

US-191/MT-64 Wildlife & Transportation Assessment

KEY FINDINGS

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Photo by Matt Ludin

Overview

The **US-191/MT-64 Wildlife & Transportation Assessment** combines local and expert knowledge, public data, citizen science, and engineering expertise to identify important areas where wildlife accommodation measures—such as culverts, bridges, underpasses, overpasses, animal detection systems, and fencing—can improve the safety of travelers and wildlife.

These key findings highlight critical considerations for two major roads that unite local communities yet divide the landscape in southwest Montana’s “gateway to Yellowstone.” Included are the Assessment’s methods, Priority Sites, and recommendations.

Why Do We Need an Assessment?

Residents, Commuters, and Visitors Depend on these Roads:



- Traffic volume along US-191* increased by 38% from 2010-2018.^a
- 83% of Big Sky workers regularly commute along US-191 and MT-64 (Lone Mountain Trail).^b
- Visitation to Yellowstone National Park increased by 20% from 2014-2017 and over 1 million trips on US-191 are made to enter the park. The town of West Yellowstone hosts more than 4 million visitors per year.^c

More Traffic is a Problem for Wildlife:



- Grizzly bears, among other species, are sensitive to traffic, losing road crossing opportunities as levels increase.^d
- Traffic on US-191 and MT-64 is already at a level that has been shown to reduce deer crossing safety.^e

The Status Quo is Risky and Expensive:



- Collisions involving wildlife make up 24% of all reported crashes on US-191 and over 13% on MT-64.^{a,b} Across Montana, the statewide average is 10%, while the national average is 5%.^{f,g}
- A driver in Montana has a 1 in 53 chance of hitting an animal every year—the second highest of any state in the nation. 1 in 127 is the average chance across the U.S.^h

* From Four Corners (about 8 miles west of Bozeman) to Beaver Creek (just south of Big Sky).

Wildlife-Vehicle Collisions: Costs to Society

Cost of Collisions

From 2011 to 2020 on US-191 (between West Yellowstone and Four Corners, Montana) and along MT-64 (Lone Mountain Trail) into Big Sky, Montana:



1,322

- **1,322 animal carcasses** were documented by the Montana Department of Transportation and Interagency Grizzly Bear Study Team.

These losses amount to:

- \$27 million in personal injury and property damage
- \$60 million if the intrinsic value of wildlife—which considers the ability of species to remain on the landscape—is included

Average Cost per Collision by Speciesⁱ



Direct Costs: vehicle repair, human injuries, and human fatalities



Passive Benefit: the value humans place on the existence of an animal species

Deer	$ \begin{array}{r} \$14,014 \\ + \\ \$5,075 \\ \hline = \$19,089 \end{array} $
Elk	$ \begin{array}{r} \$45,445 \\ + \\ \$27,751 \\ \hline = \$73,196 \end{array} $
Moose	$ \begin{array}{r} \$82,646 \\ + \\ \$27,751 \\ \hline = \$110,397 \end{array} $

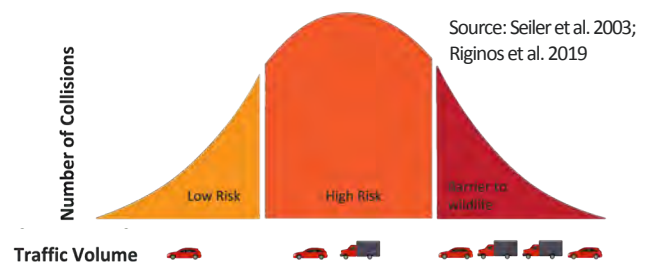
Roads Can Serve as Barriers to Wildlife

Traffic Volume and the Barrier Effect

As traffic volumes increase, so does collision risk—until a road becomes a complete barrier to wildlife passage. Noise, other disturbance, and habitat alteration are among reasons wildlife may avoid roads.



