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Author

Trask, Melinda

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JUSTIFYING ENVIRONMENTAL STEWARDSHIP: OREGON DEPARTMENT OF TRANSPORTATION'S WILDLIFE COLLISION PREVENTION PLAN CASE STUDY

Melinda Trask (503-986-3504, melinda.trask@odot.state.or.us), Environmental Project Manager, Oregon Department of Transportation, Geo-Environmental Section, 355 Capitol Street N.E., Salem, OR 97301, Fax: 503-986-3407 USA

Abstract: Although there is widespread knowledge of the effects of roads on wildlife populations and driver safety, many transportation departments are reluctant to expend state or federal funds to research and address wildlife movement problems on their highways. For many years, Oregon lacked direction on this issue from natural resource, regulatory, and highway agencies. All groups were at the proverbial standstill for years: the natural resources and regulatory agencies urged ODOT to address the problem of highways as wildlife movement barriers, and ODOT sought guidance from natural resources and regulatory agencies to define the scope of the problem. Additionally, ODOT faced internal resistance to collecting baseline information because of the perception that it was another unfunded environmental mandate. Before the ODOT Geo-Environmental Section proposed a statewide mitigation program for wildlife movement and transportation conflicts, it was necessary to obtain direct support from external natural resources agencies. The Oregon Wildlife Movement Strategy was formed in 2006, as an interagency partnership to address wildlife movement issues in Oregon. Once external support was obtained and documented, Geo-Environmental pursued internal support, particularly from units involved in maintenance, planning, traffic, safety, and the regional technical centers. However, we are continuing to communicate with external and internal stakeholders throughout development of a Wildlife Collision Prevention program for our Agency. The program will provide guidance to ODOT stakeholders for scoping of wildlife passages during project planning and development, funding alternatives, and design considerations for key species.

Introduction

Although the relationships among highways, wildlife mortality, and driver safety are well documented (USDA Forest Service 2005, Nietvelt 2002, Evink 2002), many transportation departments are reluctant to initiate and implement comprehensive programs to address wildlife movement across highways. The Federal Highway Administration (FHWA) supports the use of federal highway funds to improve wildlife passage across the nation's roads, and several of its programs address this issue. For example, one of the four main goals of the FHWA Eco-Logical program is to improve wildlife habitat connectivity across highways. Yet, despite recognition of the problem and the potential liability (Booth vs. Arizona 1998), many state transportation departments still encounter internal resistance to expend state or federal funds to research and address wildlife movement problems on their highways. Development of a Wildlife Collision Prevention Plan for Oregon Department of Transportation (ODOT) is a good example. It illustrates the obstacles encountered for a proactive environmental stewardship initiative, outreach and communication employed to garner internal and external support, and our resulting partnership with the Oregon Department of Fish and Wildlife (ODFW) and other stakeholders in an Oregon Wildlife Movement Strategy.

Data Gaps

Currently, Oregon has only limited information on the scope of the wildlife passage situation along the state highway system. We have no comprehensive, statewide system for reporting animal-vehicle collisions, and the organizations involved with wildlife management in Oregon (ODFW, U. S. Fish and Wildlife, U. S. Forest Service, Bureau of Land Management) have only scattered information on wildlife movement corridors. The most comprehensive data we have on animal-vehicle collisions are Department of Motor Vehicle accident reports (AKA crash records). Oregon has 12 years of crash records in which interactions with wildlife were recorded, 1993 through 2004. We have approximately 5,000 records throughout the state over this period, averaging approximately 400 animal-vehicle collisions per year. We know this is a gross underestimate of actual animal-vehicle collisions based on localized deer carcass pick-up records. For example, in one year in a one-hundred mile segment of highway in eastern Oregon, over 500 deer carcasses were observed. Most states and national statistics use these data, and researchers have estimated that the accident reports vastly underestimate actual numbers of wildlife killed by vehicles (Bissonette 2006, Romin and Bissonette 1996, Conover et al. 1995).

