# US 93 Post-Construction Wildlife-Vehicle Collision and Wildlife Crossing Monitoring and Research on the Flathead Indian Reservation between Evaro and Polson, Montana

## Quarterly Report 2010-1

by

Marcel P. Huijser, PhD, Research Ecologist
Western Transportation Institute
College of Engineering
Montana State University

And

Whisper Camel, MSc, Associate Wildlife Biologist
Confederated Salish and Kootenai Tribes

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# EXECUTIVE SUMMARY

This report contains a brief description of the progress on the tasks for the US93 wildlife mitigation evaluation project. The mitigation measures consist of wildlife fencing combined with wildlife underpasses and overpasses, jump-outs, and wildlife guards at access roads. The research objectives relate to investigating the effect of the mitigation measures on human safety (an expected reduction in wildlife-vehicle collisions), habitat connectivity for wildlife (wildlife use of the crossing structures), and a cost-benefit analysis for the mitigation measures. This report documents the work conducted between the start of the project (15 January 2010) and 31 March 2010.

# 1. INTRODUCTION

## 1.1. Background

The US Highway 93 (US 93) reconstruction project on the Flathead Indian Reservation in northwest Montana represents one of the most extensive wildlife-sensitive highway design efforts in North America. The reconstruction of the 56 mile (90 km) long road section includes the installation of 41 fish- and wildlife crossing structures, 2 underpasses for live-stock, 1 bicycle/pedestrian underpass, and approximately 16.6 miles (26.7 km) of wildlife exclusion fencing (excluding future mitigation measures in the Ninepipes wetland area). The mitigation measures are aimed at improving safety for the traveling public through reducing wildlife-vehicle collisions and allowing wildlife to continue to move across the landscape and the road. Other examples of relatively long road sections in North America with a high concentration of wildlife crossing structures and wildlife fencing are I-75 (alligator alley) in south Florida (24 crossing structures over 40 mi; Foster & Humphrey 1995), the Trans-Canada Highway in Banff National Park in Alberta, Canada (24 crossing structures over 28 mi (phase 1, 2 and 3A); Clevenger *et al.* 2002), State Route 260 in Arizona (17 crossing structures over 19 mi; Dodd *et al.* (2006)), and I-90 at Snoqualmie Pass East in Washington State (about 30 crossing structures planned over 15 mi; WSDOT 2007). Both the road length and number of wildlife crossing structures of US 93 on the Flathead Indian Reservation makes it the most extensive mitigation project of its kind in North America to date. If the section of US 93 south (south of Missoula, Bitterroot valley) is included, the mitigation measures along US 93 are even more substantial.

The magnitude of the US 93 reconstruction project and associated mitigation measures provide an unprecedented opportunity to evaluate to what extent these mitigation measures help improve safety through a reduction in wildlife-vehicle collisions, maintain habitat connectivity for wildlife (especially deer (*Odocoileus* spp.) and black bear (*Ursus americanus*)), and what the monetary costs and benefits are for the mitigation measures. In addition, the landscape along US 93 is heavily influenced by human use. This is in contrast to the more natural vegetation along most of the other road sections that have large scale wildlife mitigation in North America. As the roads with most wildlife-vehicle collisions are in rural areas, the results from the US 93 projects are expected to be of great interest to agencies throughout North America (Huijser *et al.* 2008).

In 2002, prior to US 93's reconstruction, the Western Transportation Institute at Montana State University-Bozeman (WTI-MSU) was funded by the Federal Highway Administration (FHWA) and the Montana Department of Transportation (MDT) to initiate a before-after field study to assess the effectiveness of the wildlife mitigation measures and to document events and decisions that shaped the process of planning and designing the mitigation measures. Preconstruction field data collection efforts were completed in the fall of 2005 and a final report on the preconstruction monitoring findings was published in January 2007 (Hardy *et al.* 2007). While the preconstruction monitoring and research efforts (Hardy *et al.* 2007) are valuable on their own, their main purpose is to provide a reference for a before-after comparison with the post-construction data.

In 2010 MDT contracted with WTI-MSU to conduct the post-construction research with regard to the effectiveness of the mitigation measures. For this project, the Confederated Salish and Kootenai Tribes (CSKT) act as a subcontractor to WTI-MSU.

## 1.2. Objectives

Consistent with the direction provided by MDT, the project has the following objectives:

- Investigate the effect of the mitigation measures on human safety through an anticipated reduction in wildlife-vehicle collisions;
- Investigate the effect of the mitigation measures on the ability to maintaining habitat connectivity for wildlife (especially for deer (white-tailed deer [*Odocoileus virginianus*] and mule deer [*Odocoileus hemionus*] combined) and black bear (*Ursus americanus*) through the use of the wildlife crossing structures; and
- Conduct a cost-benefit analyses for the mitigation measures.