Photo of vehicle by Holly Pippel



Mitigation Measures and their Effectiveness

Measures to influence driver behavior have varying degrees of success and do not address the barrier effect of roads on wildlife movement. Separating wildlife from the road and traffic by fencing and enabling safe wildlife passage via dedicated structures achieve the dual objectives of reducing wildlife-vehicle collisions and maintaining habitat connectivity.



Mitigation Measure Effectiveness in Reducing Wildlife-Vehicle Collisions and Maintaining Connectivity^j

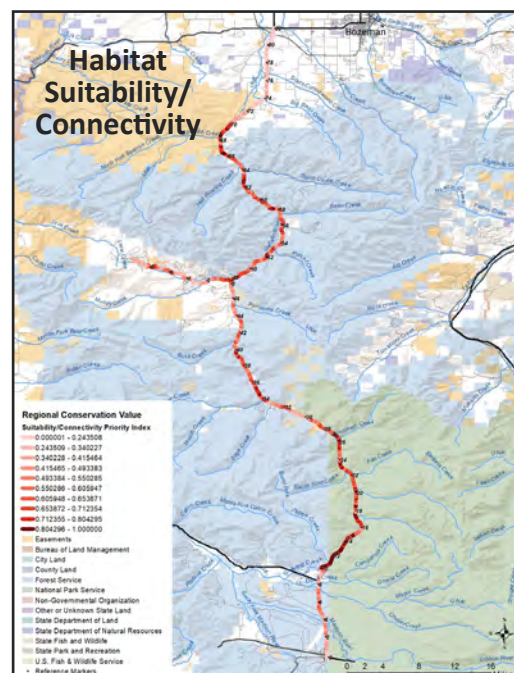
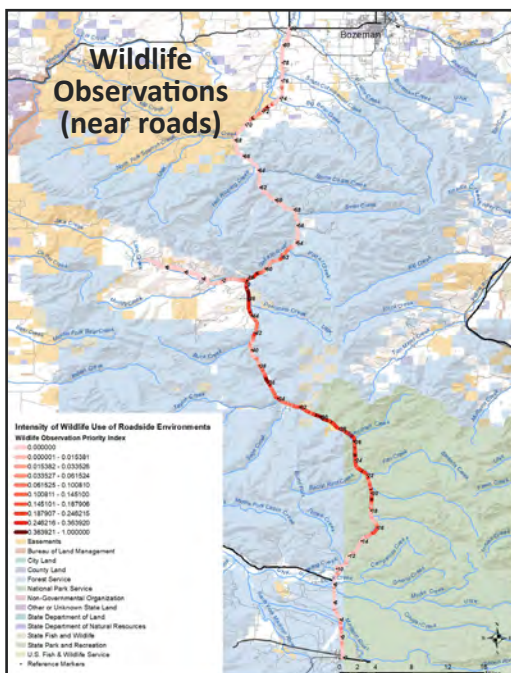
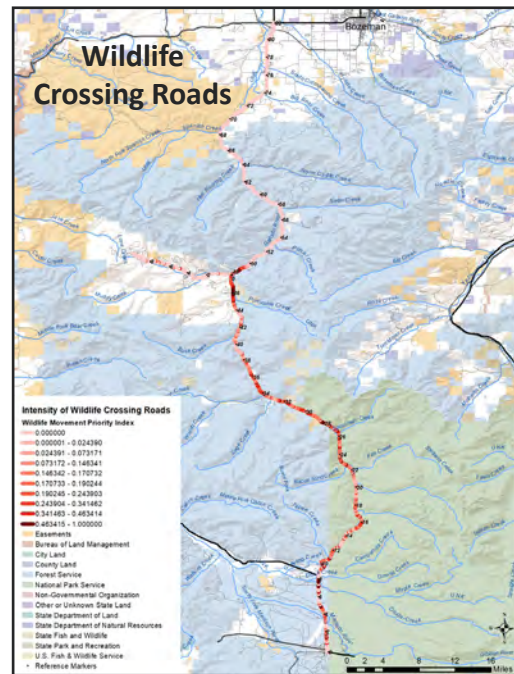
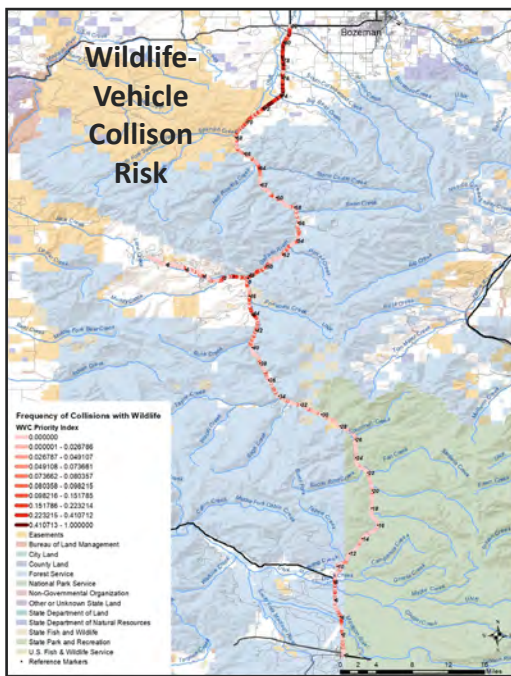
Mitigation Measure		Effectiveness in Reducing Collisions	Effectiveness in Maintaining Connectivity
<i>Measures aimed at influencing driver behavior</i>			
Seasonal wildlife warning signs		9 - 50% (highly variable)	None
Roadside animal detection systems		33 - 97% (highly variable)	None
Traffic calming measures with reduced speed [*]		Up to 60%	Unknown (may increase)
<i>Measures to separate wildlife from the road and traffic</i>			
Wildlife crossing structures with fencing		80 - 100%	Maintains habitat connectivity

