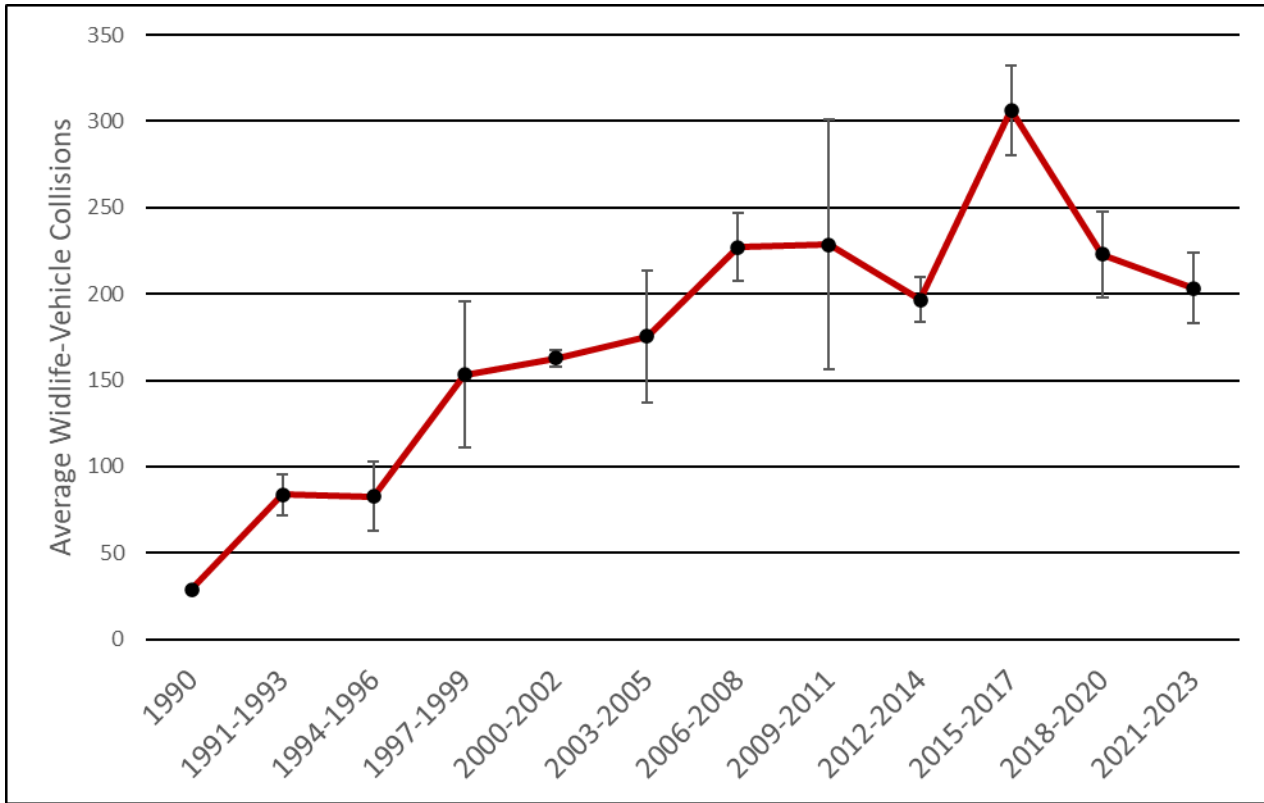


Figure 3. Three-year averages of total annual WVCs in Teton County, WY*

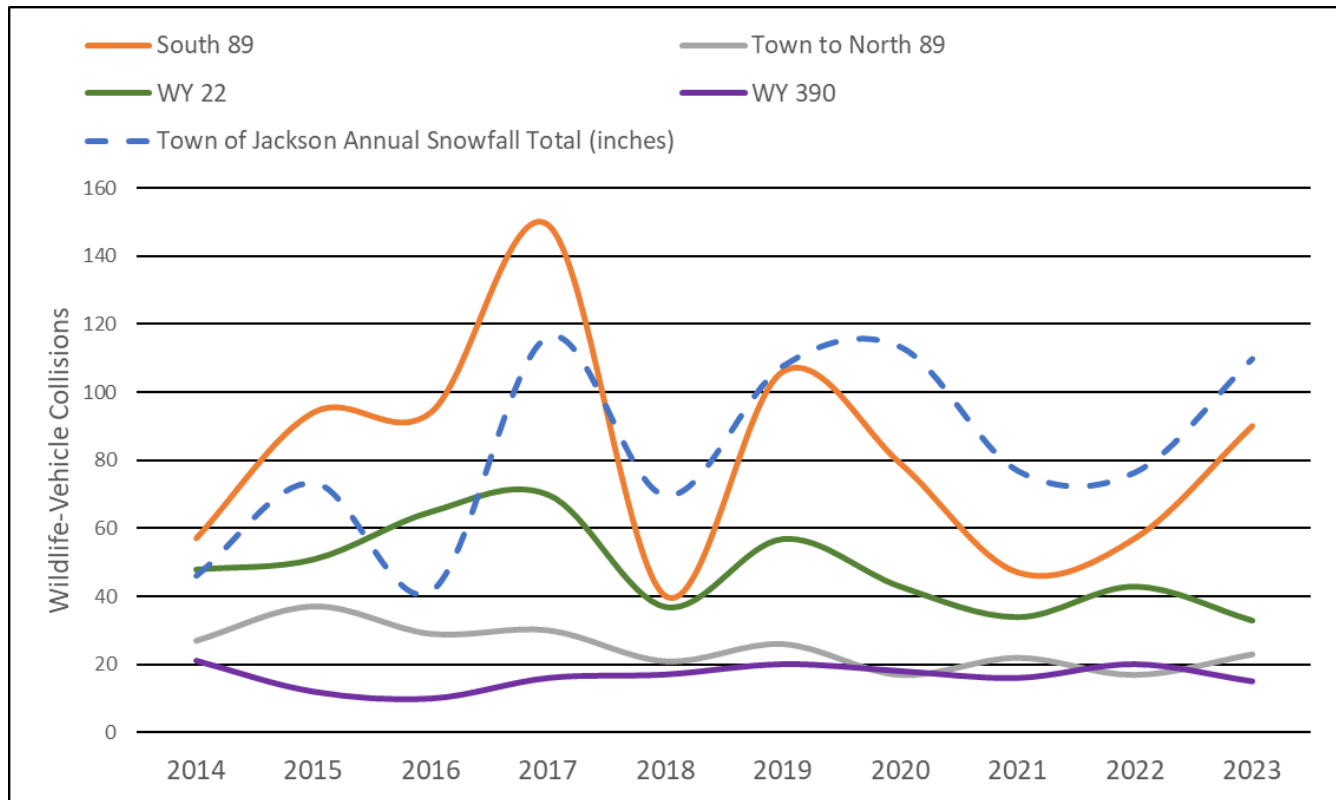


*Mean \pm SE of three WVC years indicated

Highway Trends

Since the ten-year high in WVC Yr. 2017, reported WVCs continued to fluctuate on state and federal highways in Teton County (Figure 4). Furthermore, the number of WVCs on South 89 (US 189/US 191/ US 26/ US 89) and to a lesser extent WY 22 follow a similar pattern to that of the total annual snowfall in Jackson, WY (snowfall on the valley floor) (NOAA 2024). Throughout the winter, both snowfall and snowpack can vary. The use of total snowfall is a relative indicator rather than a specific representation of the snowpack throughout the season.

Figure 4. Total Annual WVCs by Major Highway in Teton County, WY WVC Years 2014-2023



Elk

There were 38 elk WVCs reported in Teton County in WVC Yr. 2023. This count was approximately the same as the ten-year average of 39 reported WVCs per year. In 2023, elk WVCs increased on US 189/US 191/ US 26/ US 89 while elk WVCs decreased or held steady on all other major roadways since 2022 (Figure 5). 2023 elk WVCs on US 189/US 191/ US 26/ US 89 are inclusive of both the wildlife crossings project and areas outside of the project area. Of the 12 elk WVCs on South 89 in 2023, 7 were located north of the wildlife crossings project area between the northern and southern intersections of South Park Loop Road and Hwy 89 S.

Elk WVCs hotspots (2014-2023) were highest near West Gros Ventre Butte on WY 22, east of the north end of East Gros Ventre Butte on Town to North 89 (US 191/ US 26/ US 89) and south of town including south of High School Rd, near Game Creek and south and east of Hoback Junction (Figure 6).

