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MOTORISTS AS CITIZEN SCIENTISTS: THE BENEFITS OF A WILDLIFE REPORTING WEBSITE

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Abstract

In a growing number of states, wildlife-vehicle collisions are a top safety issue that generates interest with the public and media. State Highway 75 near Ketchum, Idaho (SH-75), Interstate 90 near Bozeman, Montana (I-90), and Interstate 70 near Vail, Colorado (I-70) are examples of roads that concern the public and officials about collisions with large mammals. Inspired by the Canadian “Road Watch in the Pass” project, the Western Transportation Institute (WTI) designed a wildlife reporting website so the public may enter their wildlife sightings (dead or alive). Live animal observations are important in order to get a clearer picture of wildlife use in the roadway corridor. Live animal observations are also more difficult to obtain. Therefore, a network of motorists/citizen scientists can supplement traditional data sources; however, there are potential biases and limitations of citizen science. The website also provides information about the road mortality problem and potential mitigation measures.

During a deer/elk-vehicle collision (DEVC) study on SH-75, 312 public reports were logged on the “Ketchum on the Road” website between March 28, 2007 and March 24, 2008. Two hundred fifty six of the reports were considered to be related to separate events (i.e. they were “unique”) and within the scope of the study. Live reports were of black bear, (escaped) bison, coyote, mule deer, white-tailed deer, elk, moose, red fox, and wolf. Road mortality reports were of deer, elk, red fox, raccoon, skunk, domestic dog, bird, and unknown animals. In addition to using the public’s reports, the study also relied on crash data (Idaho Highway Patrol), carcass data (Idaho Transportation Department), and road mortality data from four ten-day surveys (once per season) conducted during the study period (WTI). A minimum of 134 deer and elk were estimated to have been killed by traffic in the 26-mile section (an average of 5 carcasses per mile/year) after analyzing all data sources for 2007 only and accounting for replicate reports between sources. This minimum estimate of 134 DEVCs is considerably higher than previous annual estimates of 30-50. The website and systematic surveys likely account for the dramatic increase in the number of carcasses detected. Only 51% of the DEVCs were reported in agency databases. The public reported 38 unique deer and elk carcasses (28% of total) not accounted for by any other method. The findings show that the public’s wildlife reports from SH-75 in Idaho 1.) reduced underestimation of DEVCs, 2.) suggest that the need for mitigation is greater than previously thought, 3.) bring attention to species smaller than deer that are also killed by traffic, and 4.) help identify locations of live animals on or near the road and locations with potential successful crossings.

In October 2008, WTI’s wildlife reporting website was modified for American Wildlands’ “I-Spy on the Pass” project along I-90 in Montana. The website template will also be adapted for the “I-70 Wildlife Watch” project in Colorado by fall 2009. For both of these projects, the website, and the citizen science data it generates, aims to 1.) supplement existing agency road mortality databases with information on live animals on or alongside the road, 2.) provide a venue for engaging local communities, and 3.) aid in the development of mitigation recommendations for wildlife. Based on the past and ongoing data collection efforts we conclude that using motorists’ observations via a wildlife reporting website is an effective way to boost data collection and increase support for mitigation measures.

Background

Wildlife-vehicle collisions (WVCs) constitute a top safety issue which requires consistent monitoring and spatially specific data in order to mitigate. Relying on highway patrol crash data, department of transportation carcass data, and even systematic roadkill monitoring can underestimate or incompletely describe the road mortality situation. Utilizing the motoring public as citizen scientists can supplement traditional data sources while increasing support for mitigation measures to reduce WVCs and allow for safe passage. A wildlife reporting website can provide a convenient venue for engaging a local community in this effort but such data does not replace the need for formal data collection.

Inspired by the Canadian “Road Watch in the Pass” project, the Western Transportation Institute (WTI) designed a wildlife reporting website template so the public may enter data on the location, date and time they see animals, dead
or alive, on or alongside the road. The website also provides information about the road mortality problem and potential mitigation measures. Following are three examples where the WTI wildlife reporting website has or will be used in conjunction with wildlife-transportation projects.