^{*}Reducing speed limits without traffic calming measures can lead to more accidents! Many drivers follow the “design speed” of a road rather than its posted speed limit.^k



Priority Sites and Recommendations: Our Methods

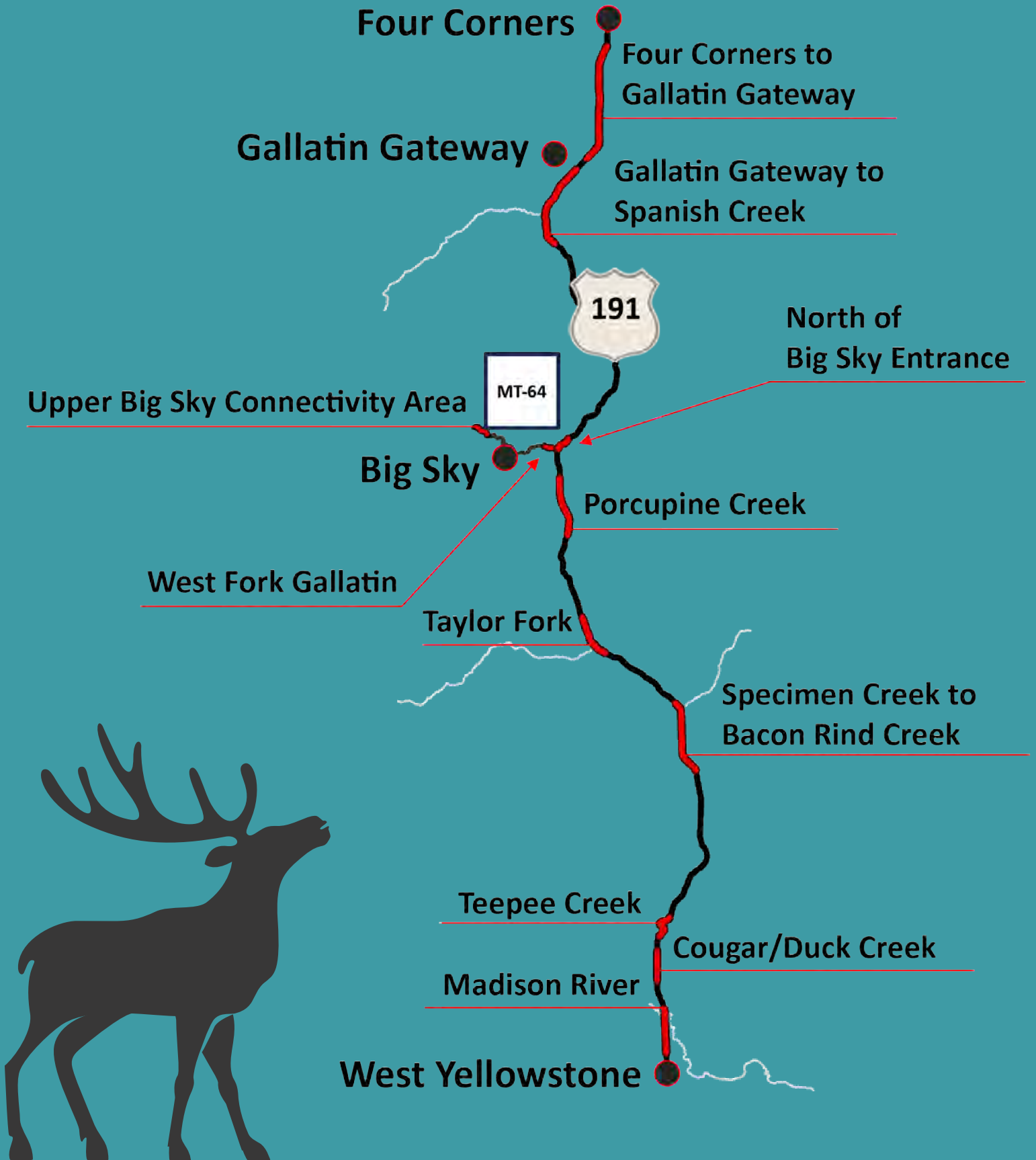
Through data analysis and site visits with an interdisciplinary team, the Assessment identified 11 priority locations that are barriers to wildlife movement and pose elevated risks to human and wildlife safety. The analysis grouped data from public sources, citizen science, and systematic surveys into four Prioritization Characteristics: Wildlife-Vehicle Collision Risk, Wildlife Observations (Near Roads), Wildlife Crossing Roads, and Habitat Suitability. For each Prioritization Characteristic, an index value was developed (on a scale of 0-1, with 1 scoring higher for prioritization and 0 scoring lower) for every 0.1 mile road segment. The team combined scores from all Prioritization Characteristics to create a composite score for each segment. This analysis revealed areas with consistently elevated values to examine in the field.



At each field site, the team—composed of independent researchers and experts from federal, state, and county agencies—considered several additional attributes. These included land security, local conservation value, mitigation options, barrier effect, and vulnerability. The rich and thoughtful discussion among the research team led to the final Priority Sites and recommendations.

Priority Site Map

 = Priority Sites



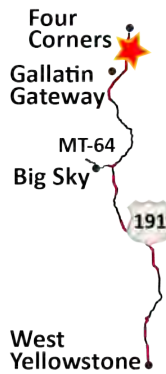
Priority Sites

Four Corners to Gallatin Gateway

US-191: Mile Post: 74.1-81-3

Average Daily Traffic: 14,607

Extent: 7.2 miles



This site has high wildlife-vehicle collision risk and very high traffic volume in an area of intensive development. Lack of land-use planning and the presence of many secondary roads, access roads, and driveways limit the potential for mitigation measures to reduce collision risk or maintain habitat connectivity. As traffic volume nears the threshold at which roads can become complete barriers to wildlife (average daily traffic > 15,000 vehicles), fewer animals will attempt to cross, and those that do will face an elevated risk of collision.^e

Recommendations:

- Consider the potential for seasonal warning signs and alternative modes of transportation, such as ride sharing and elements of intelligent transportation systems (e.g., timed traffic signal controls and warning signs), which may marginally reduce collisions.
- Evaluate the South Cottonwood Creek culvert for the potential to add a dry shelf to accommodate small- to medium-bodied terrestrial wildlife, even during higher flows.