The only other statewide source of information in Oregon for animal-vehicle collisions is dispatch records of carcass reports, maintained by the state police (in most of Oregon) and ODOT's Traffic Management Operations Center in northwest Oregon. There are over 30,000 data records of carcass reports statewide over the past seven years. ODOT has begun an effort to create a database from the dispatch records, and use the information to map clusters or hot spots of animal vehicle collisions. The quality of information needs to be evaluated before drawing any conclusions on how useful this will be as a representative dataset for animal-vehicle collisions in Oregon. If the carcass reports do not yield sufficient quality or complete data for the state, other options for road kill data collection need to be investigated.

Animal-vehicle collisions are just one component of the effects of roads on wildlife, and depending on species, road mortality may be a very minor component. Roads cause habitat fragmentation, direct and indirect habitat loss, and impede movement across the landscape. Forman et al. 2003, Evink 2002 and Carr et al. 2002 provide a thorough summary of many effects of roads on animals. The location of the vehicle strike or final resting place of the carcass may not be within the natural movement corridor for the animal. It is therefore important to understand wildlife movement patterns and landscape connectivity, which is how the landscape facilitates animal movement and population biology. Rather than focus on road kill, many studies utilize habitat modeling to identify locations where wildlife

corridors intersect highways (AKA linkage areas) (Austin et al. 2005, Singleton and Lehmkühl 2000). ODFW has begun investigating options for identifying habitat linkage areas for priority wildlife species in Oregon. They will be utilizing an expert option approach building on the foundation of the Oregon Conservation Strategy (described below).

Internal Dilemmas

The State of Oregon has laws that require fish passage and a well-supported Oregon Plan for Salmon and Watersheds to restore fish habitat and access, but these programs may only improve accessibility for aquatic organisms. There are no requirements in Oregon for providing access or passage for non-aquatic wildlife. As is the case in most U. S. states, the only regulatory basis for wildlife passage is when a listed species is involved. For example, as a condition of Section 7 Endangered Species Act consultation, the U. S. Fish and Wildlife Service required that ODOT design and install a culvert to allow for safe passage of Canada Lynx across a highway in northeastern Oregon. Management within the Geo-Environmental Section of ODOT felt that because we have no specific regulatory requirements for wildlife passage, we needed strong external support from wildlife management agencies in Oregon.

Currently, Oregon may not have a strong case for the safety aspect of animal-vehicle collisions. Based on the crash records referenced above, collisions with wildlife (including deer and elk as well as other non-domesticated wildlife) represent an average of 3% of all reported crashes in Oregon, based on the past 12 years of crash data. We have an average of 1-2 human deaths and 7-10 serious injuries per year from reported collisions with wildlife. Even though we do not believe that the crash records represent actual numbers of collisions with wildlife, ODOT's Crash Analysis Unit indicates that the crash data accurately represent human deaths and serious injuries caused by collisions with wildlife because of corresponding police reports. Compared to other causes for crashes, such as unsafe intersections or temporary work zones, animal-vehicle collisions do not appear to be a statewide highway safety priority in Oregon, at this time. Although there may be certain locations in Oregon where animal-vehicle collisions are a serious safety problem, the main impetus for ODOT to address animal-vehicle collisions at this time appears to be for wildlife management or ecological reasons. Therefore, we need strong support from wildlife managers in Oregon.

External Support

Several agencies and groups outside of ODOT have been urging our Agency to address wildlife crossings, primarily due to the effects of highways on wildlife populations. This includes the Federal Highway Administration, the U. S. Fish and Wildlife Service, Portland Metropolitan Organization, and ODFW. New highway modernization projects in Oregon such as the Pioneer Mountain to Eddyville Project and the Sunrise Corridor Project were getting pressure from all of these groups to include wildlife crossing structures as part of the design. Although we have been getting external pressures for our Agency to address wildlife passage, for several years, ODOT was at a virtual stale-mate with our external partners on who should lead this effort. We sought leadership from a wildlife management agency like ODFW or the U. S. Fish and Wildlife Service because wildlife passage across highways is only one piece of a much larger puzzle on habitat connectivity. ODOT wanted assurance from our external partners that this would be a collaborative effort, and that if we were to improve wildlife passage, it would be where it was most needed for vulnerable species and where it would connect suitable and protected habitat on both sides of the highway. In other words, we do not want to build passages to nowhere. ODOT sought guidance from wildlife management agencies to identify locations of priority wildlife movement corridors or highway linkage areas.