“KETCHUM ON THE ROAD,” STATE HIGHWAY 75, BLAINE COUNTY, IDAHO

Site and Project Description

A 26 mile section of State Highway 75 (SH 75) near Ketchum, Idaho no longer meets safety and transportation capacity needs and may require reconstruction (Blaine County 2006) (Fig. 1). In 2007, average annual daily traffic (AADT) was approximately 13,000 vehicles and the volume is expected to increase (ITD 2008). In addition, there are concerns about the number of WVCs on this section (Blaine County 2006). It was estimated that 30-50 mule deer (Odocoileus hemionus) and elk (Cervus elaphus) succumbed to vehicle collisions occurred every year [(Parrish 2002) cited in Shapiro & Associates 2003]. WTI researchers conducted a road mortality study during March 2007 to March 2008.

Road Mortality Study

The road mortality study was based on historic and recent data from different organizations [i.e., Idaho Transportation Department (ITD), Idaho Department of Fish and Game (IDFG) and Idaho Highway Patrol (IHP)] as well as data collected by WTI researchers and the general public during the study period from March 12, 2007 to March 30, 2008. In addition to data collection and analysis of road mortality data and wildlife crossing data, this study also investigated the feasibility of installing an animal detection system in sections with the highest concentration of deer/elk-vehicle collisions (DEVCS).

Wildlife Reporting Website

In order to increase our understanding of wildlife-vehicle collisions and wildlife movements across the road in the study area, the public was asked to submit their wildlife sightings into an online database called “Ketchum on the Road.” A link from the Blaine County website led users to the wildlife report submission site located on the WTI server (Appendix). A variety of methods were used to inform the public about the website (Table 1).

<table>
<thead>
<tr>
<th>Variable Message Signs</th>
<th>Promotions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mile post 117.2 McKercher north of Hailey April 12-19, 2007</td>
<td>Fliers in Ketchum, Hailey and Bellevue (e.g., in businesses, libraries, County and Federal offices, etc.)</td>
</tr>
<tr>
<td>Mile post 107 near Walker Road south of Bellevue June 7-14, 2007</td>
<td>The Environmental Resource Center published an announcement in their newsletter</td>
</tr>
<tr>
<td>Mile post 120.3 between Hailey and Ketchum November 2 - December 2, 2007</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Web and print media coverage</th>
<th>Public Service Announcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Press release by Blaine County and Western Transportation Institute on March 12, 2007</td>
<td>Played multiple times during the course of the study at the discretion of KECH 95 radio personnel</td>
</tr>
<tr>
<td>Blog announcement by Tom Bowman on April 17, 2007</td>
<td>Public Presentation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Ketchum on the Road – Wildlife Reporting Website” at The Community Library in Ketchum on November 1, 2007</td>
</tr>
</tbody>
</table>

Table 1. Media and outreach activities to encourage the public to report wildlife sightings
A total of 312 wildlife reports were made by the public during the approximately one year study period (Table 2). After accounting for replicates and those reports which did not fit our study criteria, there were a total of 256 unique and usable reports.

Figure 1: The 26 mile long road section of SH 75 under study. The road section starts at Timmerman Junction (junction with Highway 20) at the south end, and ends at the Trail Creek Bridge in Ketchum. In addition, the map shows the location of two bridges across the Big Wood River that may be used by large mammals as a wildlife underpass.
Table 2. Break down of wildlife reports received from the public via website

<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total public reports on website</td>
<td>312</td>
</tr>
<tr>
<td>Comments with no wildlife data</td>
<td>-3</td>
</tr>
<tr>
<td>Reports from outside of study area</td>
<td>-4</td>
</tr>
<tr>
<td>Reports of observations prior to the study period</td>
<td>-10</td>
</tr>
<tr>
<td>Total live (n=200) and dead (n=95) observation reports</td>
<td>295</td>
</tr>
<tr>
<td>Replicate reports of a single wildlife or carcass observation</td>
<td>-39</td>
</tr>
<tr>
<td>Total unique live (n=184) and dead (n=72) reports</td>
<td>256</td>
</tr>
</tbody>
</table>

There were 184 reports of live animals including black bear, buffalo (escaped), coyote, mule deer, white-tailed deer, mule or white-tailed deer, elk, moose, red fox, and wolf. Due to the possibility of multiple reports from different people for the same wildlife sighting, the following rule was applied: Live observations of the same species that were reported to occur within one hour of each other and that were within .2 miles of each other were treated as replicates. In those cases where replicates had differing animal counts, the largest number was chosen. Based on this rule, sixteen reports related to replications of a single wildlife sighting, therefore, there were 184 unique live wildlife reports.