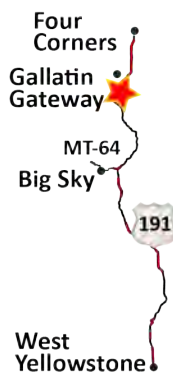


Gallatin Gateway to Spanish Creek

US-191: Mile Post: 68.1-73.7

Average Daily Traffic: 10,047

Extent: 5.6 miles



This site has high wildlife-vehicle collision risk and high traffic volume in a landscape of mixed agricultural and residential land uses to the north, with larger upland parcels that lead to the Custer Gallatin National Forest from the mouth of the Gallatin Canyon to the south.

Recommendations:

- Retrofit the bridge over the Gallatin River to accommodate large mammals by developing pathways beneath that offer secure footing and sufficient vertical clearance, as an interim measure until replacement with a more suitable structure is possible. Construct fencing to keep wildlife off the road and guide them to the structure.
- Replace the Spanish Creek Bridge with a larger structure that spans the full riparian area, has sufficient height (> 15 ft) to allow suitable dry passage beneath for large mammals year-round, and includes fencing to keep wildlife off the road and guide them to the structure.
- Have land trusts explore the potential for land security through voluntary conservation easements with landowners in the vicinity of Mile Posts 70.5-73 and examine the engineering feasibility of an overpass with fencing.
- If measures are implemented, evaluate connecting the three structures with fencing and upsizing an existing culvert between the Gallatin River and Spanish Creek bridges to better accommodate small- to medium-bodied terrestrial wildlife and aquatic species.



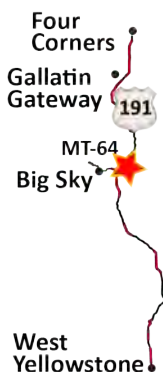
Priority Sites

North of Big Sky Entrance

US-191: Mile Post: 48.1-49.4

Average Daily Traffic: 8,421

Extent: 1.3 miles



With elevated traffic volume, this area has a growing risk of wildlife-vehicle collisions and is becoming a barrier to wildlife movement. Elk frequently cross the highway along each of the 0.10-mile segments within the site—bordered by parcels that lead to the Custer Gallatin National Forest and Lee Metcalf Wilderness Area—and bighorn sheep are often observed along the road. Both species are documented in wildlife-vehicle collisions.

Recommendations:

- Retrofit the bridge over the Gallatin River to accommodate large mammals by creating a pathway that offers secure footing under the bridge. This would serve as an interim measure until replacement with a more suitable structure is possible.
- Have land trusts explore the potential for land security through voluntary conservation easements with landowners west of the road on undeveloped parcels and examine the engineering feasibility of an overpass with fencing that could potentially connect to the bridge over the Gallatin River once it has been retrofitted or replaced.



Upper Big Sky Connectivity Area

MT-64: Mile Post: 7.3-8.2

Average Daily Traffic: 2,891

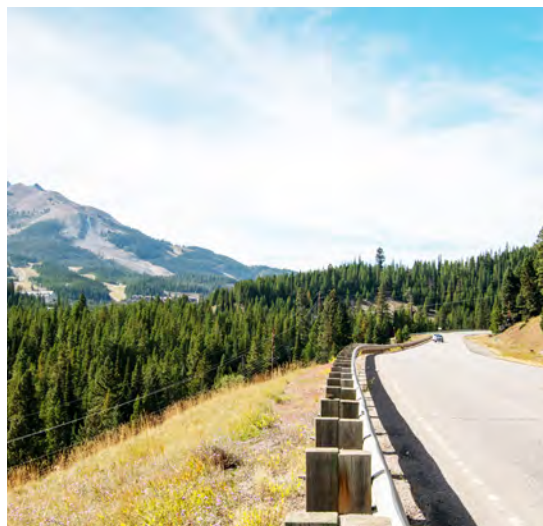
Extent: 0.9 miles



Located on steep slopes at a higher elevation than other sites, the Upper Big Sky Connectivity Area is aptly named for its importance for alpine species, including wolverines. With relatively low traffic and lower-speed travel than other sites, and complex topography and steep roadway grades, no structural measures are recommended at present. However, as development and traffic volume increase, monitoring of this site is recommended to evaluate trends and identify future opportunities to maintain regional connectivity and reduce wildlife-vehicle collisions.