Two things led to the break in the stale-mate. One was the completion of the Oregon Conservation Strategy by ODFW in 2006. The Conservation Strategy is Oregon's "Wildlife Action Plan," a statewide program that charts a course for the long-term conservation of our state's fish and wildlife. Wildlife Action Plans emphasize a non-regulatory, proactive approach to conservation. The Conservation Strategy identifies wildlife movement as a top conservation priority in our state, characterizing the effect of road crossings on fish and wildlife resources as one of the main wildlife management issues in Oregon. The Conservation Strategy gave ODFW authorization to help initiate and collaborate on a statewide Wildlife Movement effort.

The other ice-breaker was that Oregon's interagency forum for collaboration on transportation projects (Collaborative Environmental and Transportation Agreement for Streamlining or CETAS) recognized the lack of oversight and direction in Oregon on this topic. Wildlife Movement was added to the group's work plan in 2006. The idea was that CETAS would help organize and monitor an interagency collaboration to address wildlife movement, statewide. The CETAS work plan element gave ODOT's Geo-Environmental Section direction to initiate the collaboration, as well as direction for the development of an ODOT program on wildlife crossings.

In the summer of 2006, ODOT began meeting with our ODFW representatives, requesting their direct involvement and even leadership to address wildlife movement statewide. The result was the formation of the Wildlife Movement Strategy, an interagency working group to address wildlife movement issues in Oregon. Virgil Moore, ODFW's Director, provided written support for this partnership in a letter dated August 14, 2006. ODOT and ODFW are now co-chairing this group. The ODFW have begun identifying habitat linkages across the landscape, focusing on wildlife species most impacted by road crossings.

Outreach for an ODOT Plan

The Wildlife Movement Strategy is a valuable interagency partnership, but is not likely to provide direction on how ODOT should manage our highway infrastructure for wildlife passage. The Geo-Environmental Section is developing a Wildlife Collision Prevention program for our Agency to address scoping of wildlife passage during project planning and development, funding alternatives, and design considerations for key species. The Wildlife Collision Prevention program requires cooperation from several groups within our Agency. A strong outreach and communication strategy is needed to gain internal support for this type of a proactive environmental initiative. One option is a top-down communication strategy, which would entail gaining support from various groups within ODOT, moving out from the section to other groups within the Agency, gaining support along the way (see figure 1). If the top down approach were the appropriate method, Leadership Teams would provide approval and direction for the initiative before it is introduced to staff in Regions and Maintenance. In this type of communication strategy, the initiative would not be introduced externally until internal support has been garnered.

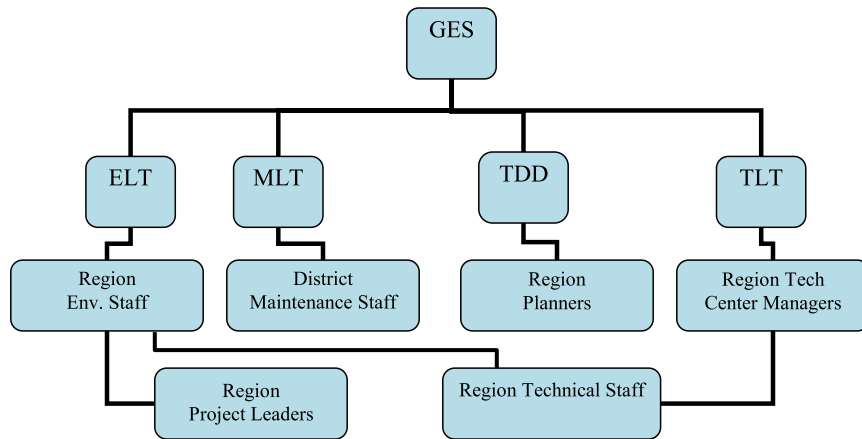


Figure 1. Conceptual top-down communication strategy for the Geo-Environmental Section.
 Key: GES = Geo-Environmental Section, ELT = Environmental Leadership Team, MLT = Maintenance Leadership Team, TDD = Transportation Development Division, TLT = Technical Leadership Team.