Figure 5. Annual Elk WVCs by Major Roadway in Teton County, WY 2014-2023

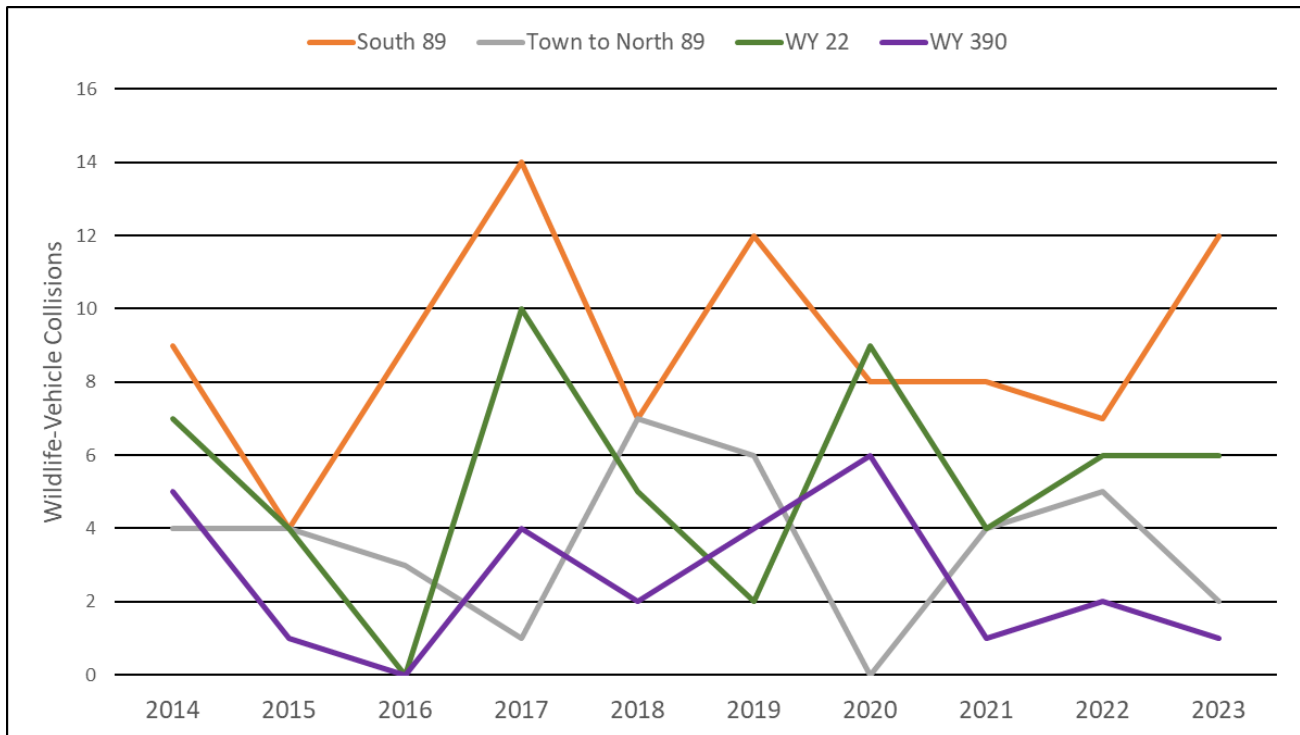
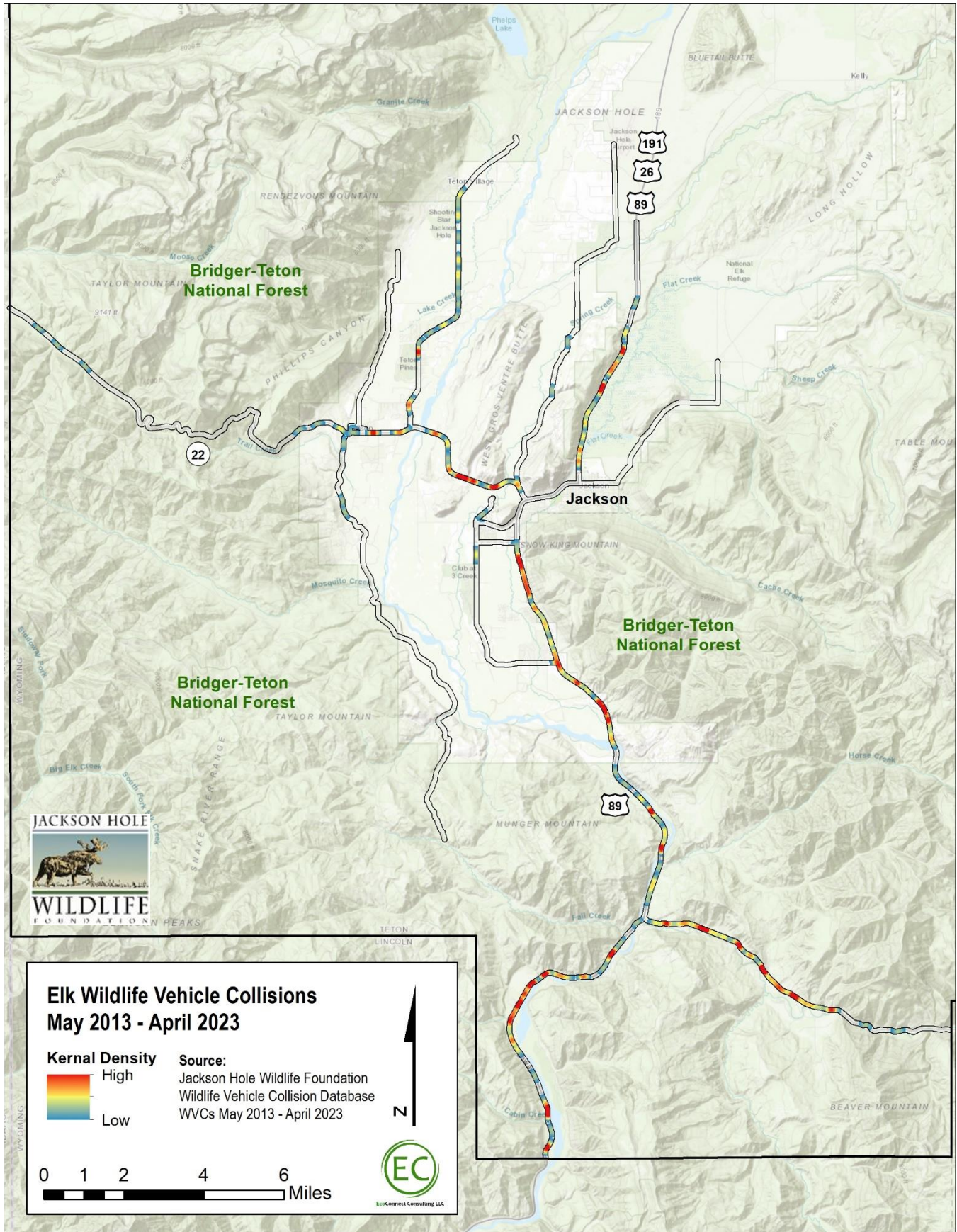


Figure 6. Elk-Vehicle Collision Hotspots



Moose

A total of 8 moose WVCs were reported in Teton County during WVC year 2023. This was lower than the ten-year average of 16 reported WVCs annually. Three moose WVCs were reported on WY 22 in 2023. Since 2014, moose WVC counts on WY 22 peaked in 2018 and have steadily declined since then except for an increase in 2022 (Figure 7).

Moose WVC hotspots (2014-2023) are found on WY 22 on Teton Pass, the southern portion of WY 390 and on WY 22 near the Snake River and West Gros Ventre Butte (Figure 8).

Figure 7. Annual Moose WVCs by Major Roadway in Teton County, WY 2014-2023.

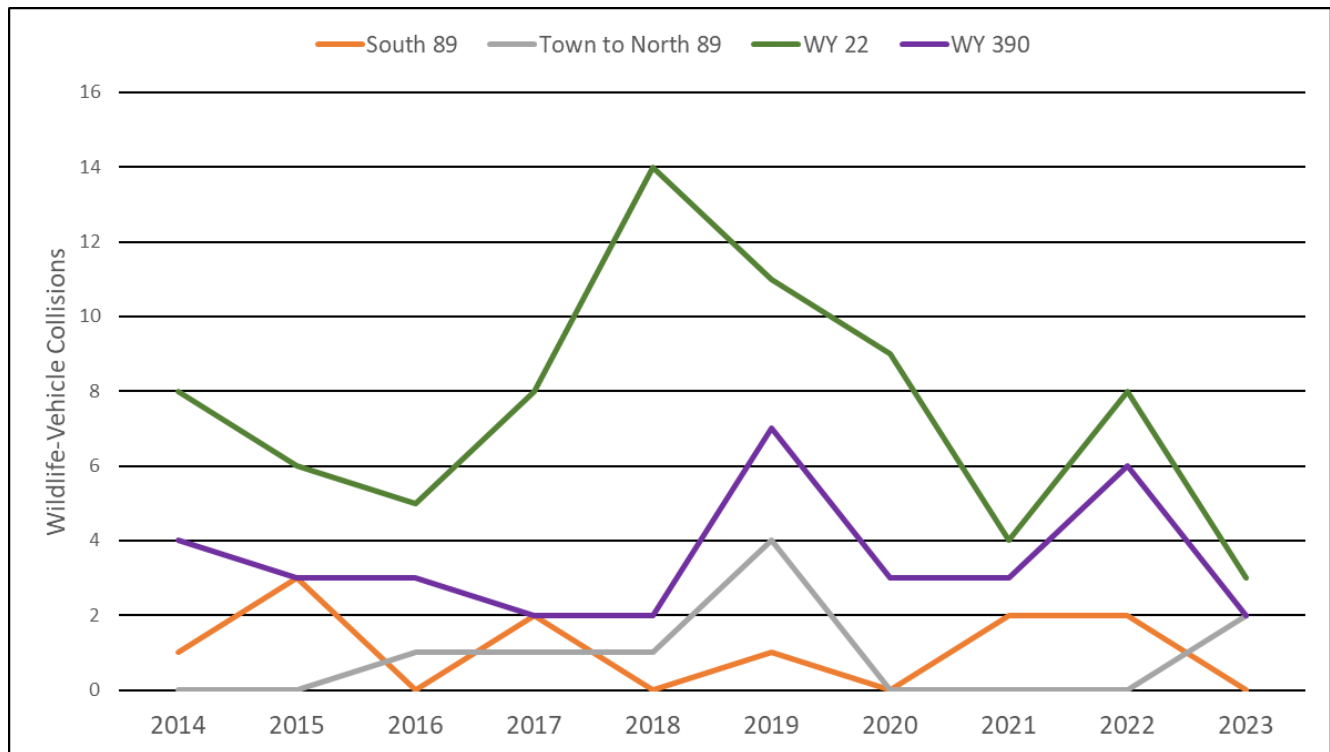
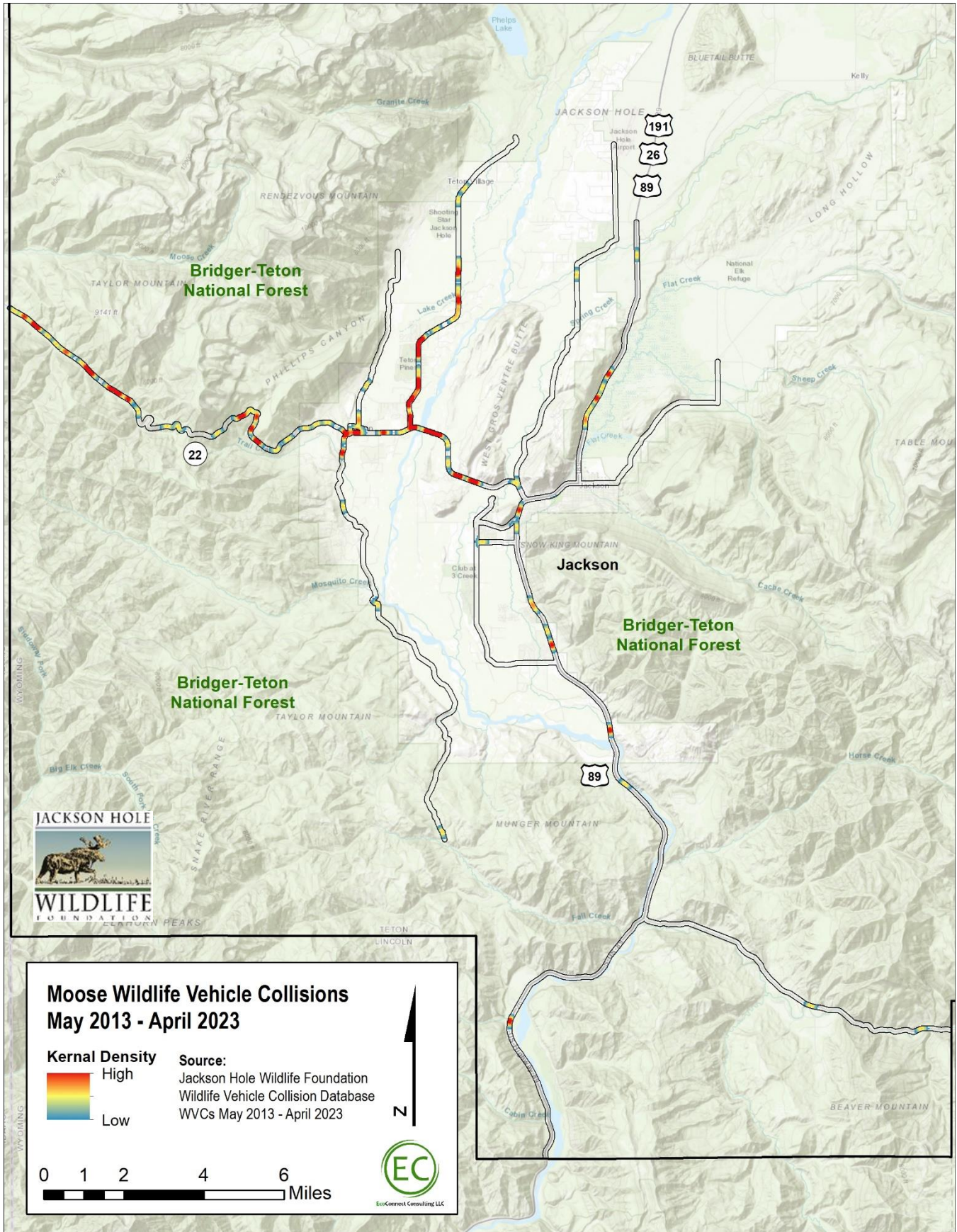


Figure 8. Moose-Vehicle Collision Hotspots



Mule Deer

There were 156 mule deer WVCs reported in Teton County in WVC Yr. 2023. This was slightly less than the ten-year average of 161 reported WVCs per year.