Recommendation:

- Monitor area for development and traffic pressure as well as for wildlife-vehicle collisions.



Priority Sites

West Fork Gallatin

MT-64: Mile Post: 0.2-1.2

Average Daily Traffic: 10,513

Extent: 1 mile



At this site, located just west of the turn-off onto MT-64 (Lone Mountain Trail), bighorn sheep frequent the steep slopes of the Custer Gallatin National Forest north of the road, while elk often graze in meadows on the south side. Due to fairly high traffic volume and fidelity of these species to preferred habitats on either side of the road, measures to reduce collisions are a primary focus. Existing structures—a small bridge at Mile Post 0.2 and a culvert at Mile Post 1.1—may allow passage by species such as black bears, mountain lions, coyotes, bobcats, lynx, and wolverines, but not elk.

Recommendations:

- Evaluate a combination of animal detection systems, traffic calming measures, and exclusionary fencing between existing structures to reduce wildlife-vehicle collisions.
- Replace the culvert at Mile Post 1.1 with a larger structure or span bridge suitable for passage beneath by a wide range of species, including deer and black bear.

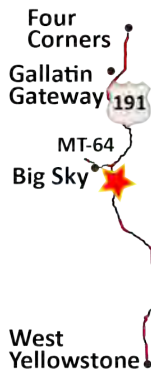


Porcupine Creek

US-191: Mile Post: 43.0-47.0

Average Daily Traffic: 7,348

Extent: 4 miles



Bordered by the Gallatin Wildlife Management Area and Custer Gallatin National Forest, this site hosts high concentrations of elk and other wildlife year-round. Porcupine and Beaver Creeks serve as major movement corridors between the Gallatin and Madison ranges.

Recommendations:

- Evaluate traffic-calming measures such as roundabouts, rumble strips, new pavement markings, or other physical changes to slow traffic. Consider posting lower speed limits, and motion-activated, nighttime lighting, especially along the site's more developed extent from the vicinity of Porcupine Creek to the north.
- Evaluate the Beaver Creek culvert for upsizing to better accommodate small- to medium-bodied terrestrial wildlife and aquatic species.
- Have land trusts explore the potential for land security through voluntary conservation easements with landowners west of the road (in the less developed southern reach of the site) and examine the engineering feasibility of an overpass with fencing, along with animal detection systems at fence ends.



Priority Sites

Taylor Fork

US-191: Mile Post: 34.2-36.4

Average Daily Traffic: 2,239

Extent: 2.2 miles



Primarily surrounded by the Custer Gallatin National Forest, the Taylor Fork is a significant tributary to the Gallatin River that serves as a major movement corridor between the Gallatin and Madison ranges. Road crossings by elk are documented in each of the fifteen 0.1-mile road segments within the site, and grizzly bear crossings are documented in five of the segments. Wildlife-vehicle collisions involving elk, moose, deer, pine martens, and a grizzly bear, are also documented.

Recommendations:

- Replace the Taylor Fork Bridge with a structure that spans the riparian area and has sufficient height (> 15 ft) to allow suitable dry passage beneath for large mammals year-round. Evaluate the need for fencing.
- Evaluate the culvert immediately south of Mile Post 36 for upsizing to better accommodate small- to medium-bodied terrestrial wildlife and aquatic species.