There were 95 reports of dead animals, including mule deer, white-tailed deer, elk, red fox, raccoon, skunk, domestic dog, bird, and unknown species. Due to the possibility of multiple reports from different people for the same carcass sighting, the following rule was applied: Dead observations of the same species that were reported to occur within 2 days of each other and that were within .2 miles of each other were treated as replicates. Based on this rule, 23 reports related to replicate reports of a single carcass, therefore, there were 72 unique reports of carcasses. Some collisions resulted in more than one carcass; therefore, the total unique carcass count for all species was greater than the number of reports (Fig. 2).

Figure 2: Public reports of unique carcasses by species (Total n =82). “Other” category includes bird, raccoon, skunk, domestic dog and “unknown species.”

This study was most concerned with vehicle collisions with large bodied mammals (i.e., deer and larger) that pose a safety concern to humans. There were 50 unique dead deer and elk reports for a total of 59 carcasses. There were 158 unique live reports of deer, elk or moose, some of which reported more than one individual animal per sighting. Unique live and dead reports for all ungulate species (deer, elk and moose) were categorized by location (Fig. 3). Most of the ungulate reports (live or dead) focused between mile post (MP) 117 and 127 (Figs. 3 and 4).
Figure 3: Public reports of unique ungulate reports (alive and dead combined) by milepost for the entire study area (Total n = 208). Note that this figure illustrates the number of unique reports only (i.e. one report may relate to multiple animals).

Figure 4: Public reports of unique ungulate (deer, elk and moose) carcasses (each carcass is counted in the graph) and unique alive reports (the number of reports of live animals is counted, but not the number of animals seen alive) by mile post for MP 117-127 (Total n = 187).

The highest concentration of deer and elk carcasses was observed between MP 118.4 and 119.1 (Fig. 5).

Road mortality data from all sources (ITD, IHP, WTI and the public) were compared to estimate the number of road killed mule deer and elk (carcass count) in the study area on an annual basis (Table 3). Replicate reports between different data sources were defined as carcasses found within .2 mile of each other and/or within 2 days of each other.
Figure 5: Public reports of unique deer, elk and moose carcasses (each carcass is counted in the graph) and unique alive reports (the number of reports of live animals is counted, but not the number of animals seen alive) by mile post for MP 117-127 (Total n = 187).

Table 3. Reported carcass counts for deer and elk from different sources and combined minimum estimates per year.

<table>
<thead>
<tr>
<th>Calendar year</th>
<th>ITD</th>
<th>IHP</th>
<th>WTI</th>
<th>Public</th>
<th>Reported Total/Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>16*</td>
<td>11</td>
<td>n/a</td>
<td>n/a</td>
<td>(27 minus two possible replicate reports) 25</td>
</tr>
<tr>
<td>2005</td>
<td>24</td>
<td>8</td>
<td>n/a</td>
<td>n/a</td>
<td>(32 minus one possible replicate report) 31</td>
</tr>
<tr>
<td>2006</td>
<td>31</td>
<td>10</td>
<td>n/a</td>
<td>n/a</td>
<td>(41 minus one possible replicate report) 40</td>
</tr>
<tr>
<td>2007</td>
<td>53</td>
<td>17</td>
<td>26**</td>
<td>54</td>
<td>(150 minus 16 replicate reports) 134</td>
</tr>
</tbody>
</table>

* Data appeared to include reports from June to December only.
** 2007 figure derived by subtracting carcasses found in 2008 (n=3) and carcasses found in April 2007 survey period which were categorized as “old” or “age unknown” (n=17) from WTI carcass total of 46; 46-20 = 26 carcasses.

The total number of reported mule deer and elk carcasses was dramatically higher in 2007 compared to three previous years. This may be due to one or more of the following factors:

1. Engaging the motoring public to report road mortality.
2. Conducting systematic road mortality surveys that included walking sections of the study area.
3. A possible increase in deer and elk populations.
4. A possible change in ITD carcass removal search and reporting effort.

Dividing the 2007 estimated minimum number of mule deer and elk carcasses (n=134) by the number of miles in the study area (n = 26), results in an estimated 5 carcasses per mile/year.

The data collected by the public has had the following benefits:

1. Carcass removal and accident data collected by ITD and IHP was supplemented by the public and helped reduce the underestimation of deer- and elk-vehicle collisions. It is estimated that 54 unique carcasses were reported by the public in 2007.
2. The public reported other species, smaller than deer, which were killed on SH 75. This increased the understanding of what species are killed by cars on the road section concerned.

