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## **Evaluating Wildlife Mortality Hotspots, Habitat Connectivity and Potential Mitigation along US 287 and MT 87 in the Madison Valley, Montana**

[http://www.mdt.mt.gov/research/projects/env/madison\\_valley.shtml](http://www.mdt.mt.gov/research/projects/env/madison_valley.shtml)

### **Introduction**

The Western Transportation Institute at Montana State University (WTI) and the Craighead Institute (ChI) conducted a two-year study to investigate the effect of the major highways in the Madison Valley on road-related wildlife mortality and movement patterns, and to identify locations and strategies for potential wildlife accommodations. Along United States Highway 287 (US 287) and Montana Highway 87 (MT 87), wildlife-vehicle collisions (WVCs) can create a public safety risk and a habitat connectivity issue, which has generated some public concern. Prior to this project, the patterns and effects of WVCs and wildlife movements across this highway corridor had not been studied in depth.

Madison Valley is situated in the Greater Yellowstone Ecosystem (GYE) and plays a key role in connecting this ecologically intact ecosystem to other intact areas of the Central Rockies, particularly the wildlands of central Idaho

and the Selway-Bitterroot Ecosystem (SBE). US 287 and MT 87 in Montana form a partial barrier for wildlife movement between protected lands around Yellowstone National Park, Hebgen Lake, and a large block of core wildlife habitat on public lands in the Gravelly, Snowcrest, and Centennial Mountains. They do not block movement completely for the species studied, but they can delay travel and may impose stress on resident wildlife. Although there is a growing body of data documenting animal movement across the highway by elk, grizzly bear, wolverine, and other species, the barrier effect of the highway and road-related wildlife mortality patterns were poorly understood prior to this study. The overall objective of this project was to determine the effect of the major highways in the Madison Valley on wildlife mortality and movement patterns.

While this study focuses primarily on the effects of the highway corridor on wildlife connectivity, it is recognized that the movements of wildlife across highway

corridors can be a serious concern from the perspective of safety for the travelling public. This study does not specifically address driver safety related to wildlife vehicle collisions. An in depth analysis of crash data as it relates to incidences and severity of wildlife related accidents was not completed for the purposes of this study. Any future implementation of the recommendations for wildlife accommodations put forth in this study must be further evaluated based on an in-depth analysis of both safety and connectivity considerations. The implementation of any wildlife accommodations within the Madison Valley are dependent on funding availability, cost-effectiveness, statewide transportation priorities, and the potential nomination and development of future highway projects within this corridor.

### **What We Did**

Past wildlife habitat and connectivity modeling by the Craighead Institute and the Wildlife

Conservation Society identified three key areas for wildlife movement:

1. the Northern Linkage between Norris Hill and North Meadow Creek,

monitoring tools (i.e., cameras) during the data collection process. However, data were collected along the entire length of the study area in order to identify additional crossing

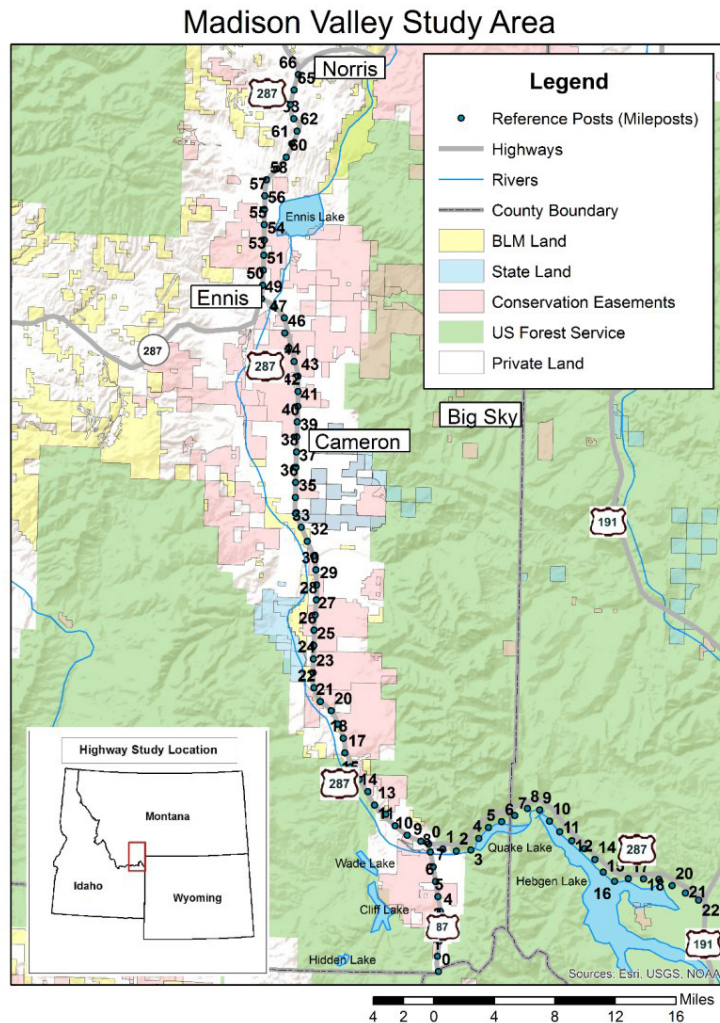
2014, collection was completed of carcass and live animal observation data three days/week, year-round in the study area. Remote camera data was recorded at 11 culverts and bridges throughout the study area to assess wildlife use of existing underpasses and opportunistically collected snow tracking data to assess patterns of wildlife crossings. Also gathered existing data and GIS layers from MDT and other state, federal, and non-profit agencies on wildlife movements, road characteristics, and land use plans in the Madison Valley and incorporated carcass location data collected by other agencies.