In WVC Yr. 2023, there were 68 mule deer WVCs reported on US 189/US 191/US 26/US 89 (South89) from the intersection with Hwy 22 to Hoback Junction (Figure 9). Mule deer WVCs reported on 89 South represent 44% of the total mule deer WVCs reported in the County for 2023. WVC Yr. 2023 mule deer WVCs on South 89 are inclusive of both the wildlife crossings project and areas outside of the project area. Of the 68 mule deer WVCs on South 89 in 2023, 45 were located north of the wildlife crossings project area between the intersection with Hwy 22 and the southern South Park Loop Road intersection with Hwy 89 S.

Total mule deer WVC counts on South 89 over the last ten years represented 42% of the total mule deer WVCs reported in Teton County, WY during that same ten years. Mule deer WVC hotspots (2014-2023) are found on WY 22 near West Gros Ventre Butte and on South 89 (Figure 10).

Figure 9. Annual Mule Deer WVCs by Major Roadway in Teton County, WY 2014-2023.

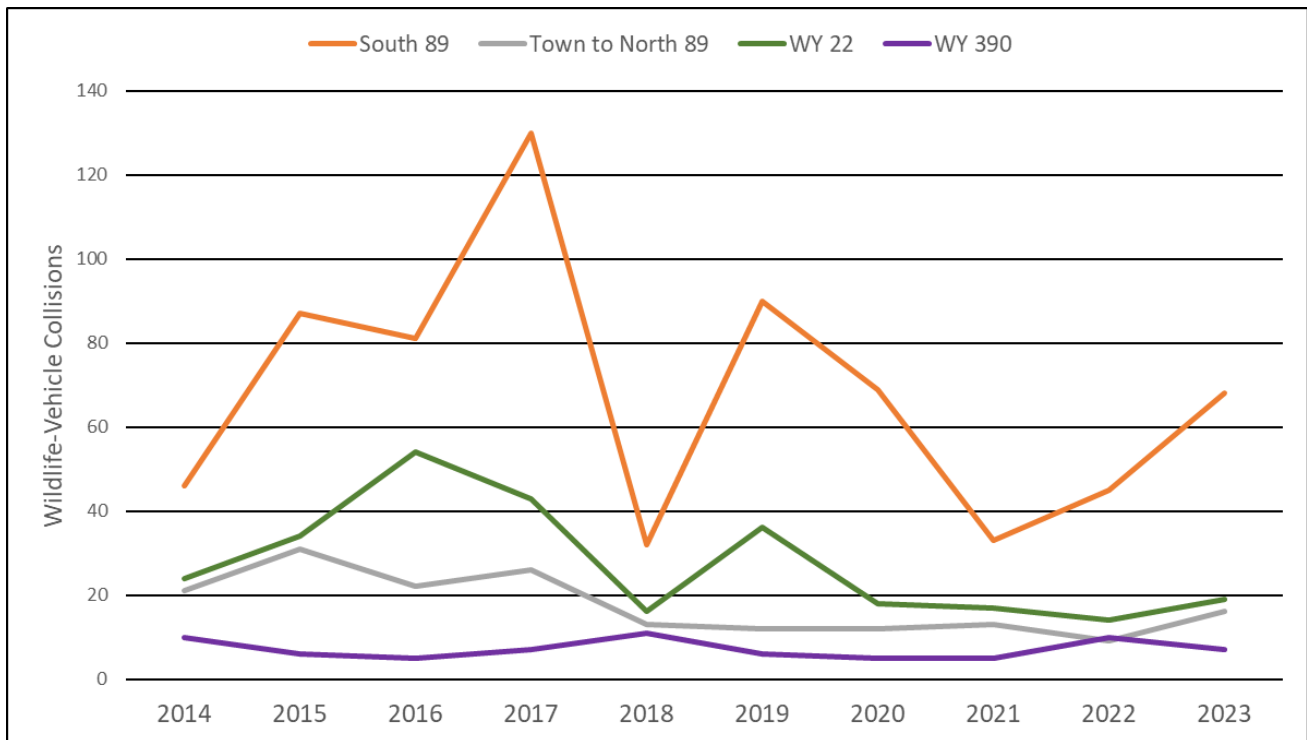
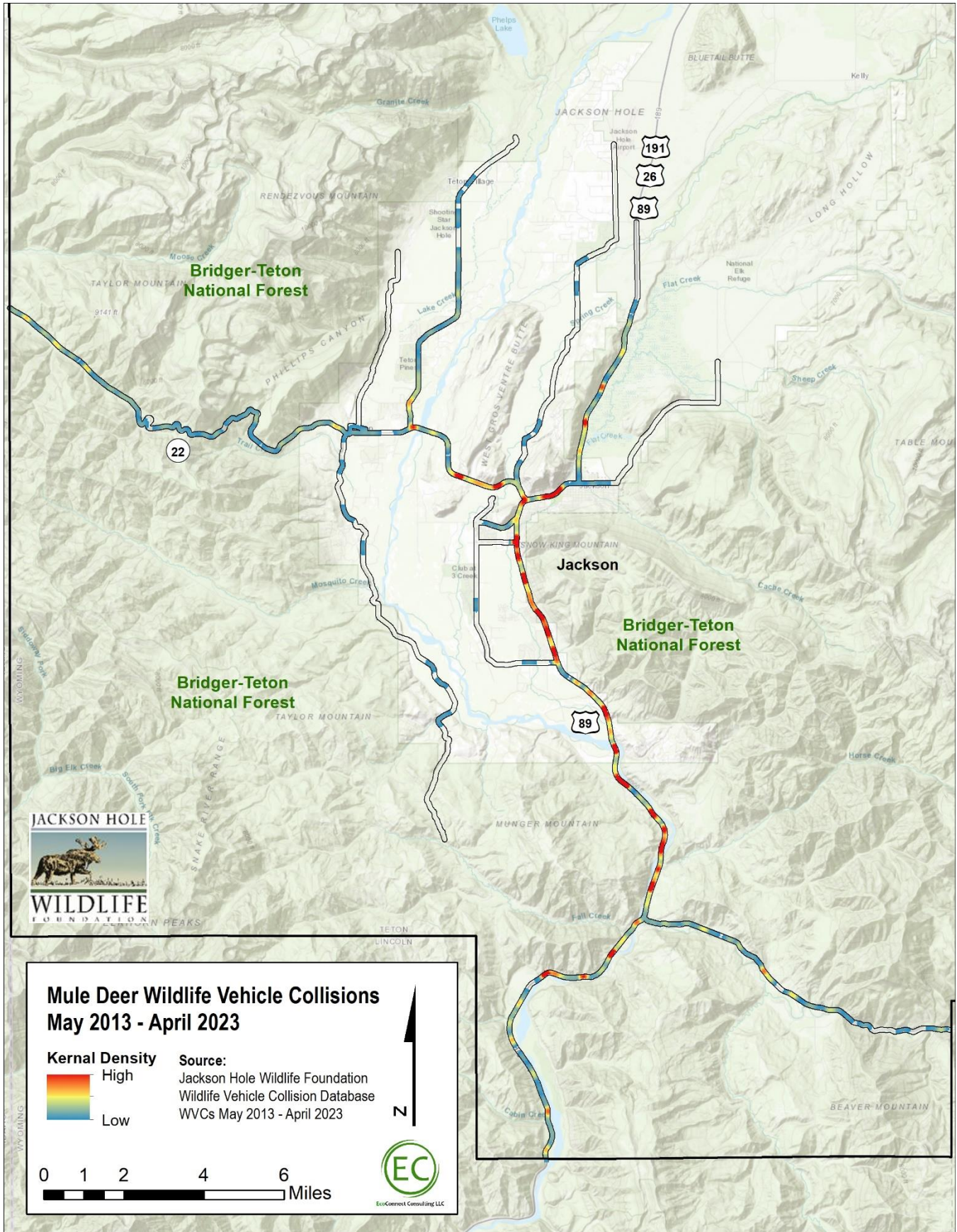


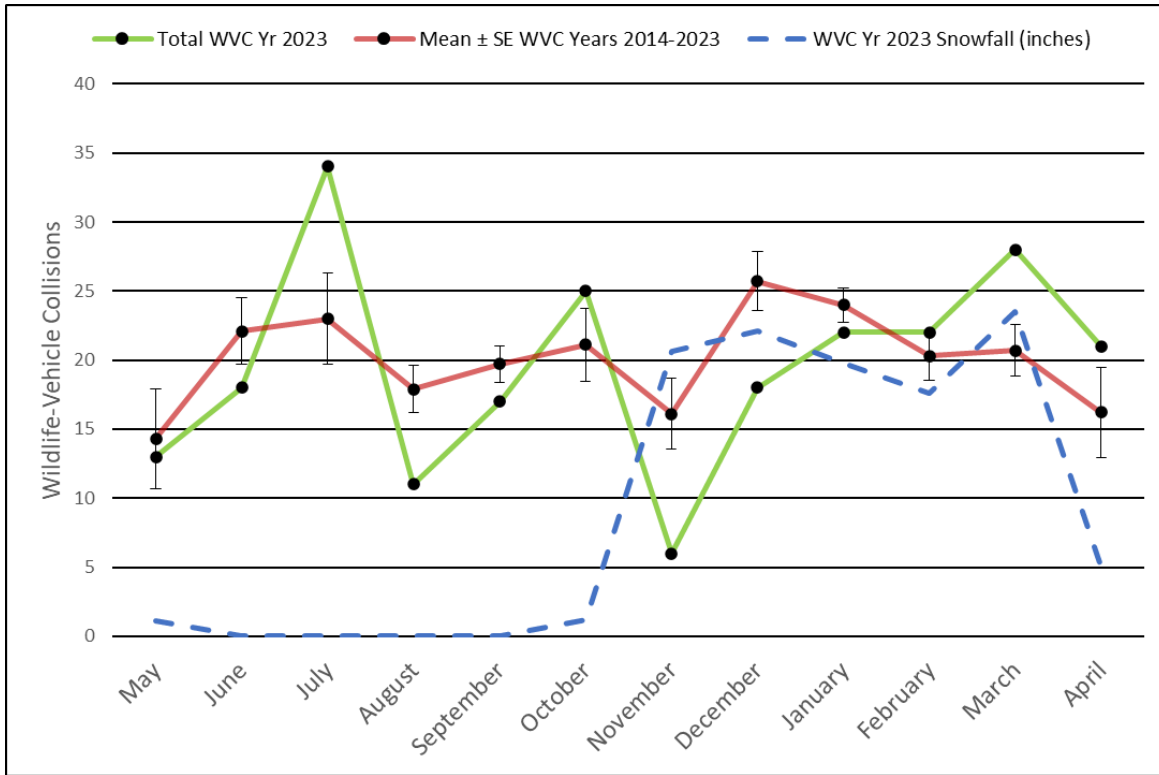
Figure 10. Mule Deer-Vehicle Collision Hotspots