3. The data showed where deer and elk are observed on or close to the road. This type of information is best obtained by multiple observers that travel the route at different times of the day. Therefore this type of data is best collected by the public rather than an agency that may be able to “monitor” the entire route with more consistent search and reporting effort. However, with only one observation session a day, perhaps at certain fixed times, agency efforts are likely to be substantially less effective than efforts of the public.

4. Public awareness was raised through the media, especially in combination with periodic press releases that provided feedback to the public with regard to the data entered. Increased awareness and participation in the data collection may help increase support for potential future mitigation measures.

“I-Spy on the Pass,” Interstate 90, Gallatin And Park Counties, Montana

Site and Project Description

Bozeman Pass, which is approximately 40 miles north of Yellowstone National Park, was identified as an important linkage for wildlife movement in the Northern Rockies (Ruediger et al. 1999). This mountain pass is crossed by Interstate 90 (I-90), which runs east/west between the towns of Livingston and Bozeman. More than 13,000 vehicles cross Bozeman Pass each day and more than 1,300 wild animals of 37 different species were killed on the Bozeman Pass section of I-90 between 2001 and 2005 (Hardy et al. 2006). This heavy vehicle use and the resulting impacts on wildlife will likely only continue to increase.

The “I-Spy” project was launched in the fall of 2008 with technical support from the Western Transportation Institute. This citizen science data collection effort was modeled after the “Road Watch in the Pass” project in Canada (Lee et al 2006). There are three primary project goals: 1) gather data about where and when animals attempt to cross or utilize habitat near the roadway; 2) supplement other sources of road kill data; and 3) increase community involvement and support for wildlife mitigations. The information collected through this project can be helpful in addressing the impact I-90 has on habitat connectivity and wildlife movements on Bozeman Pass and guide wildlife/vehicle mitigation measures.

Wildlife Reporting Website

“I-Spy on the Pass” uses an interactive website to compile driver’s observations of wildlife on the I-90 corridor on Bozeman Pass. Citizen scientist volunteers note their wildlife observations then log onto the I-Spy website to enter when and where the animal was spotted, the species observed and whether the animal was dead or alive. To encourage broad participation, the program is designed to be as inclusive as possible; anyone who drives Bozeman Pass can contribute data. I-Spy involvement requires no special training and the easy to use web-based interface facilitates accurate observation reporting. The resulting data, especially the live animal sightings, will supplement other available data sources to provide a more thorough understanding of wildlife movement patterns on the pass.

As of the end of June 2009, there were 161 distinct entries into the database, with a total of 868 individual animals belonging to 13 different species reported. Of these 868 animals, 806 were reported to be alive and 62 were reported to be dead. Table 4 summarizes the data collected during the first eight months of the project. A subset of this data is graphically displayed on a map (Fig. 6).

A large and active volunteer group is necessary for maximum data collection. Because the ideal volunteers are those who drive Bozeman Pass often, initial recruitment efforts focused on daily commuters over the pass. Future efforts to engage new volunteers will focus on the broader communities on both sides of the pass. Volunteers are recruited through the local media, presentations, events, newsletters, brochures and by word of mouth.

Continual volunteer engagement is vital for project success, and feedback is essential in maintaining relationships with volunteers. To that end, the reported data is regularly summarized and provided to the volunteers and others through email updates that include a map and highlights of unique or interesting sightings. Volunteers are encouraged to make suggestions for program improvement. To date there are 15 active I-Spy volunteers. I-Spy program staff are actively working to increase the volunteer base to get a more comprehensive special and temporal understanding of how wildlife are using habitat near the roadway.
Table 4. “I-Spy on the Pass” wildlife observations: November 2008 through June 2009

<table>
<thead>
<tr>
<th>Species</th>
<th>Alive</th>
<th>Dead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Bear</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Bobcat</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Coyote</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Deer: Mule and White-tail</td>
<td>382</td>
<td>45</td>
</tr>
<tr>
<td>Elk</td>
<td>32</td>
<td>3</td>
</tr>
<tr>
<td>Moose</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Porcupine</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Pronghorn</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Rabbit</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Skunk</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Wolf</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 6. All recorded wildlife observations, live and dead combined. Displaying the data on a map is an effective way to quickly identify spatial clustering of reported wildlife locations. * Some reported species were not included in the above map.