A top-down communication strategy is not a good fit for most environmental initiatives because in order to gain support within ODOT, external outreach is needed to justify the effort. Our Section’s involvement in the Wildlife Movement Strategy working group has overlapped with and sometimes preceded much of the outreach from within our Section to other stakeholders in our Agency. However, elements of the Wildlife Collision Prevention program will not be implemented without more Agency-wide support. Outreach for the Wildlife Collision Prevention program best follows a non-linear communication strategy (figure 2). The Plan will be presented to Region Environmental Managers for review and comment. These Managers will be responsible for seeking review within their units. We will also present this Plan for review within our Section, Planning and Research Sections in the Transportation Development Division, in the Bridge, Roadway, Traffic, and Safety Sections within the Technical Services Division. Meanwhile, elements of the Plan will be presented at Wildlife Movement Strategy meetings for discussion.

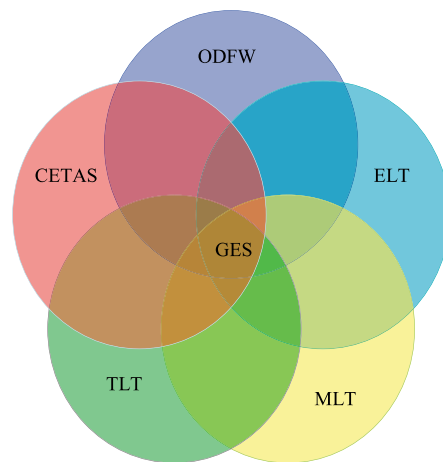


Figure 2. Conceptual model for a non-linear communication strategy.
 Key: ODFW = Oregon Department of Fish and Wildlife, CETAS = Collaborative Environmental and Transportation Agreement on Streamlining, GES = Geo-Environmental Section, ELT = Environmental Leadership Team, MLT = Maintenance Leadership Team, TDD = Transportation Development Division, TLT = Technical Leadership Team.

The Wildlife Collision Prevention program is a long-term effort that requires flexibility to adapt to new information, stakeholder concerns, or potential future regulatory changes. Continued outreach will be necessary to maintain support for the program during its implementation. The main forums for outreach to stakeholders within ODOT will include periodic updates to the Biology and Region Environmental Coordinators team meetings and the Environmental Leadership Team. Other groups within ODOT will be presented with results of some of the products (such as the wildlife collision hot spots and wildlife linkage areas), including the Environmental Leadership Team, Maintenance Leadership Team, Technical Leadership Team, and Project Leaders Academy. Periodic updates will be presented to external stakeholders as well, mainly the CETAS group and the Wildlife Movement Strategy work group.

At this point, the main concept for public outreach of ODOT's Wildlife Collision Prevention Work Plan is through the Wildlife Movement Strategy. The Oregon Conservation Strategy has a newsletter that is produced by ODFW. This newsletter now has a regular column on wildlife movement, which is developed by ODFW's Wildlife Movement Strategy coordinator. The public will also be updated on the progress of the Strategy and some of ODOT's products at professional society meetings.

Remaining Unresolved Issues

Although now we are on a clear course for initiating the Oregon Wildlife Movement Strategy and ODOT's Wildlife Collision Prevention program, there are still some challenging internal and external issues, such as conflicts with the fish passage laws, research funding, road kill data collection, design leadership, and project funding.

Oregon has state laws on fish passage, and ODOT has special funding for improving fish passage at highway crossings. We use that funding for culvert replacements and fish passage retrofits that meet strict design guidelines for fish access. Some of the fish passage improvements actually hinder passage for many or all wildlife species, particularly weirs. ODOT and ODFW have made great strides in the past few years to gain financial and institutional support for these fish passage laws. We are now challenged with considering the broader context of habitat connectivity. However, fish passage coordinators within both Agencies are hesitant to open a new "can of worms" that may set back their progress. The Wildlife Movement Strategy working group is helping to spread the message that the best way to achieve our individual goals (fish access, safety, habitat permeability) is to collaborate because solutions may be available that are most efficient and beneficial to all. Results from wildlife linkage areas and wildlife collision hot spots will help provide justification and better information on locations and types of priorities for wildlife passages across highways.