Seasonal Trends

County-wide WVC numbers in 2023 followed a similar monthly trend as the previous 10 years (2014-2023; Figure 11). July and October 2022 and March 2023 showed a spike in WVCs in excess of the 10-year monthly mean for those months. During the previous ten-year period, December and January had the highest mean WVC counts for the previous 10 years. In 2023, July, October and March, had the highest WVC counts for the WVC year. Monthly total snowfall in Jackson, WY for WVC Yr 2023 is shown.

Figure 11. Seasonal Trends of WVCs in Teton County, WY 2014-2023



Discussion

Summary for Teton County, Wyoming

Wildlife-vehicle collision observations are typically underreported. Conservative estimates suggest that wildlife-vehicle collisions are 2-4 times higher than what is reported (Huijser, et al. 2008). Some animals are injured but able to move away from the roadway before dying or succumbing to their injuries, undetected. Furthermore, carcass persistence is low for smaller species, such as birds and small mammals, and it is difficult to see smaller carcasses while driving (Guinard et al. 2012; Teixeira et al. 2013). Therefore, small carcasses are rarely reported to databases like ours. Even large-bodied animal carcasses can disappear from roadways. Scavengers can drag them substantial distances and carcasses in the lanes of traffic can be removed by agency personnel or concerned citizens who may not report them. Our data are incidental and primarily collected by community scientists, so these numbers should be considered a minimum count. It should be assumed that the true numbers are significantly higher.

During WVC Yr. 2023, a total of 235 WVCs were recorded. However, given the vast underreporting of WVCs, even when rigorous survey efforts are undertaken, the actual number of WVCs were likely 470-940 or 2x to 4x higher (Guinard et al. 2012; Slater 2002; Teixeira et al. 2013). Long-term trends in WVC annual and seasonal patterns can help elucidate what factors may lead to increased WVC. However, trends are less useful for targeting locations where management efforts could be focused. Mapping WVC hotspots in Teton County defines important target areas for mitigation, informing agency decision-making with science.

Trends

Since 1990, when roadkill data collection efforts began in Teton County, the number of reported WVCs trend has steadily increased (Figure 2); however, the last two, three-year averages (2018-2020 and 2021-2023) WVCs have decreased (Figure 3). The reason for this decrease is not precisely known and could be due to a combination of factors. Possibly factors including beneficial changes such as wildlife crossings projects and increased public education and awareness but also detrimental changes such as increased traffic volumes possibly creating barriers to wildlife movement (Riginos, Fairbank, et al. 2022, Riginos, Smith, et al. 2018).

In WVC Yr. 2023, WYDOT was working to complete the South 89 construction project inclusive of wildlife crossings and funnel fencing. Data from WVC Yr. 2024 and forward will be used to evaluate the effects of this project on WVCs.

Furthermore, in the summer of 2023 (WVC Yr. 2024), WYDOT began work on the intersection of Hwy 22 and 390 inclusive of roadway work, bridge replacement and construction of wildlife underpasses and funnel fencing. This project had significant impacts on Hwy 22 traffic flow (e.g., slower automobile speeds and increased traffic congestion) which may have been a factor in the slight reduction of WVCs on Hwy 22 in WVC Yr. 2023. Once this project is complete, and wildlife have had an opportunity to learn the crossing locations, a comparison of pre- and post- wildlife crossings installation will be informative.

While it is difficult to pick out trends in the species-specific data, it is important to continue collecting WVC data in Teton County. Long-term datasets are valuable for assessing trends over time. Notably, moose collisions in WVC Yr 2023 were the lowest recorded (8 moose) in the last twenty-five years (WVC Database, Appendix A). This is a promising result that JHWF hopes will continue in future years.

Mule deer WVC trends are also showing interesting patterns over time. For instance, in 2017, mule deer WVC counts peaked in Teton County, WY, with 265 mule deer WVCs reported which may have been driven by severe winter conditions causing mule deer to be close to roads. Traditionally, mule deer WVC numbers are largely driven by winter severity (i.e. snow depth). As a comparison to 2017, in 2020 half that number (132) were reported. In 2023, a severe winter, 156 mule deer WVCs were reported. While 2023 mule deer WVCs are an

increase from 2021 and 2022; the 2023 total equates to 59% of those reported in 2017. This approximately 40% reduction in mule deer WVCs in 2023 from 2017 is notable. Based on previous patterns, the expectation would have been for a spike similar to previous, severe winter years. The fact that mule deer WVCs were lower in 2023 may have been due to a beneficial change of the new wildlife crossings on South 89. These wildlife crossings may have been displaying effectiveness as a mitigation measure even though the projects were not fully complete.

While wildlife crossing structures have proven to be one of the most effective means of lessening wildlife-vehicle collisions and increasing habitat permeability (Huijser, et al. 2009), crossing structures are costly and not possible on all roadways. Increased awareness by individual drivers is an important variable, particularly as traffic volumes continue to increase in Teton County. It is one of Jackson Hole Wildlife Foundation's goals to implement education and awareness campaigns that facilitate the heightened awareness and behavioral changes needed for drivers to reduce wildlife-vehicle collisions.

Teton County, ID

Introduction

Jackson Hole Wildlife Foundation (JHWF) has collected wildlife-vehicle collision (WVC) data since the organization's inception in 1993 and has summarized this information in annual reports since 2015. However, the 2021-2022 report (last year's) was the first to include data from Teton County, Idaho. Inclusion of Teton County, ID data into JHWF's long-term database helps ensure protection of wildlife across jurisdictions.

The data in this second year are inclusive of Idaho Department of Fish and Game (IDFG) data reaching back to WVC Yr. 2006 and Nature Mapping Jackson Hole data beginning in 2021. Since the methodologies for collecting these data differs between Teton County, Idaho and Teton County, WY, the data are analyzed in a separate report section.

As with all datasets, the hope is that increased data collection efforts will grow the dataset and increase awareness of wildlife-vehicle collisions. Through a collaborative effort, these Teton County, ID data can inform future mitigation projects and education campaigns aimed at reducing and eliminating wildlife-vehicle collisions on both sides of the county/state line.

While the two counties include different communities and differing traffic patterns, there is an inarguable connection between the two over Teton Pass (ID 33/ WY 22). Each day of the year, high traffic volumes traverse this pass carrying commuters, recreationists and visitors around the region (on average, >10,000 vehicles/day travel WY Highway 22, [WYDOT Interactive Transportation System Map](#)). Wildlife do not notice the county boundary, as it is all habitat set within the National Forest. Therefore, having a dataset that is inclusive of both sides of the county and state line will be beneficial to our continued work as neighboring counties for the benefit of both people and wildlife.

Figure 12. Teton County, ID Study Area



Methods

Wildlife-Vehicle Collision Data Processing and Sources

Incorporation of Teton County, ID data from WVC Yr. 2006 to present was done following the same methods as described above for the annual update of Teton County, WY data.

For 2023, nine deer records recorded as unknown deer species were deleted from the database. Since there are both white-tailed deer and mule deer present in Teton County, ID, an educated assumption of species could not be made. Domestic cats and dogs and unidentified species were also deleted.

Table 2 shows the ranking of the data sources included in the JHWF WVC database. Data points from lower ranked data sources are removed when data duplication is identified. While the vast majority of the data available originated with the Idaho Fish and Wildlife Information System, it is anticipated that future sources will be added or existing sources (e.g., Nature Mapping efforts) will be strengthened.

Table 2. Data Source Ranking and applicable years.

DATA SOURCE	Source Rank
Jackson Hole Wildlife Foundation Nature Mapping Observations (2021-2022)	1
Idaho Fish and Wildlife Information System (IFWIS) (2005-2022)	2
Idaho Department of Fish and Game Roadkill 123 Database (2022-2023)*	2

*Roadkill 123 Database incorporates multiple data sources see <https://data-idfggis.opendata.arcgis.com/datasets/IDFGgis::roadkill-observations/about> for more information.

Important Caveats of the Database

- The number of WVCs reported are likely biased primarily by reporting efforts that appear to have increased in recent years.
- The database combined a mix of data collected by different means with different accuracies inclusive of data submitted by the public.
- Some observers were trained biologists while others were not (e.g., volunteers or the general public). A significant portion of these data included in these datasets are reported by the public.
- Annually, there was a large effort to remove potential duplicates.
- The observation time of the dead animal was recorded rather than the date/time of actual death.
- The database was heavily biased by ungulates. These were the species that agency personnel typically picked up and that drivers reported to authorities. Ungulates were also more readily observed by citizen scientists and the public.
- This database was likely a significant underestimate of WVC occurrences in Teton County, ID even for ungulates. Many WVC events go unreported or animals are hit and die out of sight from roads (Huijser, et al. 2008).
- The database was likely biased by larger roads (more observers and higher traffic volumes).
- Documentation and awareness of the repercussions of WVC have improved in recent years. Continued interest and reporting in the future will improve the dataset.
- WVC numbers were likely influenced by winter conditions; higher collision rates likely occurred during more severe winters when ungulates were concentrated close to roads.

WVC Hot Spot Mapping

Hotspots were identified using the Kernel Density tool in ArcMap following the methods outlined above for Teton County, WY.

Data used for raster creation included the previous 10 years of WVC data inclusive of WVC years 2014 through 2023 (i.e., May 1, 2013 – April 30, 2023). These 10 years of WVC data correspond to the report’s figures and “WVC Summary Table - Count of WVC Species by Year” found in Appendix B.

Roadway Names

The study area and major roadways are depicted in Figure 12.