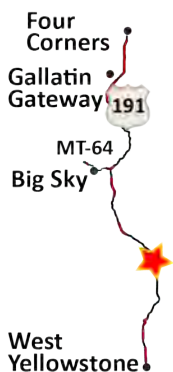


Specimen Creek to Bacon Rind Creek

US-191: Mile Post: 23.2-27.1

Average Daily Traffic: 2,509

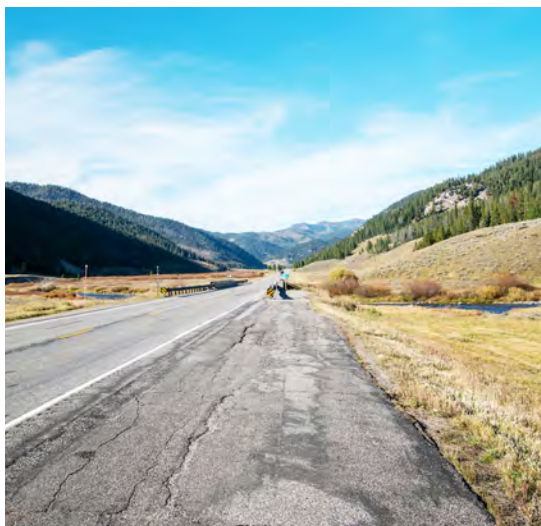
Extent: 3.9 miles



Located within Yellowstone National Park, this site is characterized by open riparian meadows along the roadside leading to forested slopes, including the Lee Metcalf Wilderness Area to the west. Frequent road crossings by elk and grizzly bears are documented here, along with wildlife-vehicle collisions involving elk, moose, deer, bighorn sheep, black bears, wolves, coyotes, foxes, pine martens, and beavers.

Recommendations:

- Replace the Gallatin River and Specimen Creek bridges with structures that fully span the riparian area of each water body and have sufficient height (> 15 ft) to allow suitable dry passage beneath for large mammals year-round.
- Evaluate five existing culverts for upsizing for use by aquatic and small- to medium-sized terrestrial wildlife.
- Consider linking the upgraded structures together with fencing to reduce wildlife-vehicle collisions and to guide wildlife to them. A possible alternative may be an animal detection system.
- Examine the potential to manage the highway as a “park road” rather than throughway, including night closure to semi-trucks.



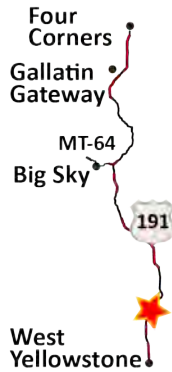
Priority Sites

Teepee Creek

US-191: Mile Post: 9.5-11.6

Average Daily Traffic: 2,509

Extent: 2.1 miles



Connecting Yellowstone National Park and the Custer Gallatin National Forest, this site provides habitat for elk, moose, and grizzly bears in a mix of forest, wetland, and riparian areas. As traffic volume increases, measures to maintain habitat connectivity are critical. Wildlife-vehicle collisions with three grizzly bears, plus elk, moose, coyotes, foxes, pine martens, beavers, and porcupines are documented here.

Recommendations:

- Replace Grayling Creek Bridge with a structure that spans the riparian area and has sufficient height (> 15 ft) to allow suitable dry passage beneath for large mammals year-round. The adjacent snowmobile bridge would require similar expansion.
- Replace the double pipe culverts at Teepee Creek with a structure that spans the wetland and riparian area and has sufficient clearance (> 15 ft) to allow large mammals to pass beneath.
- Following these changes, consider connecting the new structures with fencing, which may extend as far south as Fir Ridge.

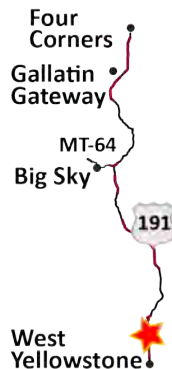


Cougar/Duck Creek

US-191: Mile Post: 7-9

Average Daily Traffic: 3,257

Extent: 2 miles



Located primarily within the Custer Gallatin National Forest in an area of forest and meadows next to Yellowstone National Park, the Cougar/Duck Creek site has high value for habitat connectivity for multiple species. The site is also significant for bison crashes based on data gathered for this study, as well as in a 2012 analysis carried out independently by MSU's Western Transportation Institute.