This document is the first in a series of quarterly reports detailing the progress on these tasks.

## 1.3. Milestones

This project covers a period of 5.5 years (15 January 2010 – 30 June 2015). The table below provides an overview of the most important milestones.

**Table 1: Overview of Milestones.**

| Description Milestones | Date accomplished |
|---|---|
| Contract signed between MDT and WTI-MSU and in effect | 15 January 2010 |
| Kick-off and 1st technical panel meeting | 2 February 2010 |
| Subcontract signed between WTI-MSU and CSKT | 13 May 2010 |
| Subcontract in effect between WTI-MSU and CSKT | 15 April 2010 |

## 1.4. Related Activities

Jeremiah Purdum was awarded a fellowship by WTI-MSU to pursue his Master of Science degree. His research topic is on various aspects of the US 93 research project, but with an emphasis on the likely benefits of providing cover to small mammals and invertebrates in wildlife underpasses. Jeremiah is projected to start his two year fellowship on 1 June 2010.

WTI-MSU was awarded a $3,000 grant by Y2Y for education and outreach activities related to the US 93 project. Kylie Paul is coordinating these activities through Defenders of Wildlife. Activities anticipated in the next quarter include excursions.

CSKT received a Tribal Wildlife Grant (TWG) from the US Fish and Wildlife Service. A portion of this grant will be dedicated to activities and materials related to the investigation of the effectiveness of the mitigation measures along US 93.

# 2. MITIGATION MEASURES AND HUMAN SAFETY

No activities regarding mitigation measures and human safety took place in this quarter. In the next quarter WTI anticipates to summarize the safety data over the previous years to evaluate the data collection program and to present preliminary results.

# 3. MITIGATION MEASURES AND HABITAT CONNECTIVITY FOR WILDLIFE

## 3.1. Road Sections with Continuous Fencing and Crossing Structures

The preconstruction research measured the number of animals, especially deer and black bear, that crossed the road before the road was widened and before the mitigation measures were put in place. For this purpose dozens of tracking beds (100 m long, 2 m wide) were installed along the road, covering about 30% of the road sections that would later be fenced. Now that the road has been widened and the fences and crossing structures are in place, the animals can only cross the road by using the underpasses (although some animals may cross wildlife guards or climb fences). The wildlife use of the underpasses is measured by using wildlife cameras. Because cameras could have a different detection probability than sand tracking beds, a relationship between crossings measured through camera images and crossings measured through tracking beds must be established. Therefore 4 crossing structures will have a tracking bed placed outside the structures (exposed to the elements, similar to pre-construction methods). These 4 crossing structures have a relatively high use by deer and black bear, which should result in a high enough sample size to establish this relationship.

Wildlife use data of the crossing structures between 2008 through 2009 were entered into databases by Tiffany Holland (M.S. at WTI-MSU) and Whisper Camel (CSKT).

There are several wildlife guards (similar to cattle guards) to discourage ungulates from entering the fenced road corridor at access roads. Wildlife guards that receive relatively little use by humans are monitored to measure how much of a barrier they really are to different wildlife species. Two structures were monitored starting in 2008. Additional structures for monitoring will be selected in summer 2010.

Animals that do end up in the fenced road corridor may escape by using one of the jump-outs. These jump-outs allow animals to walk up to the height of the fence and then jump down to safety. Ideally, the jump-outs should be low enough so that animals readily jump down to safety but high enough to discourage them from jumping into the fenced road corridor. To investigate appropriate jump-out height, jump-outs in the Ravalli Curves and Hills sections have already been monitored through tracking since 2008 (summer only). Fortunately relatively few animals end up in the fenced road corridor, but this also means it takes time to collect a high enough sample size. Now that the road section in Evaro nears completion, the jump-outs in the Evaro section will be included in further monitoring. One of the jump-outs also has a camera installed.

The status of the field work and the dates or periods that data were collected are summarized in Table 2.