Highway segments summarized in this report are defined as the following:

- ID 31 – From the intersection with ID 33 in Victor west to the County boundary
- ID 32 – From the intersection with ID 33 south of Felt north to the County boundary
- ID 33 – ID 33 traverses Teton County, ID from the state line on Teton Pass, north through Victor and Driggs, west through Tetonia and continuing west to the County boundary
- Ski Hill Rd - From the intersection with ID 33 in Driggs east to the County boundary

Results

2022-2023 Data

There were 58 total reported WVCs in Teton County, ID during WVC Year 2023 (May 2022 – April 2023; Figure 13). From 2021-2023, the three-year average (46) decreased from the previous three-year period (67) and represents the second highest of three-year periods reported (Figure 14). The highest average (2018-2020) may have been influenced by the 2019-2020 winter. The number of reported WVCs in 2023 was higher than the ten-year average of 38 WVCs per year.

Figure 13. Total Annual WVCs in Teton County, ID 2006-2023.

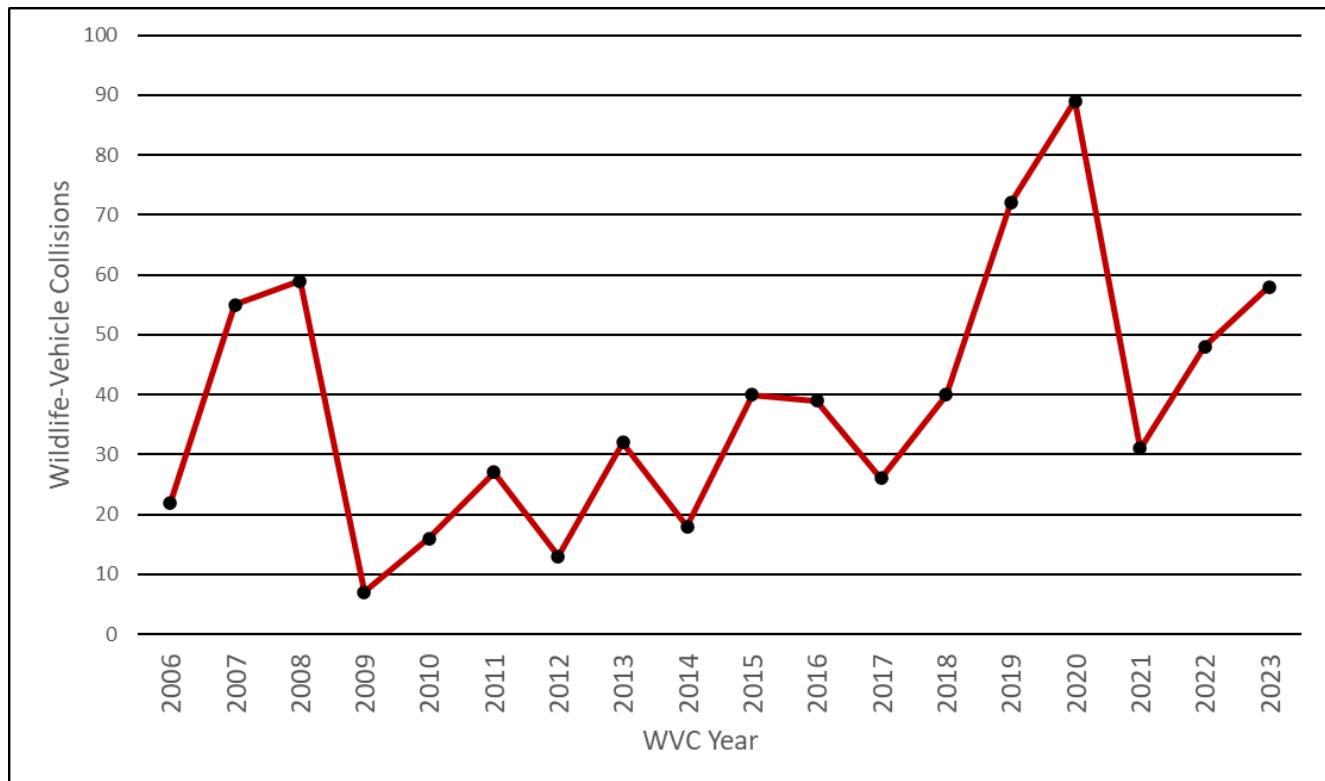
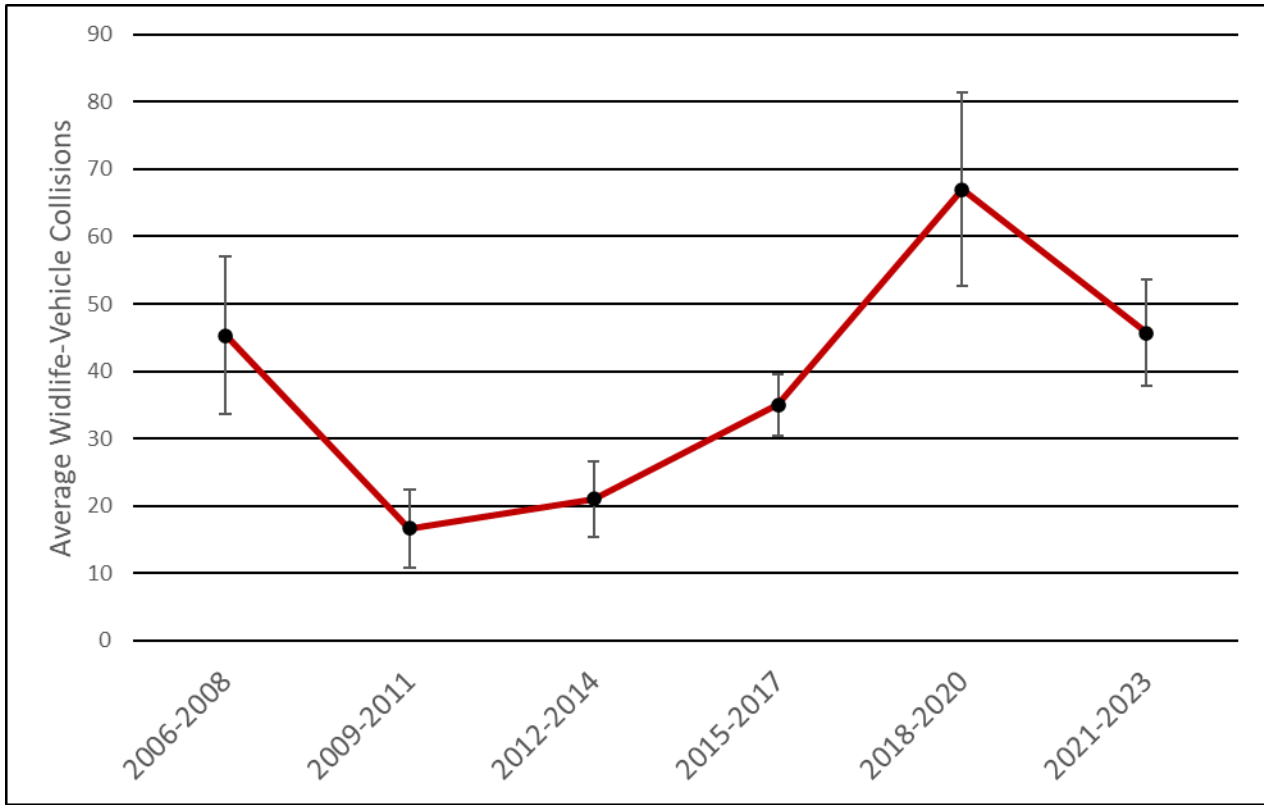


Figure 14. Three-year averages of total annual WVCs in Teton County, ID 2006-2023*



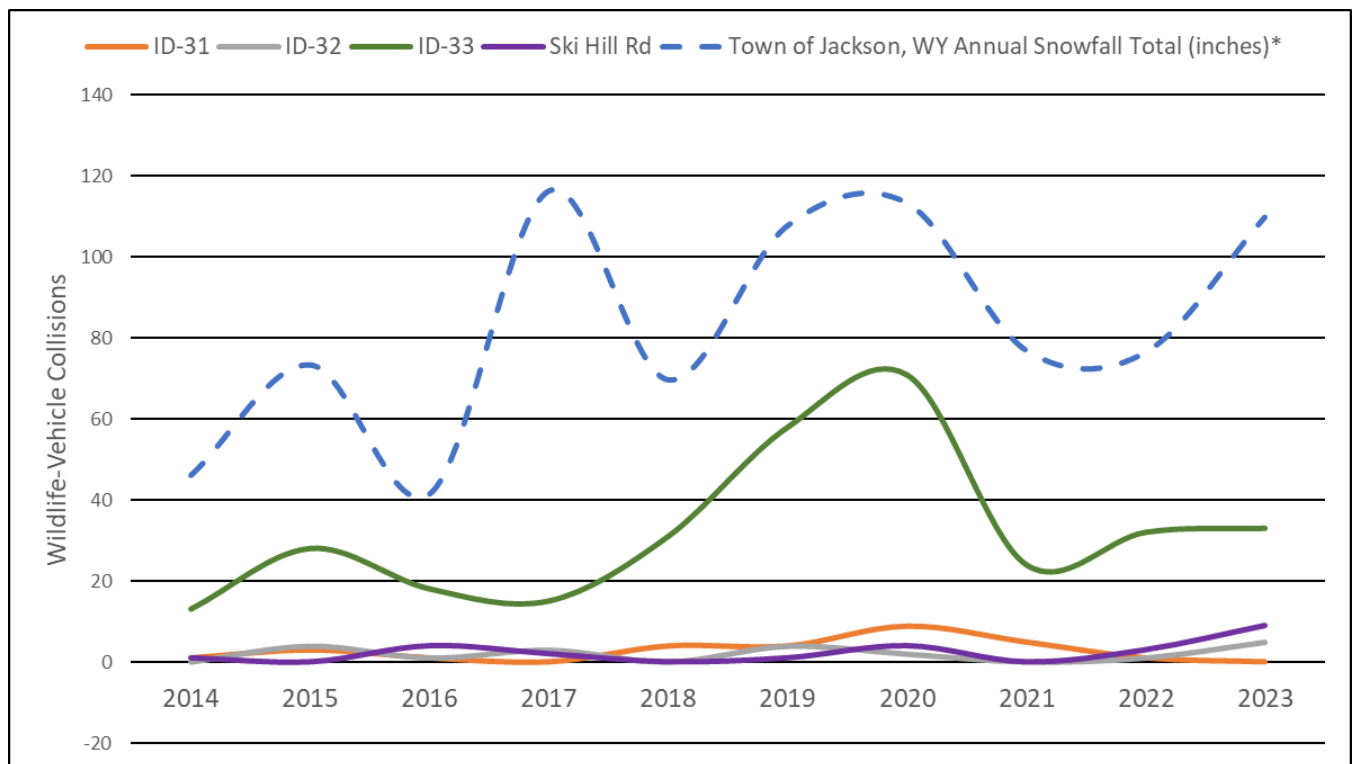
*Mean ± SE of three WVC years indicated

Highway Trends

Since a high in 2020, reported WVCs continued to fluctuate (Figure 15). The number of reported WVCs slightly follow a pattern similar to that of the total snowfall for the year (NOAA 2024). Throughout the winter, both snowfall and snowpack can vary. Snowfall and snowpack also vary on the west versus east side of the Tetons. Nonetheless, snowfall data for Jackson, WY was used to show a relative trend as data available for Driggs, ID were missing a significant number of entries for the winter months (NOAA 2024). Jackson, WY is closer to Teton County, ID than other available weather station locations. Therefore, the use of total snowfall is a relative indicator rather than a specific representation of the snowpack throughout the year.