A major outcome of this project was a GIS database of the study area that has the potential to help MDT and other agencies with transportation and natural resource planning. All data gathered were analyzed in the context of highway safety, infrastructure, wildlife use, habitat, and connectivity linkage zones with special attention paid to ungulates and forest carnivores.

## What We Found

An overview of the data used for this report demonstrates that wildlife interact with the highways throughout the length of the study area (Figure 2). There are only two 1-mile segments where no road kills were observed (Reference Post [RP] 14–15, and RP 17–18). Similarly there were few segments where animal tracks were not recorded or live animals were not seen. This figure also illustrates the wealth of data collected in the field for analysis, which are included in the geodatabase for this project.

The results of the data analysis have several conclusions that are species specific. These conclusions reflect that US 287 and MT 87 in the study area bisect important habitat and may be a barrier for individuals of



**Figure 1: Study area map with reference posts**

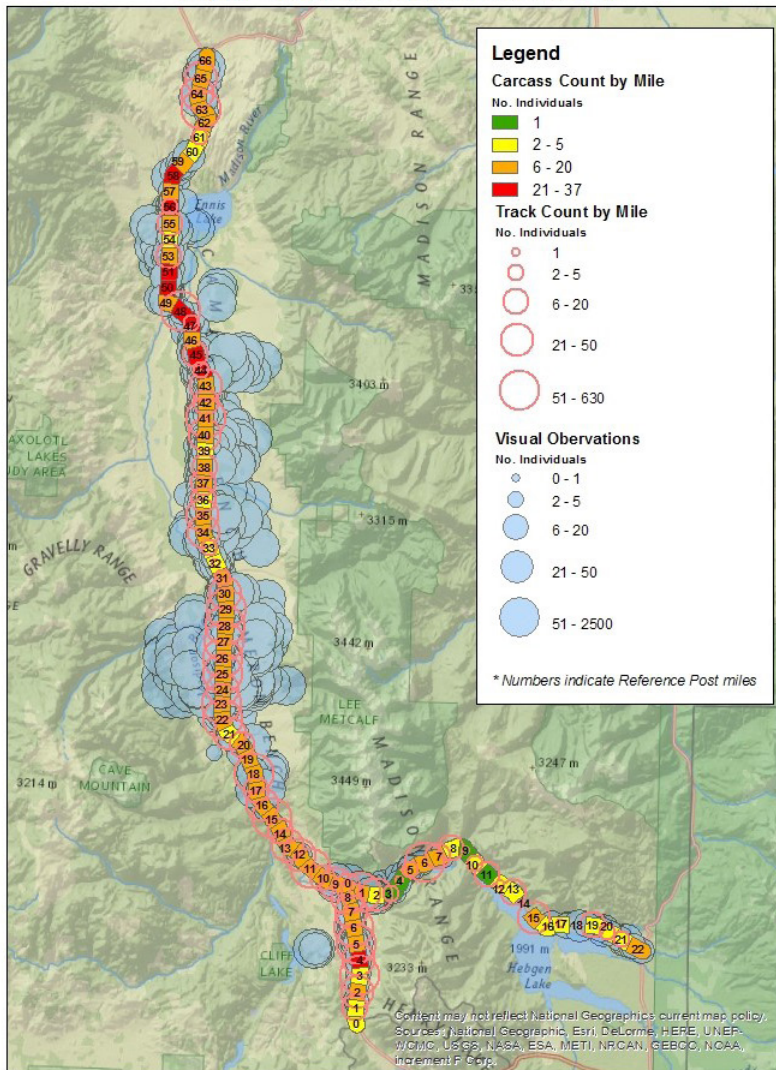
2. the riparian strips along the Eastern Drainage Linkage including Jack and Indian Creeks, and
3. the Southern Linkage extending from Papoose Creek to Reynolds Pass.