**Table 2: Activities Road Sections with Continuous Fencing and Crossing structures.**

| **Description Activities** | **Date or period monitored** |
|---|---|
| *Crossing Structures Ravalli Curves and Ravalli Hill* | |
| Tracking on tracking beds in the wildlife crossing structures in Ravalli Curves (9 wildlife crossing structures) and Ravalli Hill (2 wildlife crossing structures) took place from May 2008 until 26 February 2010. These data were supplemented by images from a limited number of cameras. | 23 May 2008 – 26 February 2010 |
| Wildlife cameras were installed at all remaining crossing structures in Ravalli Curves and Ravalli Hill. The cameras, battery status and memory card status were checked once a month from 26 February 2010 onwards. Tracking in the structures coincides with the camera checks, and is supplemental to the images from the cameras from this date onwards. Note: most of the cameras were positioned outside the structure to be able to collect data on animal behavior as they approach the crossing structures. | 26 February 2010 - present |
| | |
| *Crossing Structures Evaro* | |
| Still under construction, gaps in fence, no monitoring yet. | none |
| | |
| *Wildlife guards* | |
| Maintenance of the two wildlife cameras at two wildlife guards in Ravalli Curves section took place on a biweekly basis from July 2008 until 26 February 2010. | July 2008 – 26 February 2010 |
| Maintenance of the two wildlife cameras at two wildlife guards in Ravalli Curves section continued on a monthly basis from 26 February 2010 onwards. | 26 February 2010 - present |
| More guards will be monitored starting summer 2010 | none |
| | |
| *Jump-outs* | |
| Tracking beds were monitored from May 2008 until September 2009 (summer only).Further monitoring to start in May/June 2010 | July 2008 – September 2009 |
| Maintenance of the one wildlife camera at one jump-out continued on a biweekly basis until 26 February 2010. | July 2008 – 26 February 2010 |
| Maintenance of the one wildlife camera at one jump-out continued on a monthly basis from 26 February 2010 onwards. | 26 February 2010 - present |

## 3.2. Road Sections with Isolated Underpasses

A large part of North America consists of landscapes heavily altered and used by humans. Wildlife-vehicle collisions still occur in such landscapes, and such landscapes may also be important for nature conservation. However, because of the human use and presence long sections with wildlife fencing are not always possible or appropriate. While crossing structures may still allow for safe crossings by wildlife, there may only be limited fencing, or sometimes no fencing, associated with such structures. Ten of such "isolated" structures will be monitored for this project to evaluate their effectiveness. The structures and periods they were monitored are listed in Table 3.

**Table 3: Isolated Structures monitored.**

| **Structure name** | **Date or period monitored through December 2009** | **Date or period monitored from 1 Jan 2010 onwards** |
|---|---|---|
| Pistol creek 1 (station 498+55.7) | November 2007-1 January 2008<br>27 August 2009- 31 December 2009 | 1 January 2010 - |
| Pistol creek 2 (station 501+63) | August 2009- 31 December 2009 | 1 January 2010 - |
| Mission creek (station 528+90) | September 2009 – 31 December 2009 | 1 January 2010 - |
| Post creek 1 (station 550+56.6) | November 2007 - May 2009 | 29 June 2010 - |
| Post creek 2 (station 555+06) | November 2007 – October 2008<br>January 2009 – May 2009<br>August 2009 – 31 December 2009 | 1 January 2010 - |
| Post creek 3 (559+98.4) | November 2007 – 31 December 2009 | 1 January 2010 - |
| Spring creek 1 (774+00) | May 2009 - December 2009 | 1 January 2010 - |
| Spring creek 2 | None | 11 March 2010 |
| Mud creek | 23 June 2009 – 23 July 2009 | None |

## 3.3. Anticipated Activities 2nd Quarter 2010

1. Restore the tracking beds at the jump-outs in Ravalli Curves and Hill
2. Select additional structures for a total of 10 isolated structures that will be monitored.
3. Plan for purchasing of additional cameras (Evaro section, wildlife guards, fence ends).
4. Develop access database and data entry form.

# 4. COST-BENEFIT ANALYSIS

No activities regarding cost-benefit analysis took place in this quarter.

WTI anticipates collecting data on the costs for planning, construction, and maintenance from MDT in the 4th quarter of 2010.

WTI recognizes that not all data may be available at that time yet, and additional data will be collected later during the course of the project.

# 5. SCHEDULE AND BUDGET

The planned and the actual schedule through 2011 are shown in Table 4. The percentage completion for each task is shown in Table 5.

**Table 4: Planned Schedule through 2011.**

| | 2010 | | | | 2011 | | | |
|---|---|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| **1. Deer and black bear vehicle collisions** | | | | | | | | |
| | | | | | | | | |
| Summary crash and carcass data through 2009 | | | | | | | | |
| | | | | | | | | |
| **2. Wildlife use of underpasses** | | | | | | | | |
| | | | | | | | | |
| Cameras operational structures RC and RH | | | | | | | | |
| Cameras operational structures EV | | | | | | | | |
| Cameras operational isolated structures | | | | | | | | |
| Tracking beds operational outside 4 structures | | | | | | | | |
| | | | | | | | | |
| Cameras operational fence ends | | | | | | | | |
| | | | | | | | | |
| Cameras operational 2 guards RC | | | | | | | | |
| Cameras operational additional guards | | | | | | | | |
| | | | | | | | | |
| Camera operational at people access point RC | | | | | | | | |
| | | | | | | | | |
| Camera operational 1 jump-out | | | | | | | | |
| Tracking beds operational jump-outs RC and RH | | | | | | | | |
| Tracking beds operational EV | | | | | | | | |
| | | | | | | | | |
| Deer pellet group counts | | | | | | | | |
| | | | | | | | | |
| **3. Cost-benefit analyses** | | | | | | | | |
| | | | | | | | | |
| Obtain cost data from MDT | | | | | | | | |