It is likely that Figure 15 displays not only the relationship, or lack thereof, between snowfall and WVCs but also serves as an indicator of reporting efforts.

Figure 15. Total Annual WVCs by Major Highway in Teton County, ID WVC Years 2014-2023



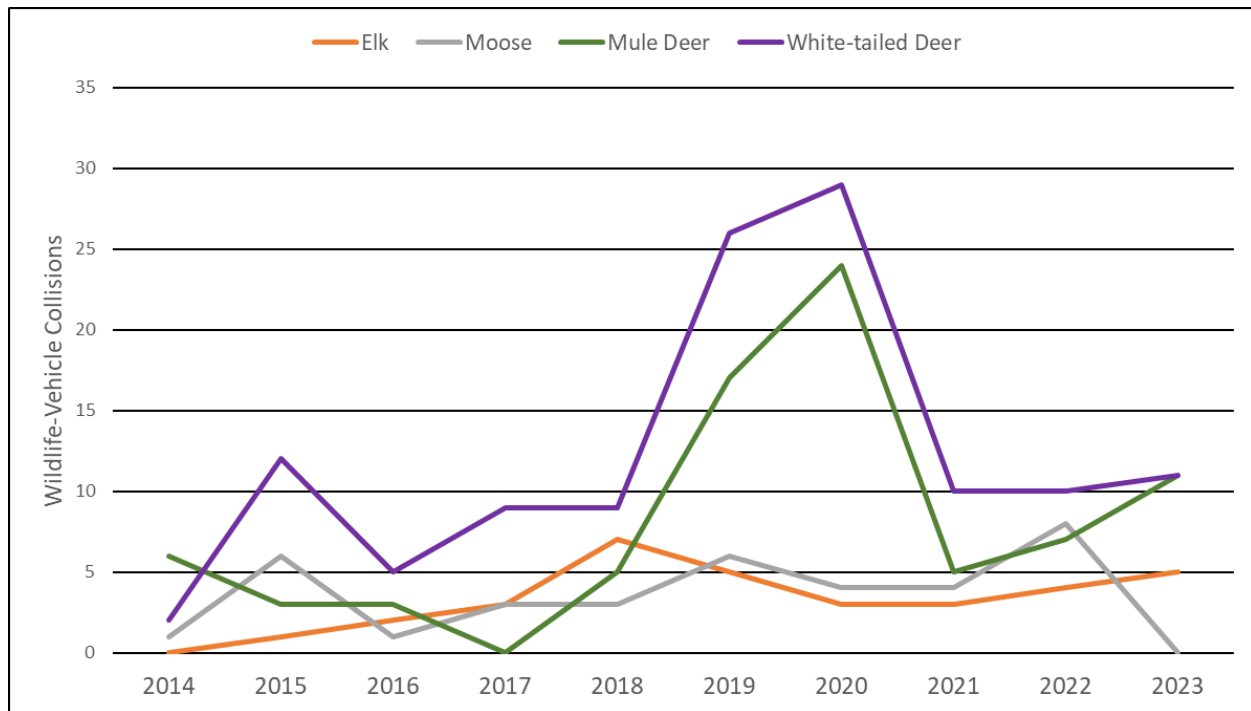
* Snowfall data for Jackson, WY was used as the data available for Driggs, ID was missing a significant number of entries for winter months (NOAA 2024). Jackson, WY is closer to Teton County, ID than other available weather station locations.

Idaho 33

ID 33 is the longest highway segment in the study area traversing the county from the state line on Teton Pass, through the towns of Victor, Driggs and Teton and west to the county boundary.

Along ID 33 there were five elk, no moose, 11 mule deer and 11 white-tailed deer WVCs reported in 2023. Combined, these ungulate WVCs represent 47% of the WVCs reported in Teton County, ID in 2023. Since 2014, mule deer represent 30% and white-tailed deer represent 45% of the WVCs reported on ID 33. The dominance of deer species WVCs on ID 33 is shown in Figure 16.

Figure 16. Total Annual WVCs Recorded on ID 33 by Ungulate Species WVC Years 2014-2023



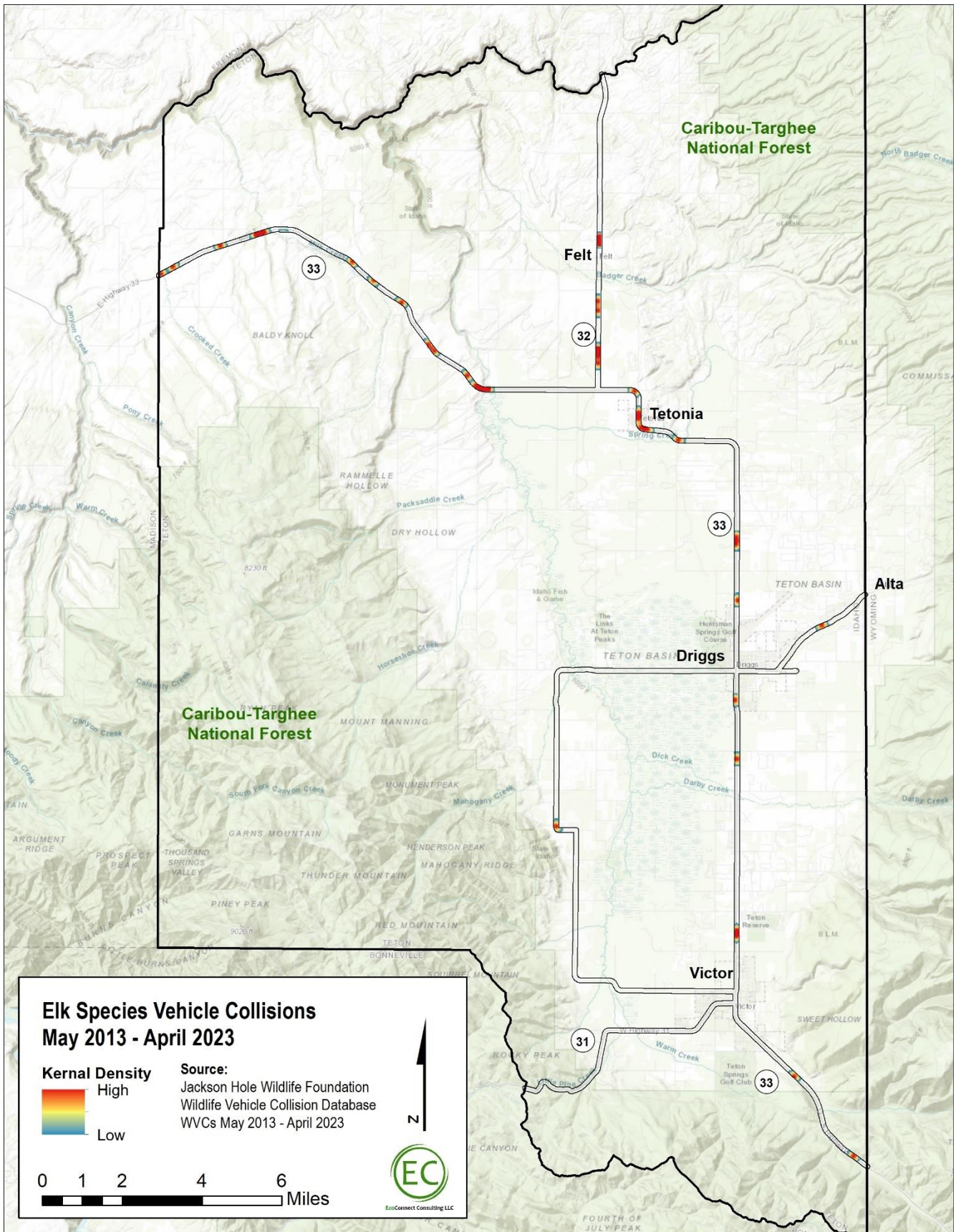
Species Specific Wildlife-Vehicle Collision Hotspots

The following hotspot figures (Figure 17 through Figure 19) identify several distinct locations throughout Teton County, ID where WVCs are prominent.

As with ID 33, deer WVCs are prominent throughout the county, representing 60% of the total WVCs recorded between 2014-2023.