Like many other DOTs, ODOT has a Research Unit with dedicated funding for conducting research or collaborating on research that will help solve many of our highway management and operations issues. Historically, the Research funds went exclusively to engineering topics, but have been broadened to include environmental topics in the past several years. Wildlife crossing studies must compete with all other environmental proposals, and the ODOT Research Unit has contributed to only two wildlife crossing studies in the past two years, both of which are collaborative efforts with many other institutions. The Geo-Environmental Section was not able to gain Research funding to collaborate on the analysis of the dispatch records to map statewide wildlife collision hot spots. Help may be on the way, however. Oregon has a new highway research consortium (Oregon Transportation Research and Education Consortium). Geographers at Portland State University are interested in wildlife crossing topics and have developed a proposal for funding through this new consortium to answer some of the research needs of the Oregon Wildlife Movement Strategy, particularly modeling of landscape or highway features associated with wildlife collision hot spots or wildlife linkages.

The unresolved issues associated with road kill data collection, design leadership, and project funding will most likely fall upon ODOT to solve internally. We need to evaluate dispatch records to determine if they are of sufficient quality to identify wildlife collision hot spots. If not, we may need to coordinate with Maintenance Districts to develop solutions for improving data collection within the framework of continually limited funding (Oregon citizens have not voted for an increase in gas tax dollars or supported any other state funds for highway maintenance in over 10 years). When the Oregon Wildlife Movement Strategy identifies priority wildlife linkage areas, design solutions and funding will be needed. Although there are many resources on highway retrofits for safe wildlife passage (Ruediger and DiGiorgio 2007 Huijser 2006, USDA Forest Service 2005, Clevenger and Waltho 2005, Clevenger et al. 2001), engineering support will be needed within ODOT for potential standard designs or even project-specific designs. Within the existing structure of ODOT, there is no place or funding for engineering expertise on this topic.

The Wildlife Collision Prevention program needs to identify funding options for wildlife passages. If we can demonstrate a safety concern that exceeds other safety priorities, then wildlife crossing measures can be supported through Highway Safety Improvement Funds. The Enhancement Program under Federal Highway Administration seems like the most appropriate program for wildlife passage improvements and has been used in other states, but in Oregon, this program has never been successfully used to fund environmental enhancements, only other types of enhancements, such as bike-pedestrian improvements or historic preservation.

Oregon's Successful First Steps

Oregon's transportation and wildlife managers have made fantastic strides in initiating a statewide wildlife passage program in the past year. It took years of finger-pointing among ODOT, ODFW, the U. S. Forest Service, and the U. S.

Fish and Wildlife Service to come to the final decision for ODOT and ODFW to co-lead the effort in Oregon. The collaborative effort of the Oregon Wildlife Movement Strategy has support from high levels of management in ODOT and ODFW, and is based on the Oregon Conservation Strategy which has support from Oregon's governor, Ted Kulongoski. We have an informal Charter that describes how ODOT will identify wildlife collision priorities and ODFW will identify wildlife linkage priorities on the state highway system, and collaborate with our land-use partners to characterize wildlife passage opportunities and constraints on the state highway system.

Both ODOT and ODFW have initiated our wildlife movement tasks. ODFW is currently holding meetings throughout the state to map priority wildlife linkages and ODOT hired a consultant to map wildlife collision hot spots using dispatch records. We still have some obstacles to overcome to get to the point where we are comprehensively addressing wildlife passage. But at this time, I feel that ODOT needs more information on the scope of the issue in Oregon before we decide how far and how many resources we want to invest. The information being gathered by ODOT and ODFW will help us understand if and where we have particular safety risks due to animal-vehicle collisions, priority linkage areas for wildlife species, and our stakeholder concerns.

Biographical Sketch: Melinda Trask is an Environmental Project Manager for the Oregon Department of Transportation, with a Master of Science in Plant Ecology from Oregon State University and a Master of Environmental and Regional Planning from Washington State University. Melinda has a broad educational and professional background in ecology of the western United States. She has taught ecology and botany laboratory classes, organized and led field survey crews for rare plant studies, conducted desert tortoise and peregrine falcon surveys, assisted with fish salvage operations, delineated wetlands, prepared numerous Biological Assessments for Section 7 Endangered Species Act consultations, monitored environmental protection measures during various types of construction projects, and developed site restoration plans. Melinda is currently the co-chair of the Oregon Wildlife Movement Strategy, an interagency working group to address wildlife passage in Oregon.

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