FWP biologists identified a fourth area of concern along US 287 near Hebgen Lake. These four areas comprised the major focus for this project in terms of deploying

sites, movement barriers, and other possible effects of the highway on animal behavior (Figure 1).

At the outset of the project, a bibliography of relevant literature and literature review on land use planning in the Madison Valley and subdivision impacts on wildlife, specifically ungulates (hoofed mammals such as deer and elk) was written. From April 2012 to April

## Observations recorded during the study period (April 5, 2012 to April 10, 2014)



**Figure 2: Wildlife-related observations recorded during the study**

many species included in this study. Some migratory species (elk, bighorn sheep, mule deer and pronghorn) may cross or attempt to cross the highways in the spring and in the fall as they move between winter and summer ranges. However, some individuals of these species may spend the winter season or even live year-round in the vicinity of the highway.

White-tailed deer, elk, mule deer, and pronghorn were the ungulate species most frequently killed in the Madison Valley during this 2-year study. Hotspots varied by species, with elk showing the clearest patterns.

Exploratory regression models were ran to indicate what factors may contribute to observed patterns of carcasses (e.g., fencing, visibility). Results indicate that animal carcass locations (and presumably movement patterns) are generally influenced by existing development patterns, vegetation cover, terrain, and potential barriers near roadways.

### What the Researchers Recommend

Based on the data analyzed for this study, there are specific road sections that stand out where wildlife

accommodation measures would increase motorist safety and/or benefit wildlife. The importance of the Madison Valley as winter range for ungulates will remain the same or perhaps increase in the future given the permanent habitat protections that exist in the form of government lands and conservation easements on private lands. Traffic will likely increase in the future. Crossing structures of the appropriate type and size for the species and topography in the area, in combination with wildlife exclusion fencing, are investments that will benefit motorists, sportsmen, wildlife watchers, and the general public, as well as wildlife with the Madison Valley. Such accommodations would promote safe passage of wildlife across a highway that acts as a partial barrier to movement and which bisects critical winter range and increases the safety of the travelling public as it relates to the potential for wildlife-vehicle collisions.

To increase motorist safety, reduce WVCs and increase wildlife habitat connectivity in the Madison Valley, accommodation efforts will be most effective if they address winter conditions and focus primarily on elk. The most important area to address is the section of US 287 from about RP 22 to RP 26. This is a hotspot for elk, but crossing structures here would likely be effective for both elk and mule deer, and may also be used by species such as white-tailed deer, pronghorn, and wolves. Crossing structures of the appropriate type and size, in combination with wildlife exclusionary fencing, would likely be used by thousands of elk every winter and may greatly reduce carcasses in that area. Accommodation measures in this area would also complement the substantial conservation investment in easements and the Wall Creek Wildlife Management Area by potentially reducing the barrier effect of the highway to ungulate movement.

### **For More Details . . .**

The research is documented in Report FHWA/FHWA/MT-16-016/8217-001, [http://www.mdt.mt.gov/research/projects/env/madison\\_valley.shtml](http://www.mdt.mt.gov/research/projects/env/madison_valley.shtml)

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### **MDT Implementation Status: November 2016**

The intent of this research project was not to determine placement of wildlife accommodation features in the Madison Valley corridor. In addition, there are no near term construction projects planned in the corridor. The process developed will be refined and used by MDT as appropriate during the project design process throughout the state.

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