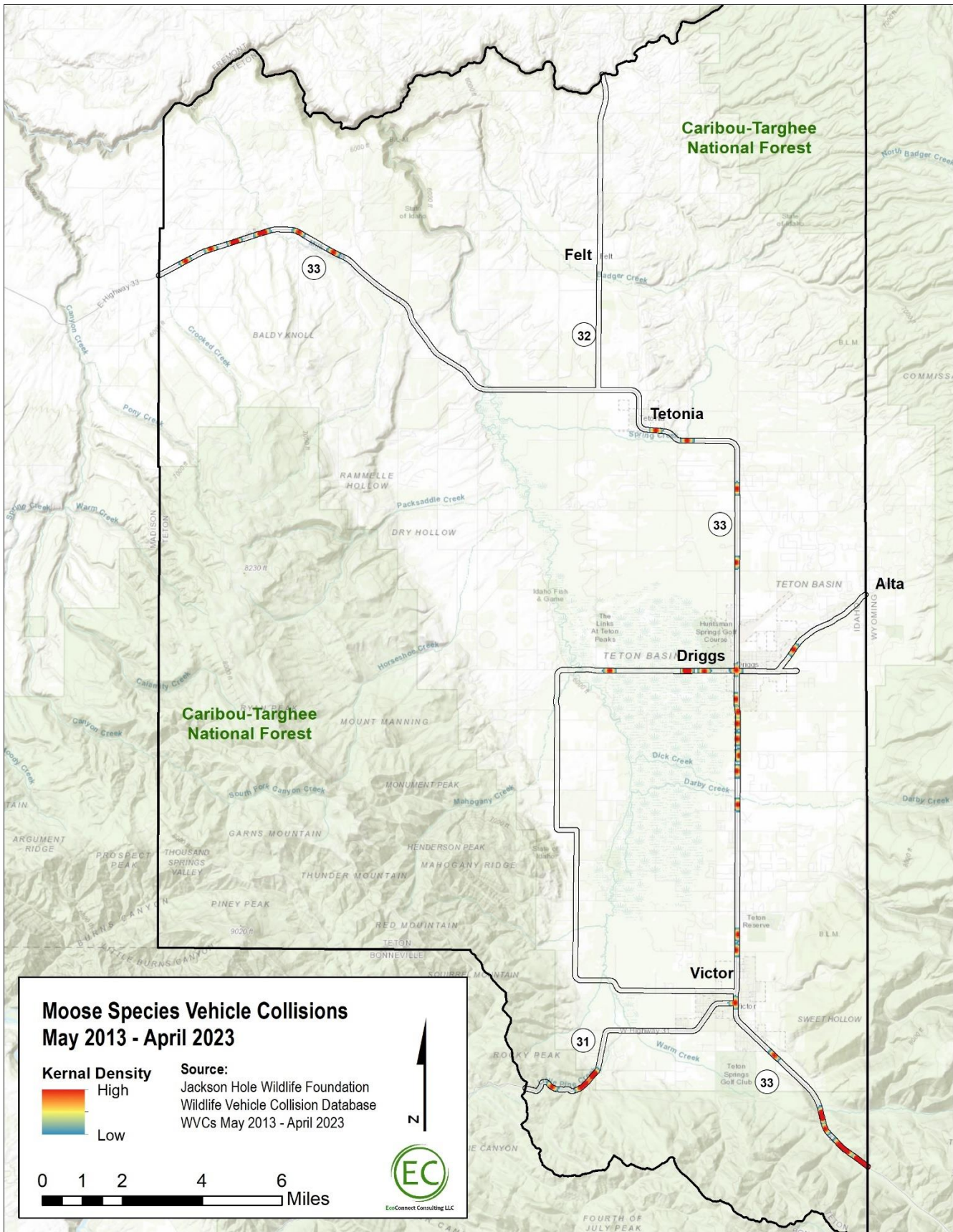
Elk

Figure 17. Elk-Vehicle Collision Hotspots



Moose

Figure 18. Moose-Vehicle Collision Hotspots



Deer (Mule Deer and White-Tailed Deer Combined)
Figure 19. All Deer Species-Vehicle Collision Hotspots

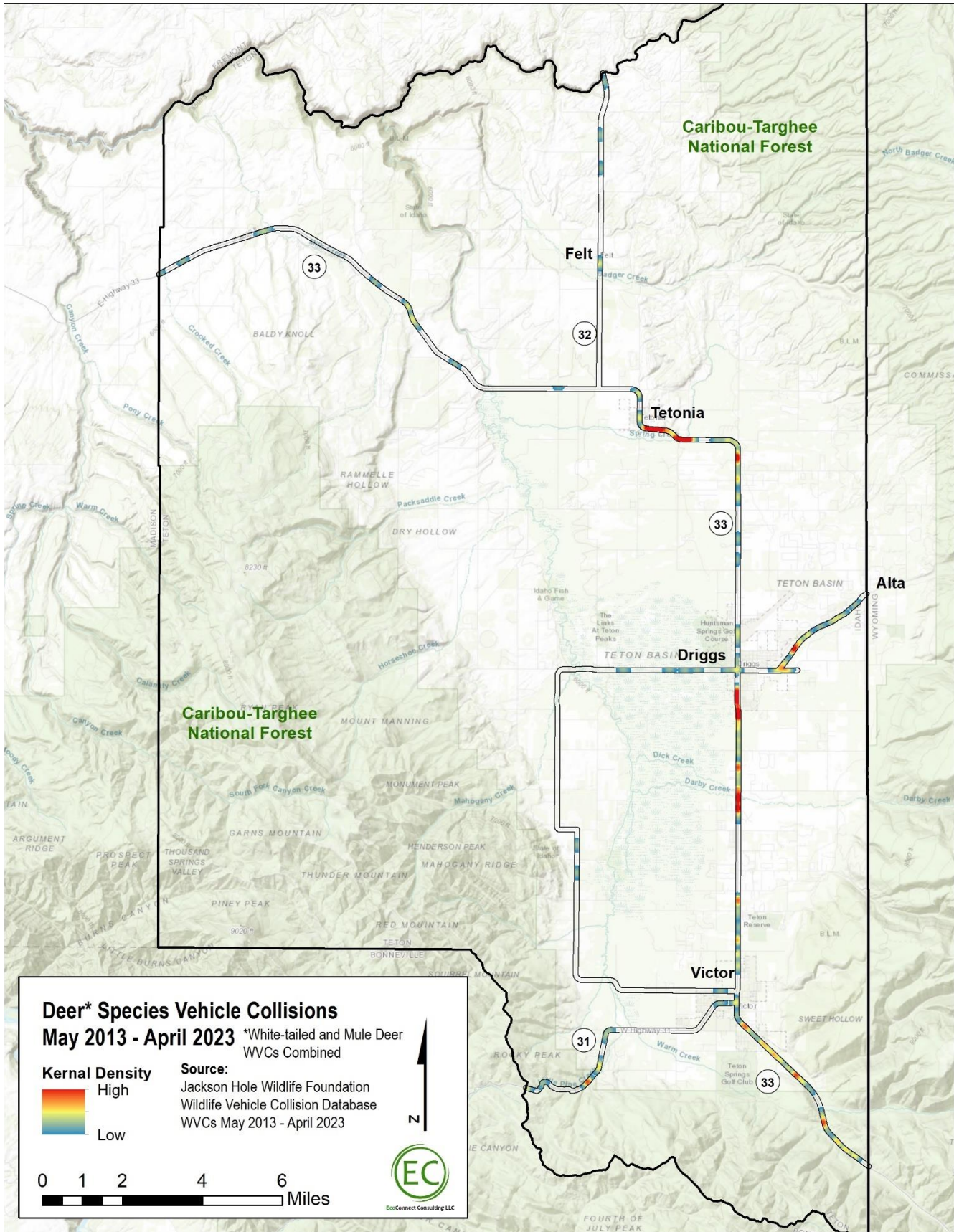


Figure 20. Comparison of Mule Deer versus White-tailed Deer-Vehicle Collision Locations

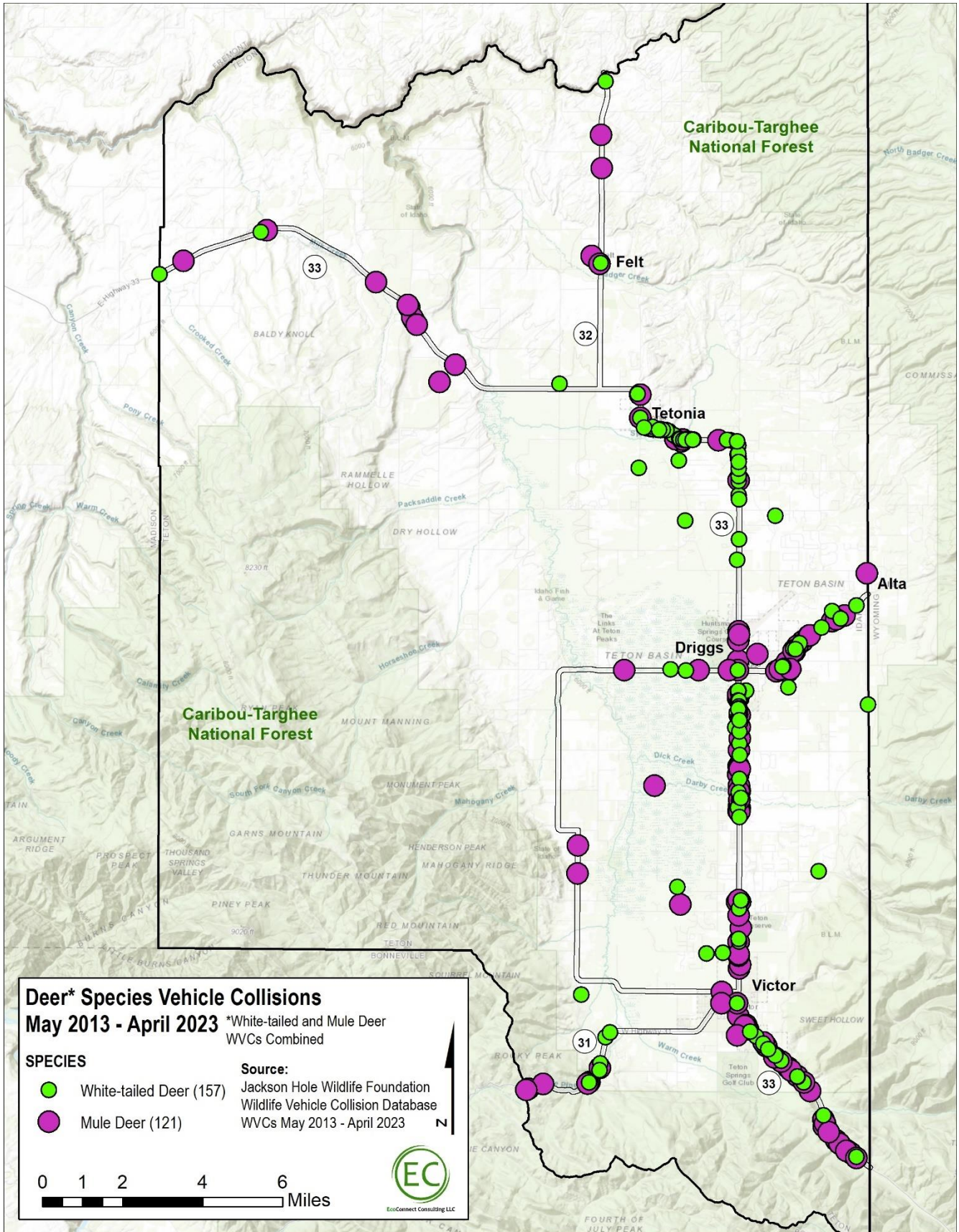
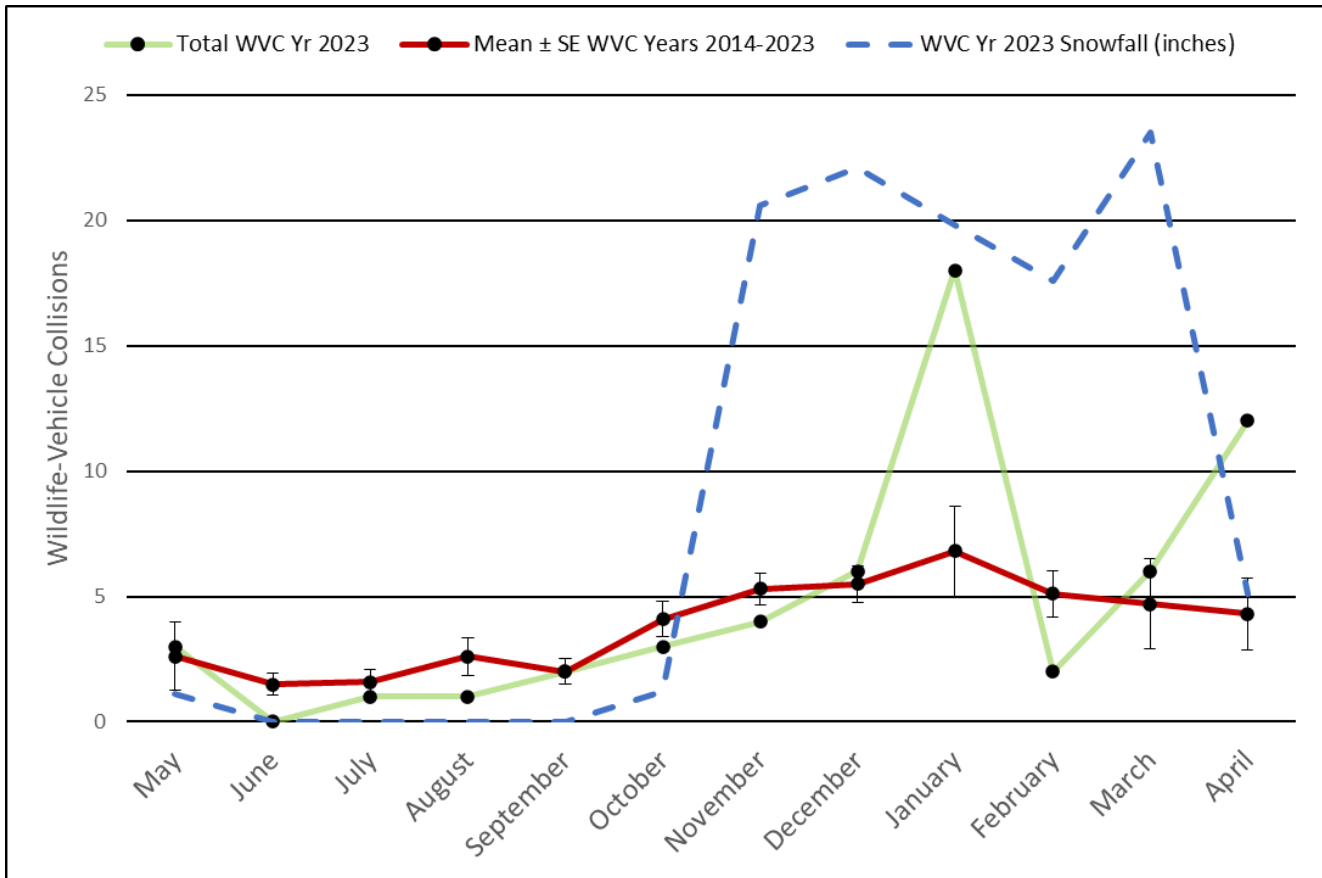