While “I-Spy” indicates that engaging citizens in data collection efforts is a cost effective way to gather a broad range of information and educate communities about the effects of roads on wildlife, this data does have limitations. There are no strict protocols or controls on data collection or reporting, other than the fields available on the website, and there are many factors that may influence the quality and accuracy of the data being reported. While complementary and valuable in its own right, citizen science data must be used differently than that gathered by more rigorous research efforts. Overall this project is proving to be a valuable tool for American Wildlands’ efforts to increase public involvement in wildlife and transportation issues and to promote the economic, ecological, and human safety benefits transportation mitigations for wildlife.
“Mountain Corridor Reconstruction Project,” Interstate 70, Eagle, Summit, Clear Creek and Jefferson Counties, Colorado

Site and Project Description

The heavily traveled Interstate 70 (I-70) Mountain Corridor from Evergreen to Glenwood Canyon, Colorado is slated for reconstruction to ease congestion and is recognized as a major barrier to wildlife through the Southern Rocky Mountains (USFS 2002). Center for Native Ecosystems and ECO-resolutions, LLC are collaborating with Colorado Department of Transportation (CDOT) to conduct an assessment of the wildlife habitat-roadway interface using the Federal Highway Administration’s Eco-Logical framework (Brown 2006). The project is identifying connectivity zones for aquatic and terrestrial wildlife and the barriers to movement in these zones, ultimately resulting in a suite of recommended mitigation measures to provide safe passages for wildlife.

Wildlife Reporting Website

The “I-70 Wildlife Watch” project, which will launch in the fall of 2009, will provide an observational database of wildlife activity on and adjacent to the roadway, thereby augmenting conventional data collection efforts (including comprehensive field inventories, animal-vehicle collision data analysis and camera monitoring). Motorist observations will supply additional information on wildlife activity, including both live and dead observations, and, in some cases, information on behavioral responses to the roadway. While limited in its analytic potential, such opportunistic data is highly complementary to the standard animal-vehicle collision database, as live animal observations can help to flag areas where wildlife are successfully crossing the roadway or where they approach, but do not attempt to cross at all – this information cannot be captured by roadkill surveys, camera monitoring or track and scat surveys alone.

As such, the data collected through the “I-70 Wildlife Watch” website will help highlight patterns in wildlife activity along the roadway. An understanding of where wildlife are crossing the interstate, attempting to cross, or barred from crossing is essential in the effective placement of mitigation measures (Clevenger and Waltho 2000). These citizen-reported data, combined with conventional data collection efforts and compiled information from other studies throughout the project area, help paint a more complete picture of wildlife use of roadside habitat and crossing activity. All of this information will assist in the development of mitigation measures for the safe passage of wildlife along this stretch of I-70.

Based on previous versions of WTI’s wildlife reporting websites, the “I-70 Wildlife Watch” website has been adapted to the specific needs and species of the I-70 Mountain Corridor to create a user-friendly web-based tool. Participants in the “I-70 Wildlife Watch” will be recruited through messages on CDOT’s variable message signs along the interstate, local media, targeted community forums, and posters and flyers distributed throughout the community and at recreation hotspots (e.g., ski area parking lots, major trailheads). As motorists along I-70 include residents of mountain communities as well as a number of Front-Range recreationists and tourists, and interstate truckers, we are also developing outreach tools for these types of travelers, including outreach to Front Range residents and a special effort targeting drivers of the Colorado Mountain Express, a shuttle service between Denver International Airport and the resort communities whose drivers are on this stretch of road several times a day. These outreach efforts are designed to reach a wide audience of potential website users with the goal of maximizing participation among various types of motorists to capture a broad array of observations, both spatially and temporally.

The capacity of interactive websites for public engagement is also a primary motivating factor in adapting the wildlife reporting website to the I-70 Mountain Corridor. Local communities and economies value the natural environment in which people live, work and recreate, yet a lack of public awareness and political support for wildlife mitigation continues to be a major obstacle to the implementation of highway safe passage measures for wildlife (Paul, 2007). The “I-70 Wildlife Watch” website will act as a forum, both for collecting information from motorists, and educating users on the importance of habitat connectivity for wildlife and the techniques that can be used to preserve and restore connectivity at the roadway interface.