Recommendation:

- Consider options for replacing the existing Cougar Creek Bridge and Duck Creek culvert with structures that fully span the riparian area of each water body and have sufficient height (> 15 ft) to allow suitable dry passage beneath by large mammals year-round. If this measure were implemented, the adjacent snowmobile bridges would require similar expansion. Fencing and fence end treatments such as animal detection systems would also be necessary.



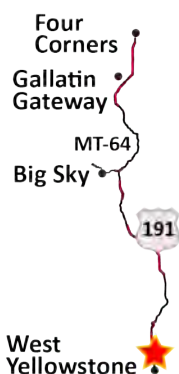
Priority Sites

Madison River

US-191: Mile Post: 9.5-11.6

Average Daily Traffic: 2,509

Extent: 2.1 miles



Ensnoced within lodgepole pine habitat at grade with the road within the Custer Gallatin National Forest, this site is frequently used by bison and other species just beyond Yellowstone National Park. The area is also significant for bison crashes based on data gathered for this study, and in a 2012 analysis carried out independently by MSU’s Western Transportation Institute.

Recommendation:

- Consider options for replacing the existing Madison River Bridge to fully span the riparian area with sufficient height (> 15 ft) to allow suitable dry passage beneath by large mammals year-round, and/or consider constructing a dedicated overpass structure. Fencing and fence end treatments such as an animal detection system would also be necessary.



Looking Ahead

Making US-191 and MT-64 safer for travelers and wildlife is a multi-year, multi-site proposition that will take collective action to bring about. In the end, a variety of measures enacted over time will improve driver safety and maintain wildlife movement.

Together with elected officials and public agencies, area communities will determine how to move forward with recommendations of the US-191/MT-64 Wildlife & Transportation Assessment.

Sources:

^a MDT. 2020. US-191 Corridor Study.

^b Gallatin County. 2017. TIGER Proposal.

^c National Park Service. 2022. NPS Statistics (IRMA).

^d Waller, J. & C. Miller. 2015. Decadal Growth of Traffic Volume on US-2 in NW MT. *Intermtn. Jl. of Sciences* 21 (1–4): 29–37.

^e Riginos, C., C. Smith, E. Fairbank, E. Hansen, & P. Hallsten. 2018. Traffic Thresholds in Deer Road-Crossing Behavior. WYDOT.

^f MSU-WTI. 2023. Unpublished.

^g NHTSA-NCSA. 2022. Traffic Safety Facts 2020.

^h State Farm Insurance. 2023.

ⁱ Data Source: Huijser M, Duffield J, Neher C, Clevenger A, & Mcguire T. (eds). 2022. Update and expansion of the WVC Mitigation Measures and their Cost Benefit Model. TPF-5(358). NVDOT.

^j Huijser, M, Ament, R, Bell, M, Clevenger, A, Fairbank, E, Gunson, K, and T Mcguire (eds). 2022. Animal vehicle collision reduction and habitat connectivity pooled fund study – Literature review. TPF-5(358). NVDOT.

^k Huijser, M. P., Mosler-Berger, C., Olsson, M., & Strein, M. (2015). Wildlife warning signs and animal detection systems aimed at reducing wildlife-vehicle collisions. *Handbook of road ecology*, 198-212.

Thank You to the Assessment's Generous Supporters and Participating Agencies

Sponsors:

Big Sky Resort Area District, Moonlight Community Foundation, Yellowstone Club Community Foundation, and The Volgenau Foundation.

Participating Agencies:

Gallatin County, Montana Department of Transportation, U.S. Forest Service, Interagency Grizzly Bear Study Team, National Park Service, U.S. Fish and Wildlife Service, Federal Highway Administration, and Montana Fish, Wildlife and Parks.

To read the Assessment's full report, visit:

[Largelandscapes.org/191](https://largelandscapes.org/191)