Figure 20 shows the distribution of mule deer versus white-tailed deer-vehicle collisions across the study area. The data for both species were used in combination to create the hotspots identified in Figure 19.

Seasonal Trends

WVC numbers in 2023 followed a similar monthly trend as the previous 10 years (2014-2023) except for in the winter and spring of 2023. January and April 2023 WVCs exceeded the monthly mean for those months over the previous ten-year period. As the effort to record WVC observations increases, the confidence in the ten-year mean will also increase.

Figure 21. Seasonal Trends of WVCs in Teton County, ID 2014-2023



* Monthly total snowfall in Jackson, WY for WVC Yr 2023 is shown. Snowfall data for Jackson, WY was used as the data available for Driggs, ID was missing a significant number of entries for winter months (NOAA 2024). Jackson, WY is closer to Teton County, ID than other available weather station locations.

Discussion

Summary for Teton County, ID

As with all new datasets, an increase in data collection efforts will continue to strengthen the dataset. Wildlife-vehicle collision observations are typically underreported and this is particularly true at the beginning stages of data collection efforts. Conservative estimates suggest that wildlife-vehicle collisions are 2-4 times higher than what is reported (Huijser, et al. 2008). Some animals are injured but able to move away from the roadway before dying or succumbing to their injuries, undetected. Furthermore, carcass persistence is low for smaller species, such as birds and small mammals, and it is difficult to see smaller carcasses while driving (Guinard et al. 2012; Teixeira et al. 2013). Therefore, small carcasses are rarely reported to databases like ours. Even large-bodied animal carcasses can disappear from roadways. Scavengers can drag them substantial distances and carcasses in the lanes of traffic can be removed by agency personnel or concerned citizens who may not report them. These WVC data are incidental and primarily collected by community scientists, so these numbers should be considered a minimum count and it should be assumed that the true numbers are significantly higher.

In 2023, a total of 58 WVCs were recorded. However, given the vast underreporting of WVCs, the actual number of WVCs were likely at least 116-232 or 2x to 4x higher (Guinard et al. 2012; Slater 2002; Teixeira et al. 2013). Long-term trends in WVC annual and seasonal patterns can help elucidate what factors may lead to increased WVC. However, trends are less useful for targeting locations where management efforts could be focused. Mapping WVC hotspots in Teton County, ID defines important target areas for mitigation, informing agency decision-making with science.

Trends

Since 2006 (Figure 14 & Figure 2), when roadkill data collection efforts began in Teton County, ID, the number of reported WVCs has increased. The reason for this increase is unknown and could be due to a combination of factors including an increase in reporting effort by agencies, community scientists and the public.

While it is difficult to decipher whether changes in the number of WVCs are influenced by weather patterns, reporting effort or traffic volumes, it is important to continue collecting WVC data in Teton County, ID. Long-term datasets are valuable for assessing trends over time and can inform mitigation efforts such as driver awareness education and wildlife crossing projects. Long-term datasets contribute to our ability to answer such questions.

While wildlife crossing structures have proven to be one of the most effective means of lessening wildlife-vehicle collisions and increasing habitat permeability (Huijser, et al. 2009), crossing structures are costly and not possible on all roadways. Increased awareness by individual drivers is an important variable particularly as traffic volumes continue to increase in Teton County, ID. It is one of Jackson Hole Wildlife Foundation's goals to implement education and awareness campaigns that facilitate the heightened awareness and behavioral changes needed for drivers to reduce wildlife-vehicle collisions.

Combined Resources

Suggested Citation

Jackson Hole Wildlife Foundation. 2024. Teton County Wildlife-Vehicle Collision Database Summary Report (2022-2023). Jackson, WY.

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References

- Biota Research and Consulting, Inc. 2003. *Final Report: Jackson Hole Roadway and Wildlife Crossing Study, Teton County, WY*. Jackson, WY: Prepared for: Jackson Hole Wildlife Foundation.
- Guinard, E, R Julliard, and C Barbraud. 2012. "Motorways and bird traffic casualties: carcasses surveys and scavenging bias." *Biological Conservation* 147: 40–51.
- Huijser, M P, J Duffield, A Clevenger, R Ament, and P McGowen. 2009. "Cost–benefit analyses of mitigation measures aimed at reducing collisions with large ungulates in the United States and Canada: a decision support tool." *Ecology and Society*. 14(2): 15.
- Huijser, M.P., P.T. McGowen, A.P. Clevenger, and R. Ament. 2008. *Wildlife-Vehicle Collision Reduction Study: Best Practices Manual*. Washington, DC: The U.S. Federal Highway Administration (FHWA).
- NOAA. 2024. *NOWData - NOAA Online Weather Data*. Accessed September 2024.
<https://www.weather.gov/wrh/climate>.
- Riginos, C, C Smith, E Fairbank, E Hansen, and P Hallsten. 2018. *Traffic thresholds in deer road-crossing behavior. Technical Report WY-1807F*. State of Wyoming Department of Transportation.
- Riginos, C, E Fairbank, E Hansen, J Kolek, and M Huijser. 2022. "Reduced speed limit is ineffective for mitigating the effects of roads on ungulates." *Conservation Science and Practice* 4(3):e618.
- Slater, F. M. 2002. "An assessment of wildlife road casualties – the potential discrepancy between numbers counted and numbers killed." *Web Ecology* 3:33–42.
- Teixeira, F Z, A.V A Coelho, and A Esperandio. 2013. "Vertebrate road mortality estimates: effects of sampling methods and carcass removal." *Biological Conservation* 157:317-323.

Appendix A: WVC Summary Table - Teton County, WY
WVC Species Count By WVC Years 2014-2023

SPECIES	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
American Marten						1					1
American Robin			1								1
Bighorn Sheep				4					2	3	9
Black Bear	1		1	2		1	2		5		12
Black-billed Magpie	1					1				1	3
Boreal Toad				1							1
Common Muskrat										1	1
Common Raven		1									1
Coyote	1		3	2		2	1	1	1	5	16
Elk	46	29	25	46	49	34	47	37	40	38	391
Gray Wolf		1									1
Great Horned Owl	1		4					2	1		8
Grizzly Bear			1	1			1				3
Least Chipmunk			2								2
Long-tailed Weasel				1		1					2
Moose	15	13	12	18	20	28	15	10	20	8	159
Mountain Bluebird		1				1			1		3
Mountain Lion					1			1			2
Mule Deer	134	217	223	265	105	179	132	86	119	156	1616
North American Badger						2	2	1			5
North American Porcupine	4	2	4	4		3	1	2		3	23
Northern Goshawk	1										1
Northern Raccoon	4	6	4	1	1	5	6		5	2	34
Pronghorn	1				1						2
Red Fox	1	1		2	2	2	3	3	2	3	19
Red Squirrel			1					1			2
Rough-legged Hawk	1										1
Ruffed Grouse		1								1	2
Snowshoe Hare										1	1
Striped Skunk		4		6		2	3	19	7	10	51
Tiger Salamander						1					1
Trumpeter Swan										1	1
Wandering Gartersnake			1		1	2	1		1		6
Weasel			1								1
Western Tanager							2				2
Western Toad									1		1
White-tailed Deer	2		1	4	1	2	5	1	5	2	23
Yellow-bellied Marmot		1		1				1			3
Total	213	277	284	358	181	267	221	165	210	235	2411

Appendix B: WVC Summary Table - Teton County, ID
WVC Species Count By WVC Years 2014-2023

Species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
American Beaver			2								2
American Black Bear									1		1
American Black Duck					1						1
American Marten										1	1
American Mink	1										1
American Robin							1			2	3
Barrow's Goldeneye							1				1
Black-headed Grosbeak							1				1
Bobcat	1										1
Coyote							1			1	2
Elk		1	4	7	7	8	4	3	5	12	51
Great Horned Owl						2	1			1	4
Moose	2	9	6	4	7	6	5	5	11	1	56
Mule Deer	8	7	10	2	6	22	29	8	11	18	121
Muskrat							1				1
North American Porcupine			3				2	1		1	7
Northern Flicker							1				1
Northern Raccoon		3	1		4		2	1	2	1	14
Northern River Otter	1										1
Rabbit and Hares (Leporidae)		1									1
Red Fox		1					1	1	1		4
Red-tailed Hawk										1	1
Ring-necked Pheasant		1									1
Ruffed Grouse							1				1
Sharp-tailed Grouse					1						1
Skunks and Stink Badgers (Mephitidae)	1	2	4		3						10
Striped Skunk						4	4	1	2	2	13
Uinta Ground Squirrel										1	1
White-tailed Deer	4	15	9	13	11	30	34	11	14	16	157
Yellow-rumped Warbler									1		1
Total	18	40	39	26	40	72	89	31	48	58	461