Legend
- planned
- on schedule
- ahead
- behind

**Table 5: Percentage Complete.**

| Task | Planned Percentage complete | Actual Percentage complete |
|---|---|---|
| | | |
| 1. Deer and black bear vehicle collisions | 0% | 0% |
| 2. Wildlife use of underpasses | 5% | 5% |
| 3. Cost-benefit analyses | 0% | 0% |

Through 31 March 2010 the amount spent on the MDT account for the project was $8,533 (Figure 1). This was less than the $27,110 budgeted. The difference is explained by bills that have not been received yet and slight delays compared to the original anticipated start date of the project.

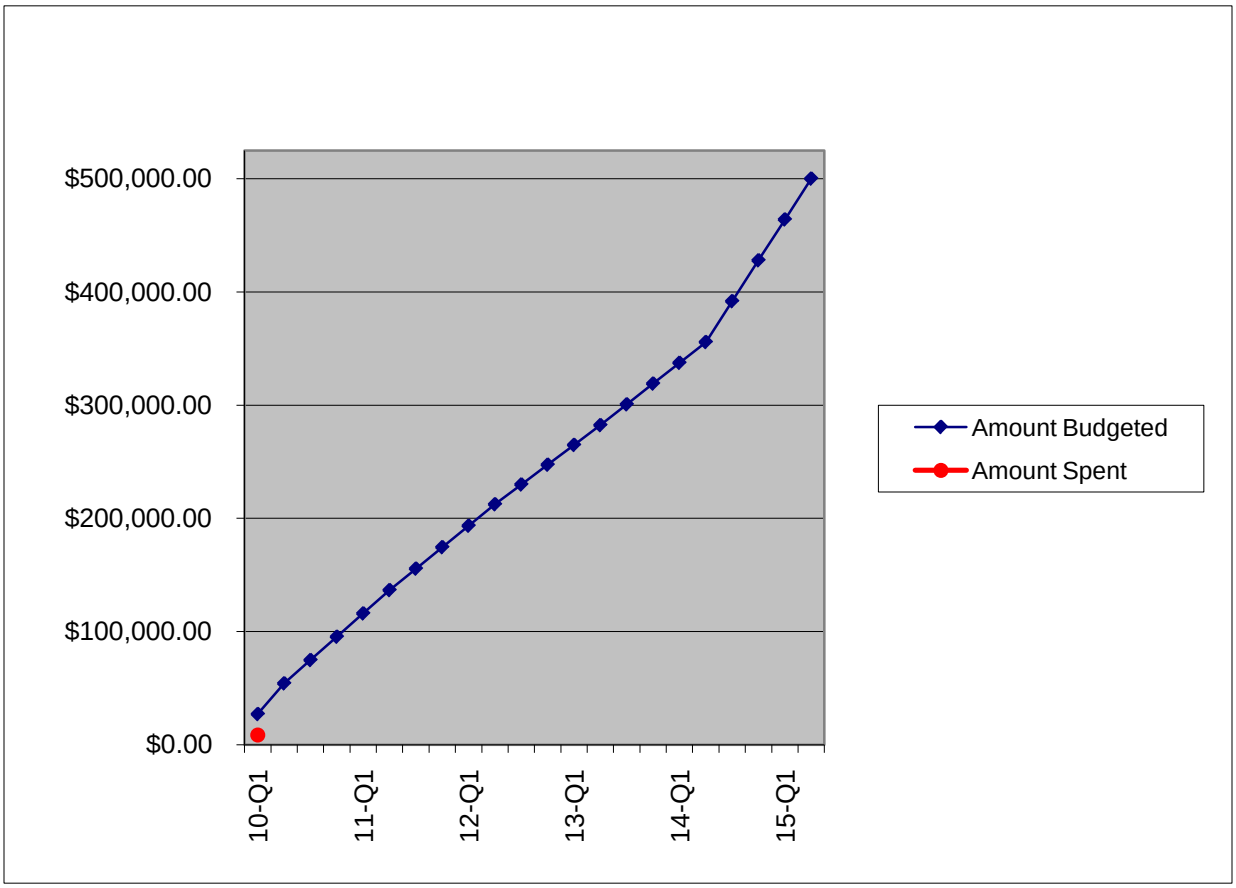


**Figure 1: Project budget; amount budgeted and amount spent per quarter through 30 June 2015.**

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