Successful participation also requires feedback and encouragement. As opposed to creating one-time users, the “I-70 Wildlife Watch” project seeks to maximize on-going participation. Immediate feedback on the website itself is an important tool for these purposes. Upon entering their observations, users can access the database to see how their observation fits in with others – for example, where hot spots are located, which species have been observed – all in a visually-compelling Google Earth framework. Users can also choose to opt in to receive e-newsletters with periodic updates on the project to stay informed and involved.
Conclusions

In addition to the potential for obtaining better estimates of roadkills, engaging motorists also aids in collecting live animal observations. Observations from live animals are important because they help determine placement of mitigation measures. For example, if wildlife fencing (i.e. a barrier) is erected along road sections where no or low mortality occurs, it may be because there are 1.) no animals crossing, or 2.) animals do cross but they are not or rarely hit by vehicles. If the placement of safe crossing opportunities would be solely based on road mortality hot spots, and if a wildlife fence or another type of barrier is erected between such safe crossing opportunities, important wildlife movement areas where animals cross the road successfully may be blocked. Observations of live animals on or near the road reduce such unintended consequences of mitigation measures. Live observations are also harder to obtain than observations of road killed animals. While many (but not all) dead animals are recorded by agency personnel, routines (certain days, certain times of days) would heavily influence agency observations of animals seen alive. Having multiple observers that travel a road on different days and times help reduce the bias associated with such routines (though there are other biases involved with citizen data).

For these types of projects with limited capacity and funding, engaging local citizens in the research effort is highly advantageous. A wildlife reporting website has the potential to enhance traditional data collection efforts and aid in determining the placement and design of mitigation measures for wildlife. In addition, wildlife reporting websites provide a venue for engaging the motoring public, increasing awareness, and building support to ensure the future implementation of mitigation measures for safe passages.

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Biographical Sketches

Angela V. Kociolek received her M.S. in Biological Sciences (1997) at Montana State University-Bozeman. She served as an environmental educator with the Peace Corps in Northeast Thailand (1998-2000). Currently Angela is part of the Road Ecology team at the Western Transportation Institute. Her background in community outreach was well-suited for this project which required public involvement. She believes an informed public is a resource worth tapping into to forward the goal of reducing transportation impacts to wildlife and the environment. Angela continues to work on a variety of projects related to wildlife-highway interactions.


Doug Galarus has nearly 20 years experience in information technology development, testing, implementation and management. He has extensive experience as the project lead for mobile data communications systems, database-driven web sites, web site design, desktop applications, kiosk development, PDA and Tablet PC –based development, and interactive CD-ROMs. At the Western Transportation Institute, he has applied his technical expertise to the development of specific applications for transportation safety, including improved tools for road weather management and road ecology. Doug holds Master’s degrees in Computer Science and Mathematics Education, and is Program Manager for the Systems Engineering, Development and Integration Program at Western Transportation Institute.

Dylan W. Taylor works on wildlife habitat connectivity and transportation issues at American Wildlands. He has 10 years experience in conservation policy and wildlife biology in the Rocky Mountains. In addition to his current efforts in Montana, he has worked on transportation and wildlife movement research and advocacy in Banff National Park in Canada, on the Bridger-Teton National Forest in Wyoming, the in the Vail Pass section of Interstate 70 in Colorado.
Dylan earned a B.A. in Environmental Studies at the University of North Carolina, Wilmington (1994), and a Masters of Forestry at the Yale School of Forestry and Environmental Studies (2002).

Julia Kintsch is a conservation ecologist with over 10 years of experience in applied ecology and conservation planning. Her work focuses on the development of practical and effective science-based solutions to mitigate humanity’s impacts on natural systems. Prior to founding ECO-resolutions, LLC, Julia was the program director for the Southern Rockies Ecosystem Project from 2003-2008. Her experiences include working as an environmental educator in Senegal, West Africa as a Peace Corps Volunteer, and developing conservation plans for the Michigan Chapter of The Nature Conservancy. Her work has involved extensive collaboration with federal and state agencies, local municipalities, and non-profit organizations, and she brings a creative and resourceful approach to natural resource decision-making.

References


Blaine County. 2006. RFP – Blaine County State Highway 75 wildlife data collection and mitigation research project. 18 May 2006, Blaine County, ID, USA.


Appendix A: Screenshots of the “Ketchum On The Road” Wildlife Reporting Website

1. Blaine County’s website with a button link to “Ketchum on the Road: Report Highway 75 Wildlife Sightings” on left hand navigation bar.

2. Introductory information about the database on WTI’s website.
3. Google Earth map depicting landmarks in study area and surrounding topography. This allowed users to zoom in on the appropriate road section.

4. Google Earth map depicting landmarks in study area and surrounding topography. This screenshot shows 0.1 mi posts (red markers) around the 119.0 mi post.
5. Data form for submitting a live or dead animal observation. Note: the tenth of a mile location obtained when clicking on a red marker on the previous page was automatically stored in the data form.

6. Easy-to-use drop down menus and space for free form comments.