Implementing Wildlife Crossing Infrastructure: Understanding DOT Culture

Interview/Survey Report

by

Angela V. Kociolek
Research Scientist, M.Sc.
ARC Technology Transfer Initiative Leader

Western Transportation Institute
College of Engineering
Montana State University

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DISCLAIMER

The survey results reported herein are largely based on closed question choices and, therefore, may not adequately represent the opinions or beliefs of all survey respondents. The closed question choices were based on responses obtained during interviews with a subset of Department of Transportation personnel from various state agencies. Every attempt was made retain the original intent of interviewees and any misinterpretation by the author was unintentional.

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EXECUTIVE SUMMARY

In 2012, the ARC Technology Transfer Initiative undertook a study of culture as it pertains to US state departments of transportation (DOTs) and their implementation of wildlife crossing infrastructure. The purpose of this effort was to gain a better understanding of what role culture, such as beliefs and attitudes, may be playing in the process. Currently, the decision of when or whether to build overpasses or underpasses - as a means to reduce wildlife vehicle collisions and improve habitat connectivity - is made by individual state DOTs. Hence, if ARC plans to continue to play a role in sparking new designs and promoting the wise building of wildlife crossing infrastructure as a standard practice, it is critical to understand the process and any obstacles that may exist from the state DOT perspective.

An interview and survey tool were used to query and analyze the perspectives of the DOT employees deemed most appropriate and/or knowledgeable on the subject. In summary, the results showed wide variation in how DOTs function with regard to the consideration and planning of wildlife crossing infrastructure. A disparity seems to exist between the states that view and treat wildlife crossing infrastructure as ultimate cost-saving measures and those which hold the view that the promise of such infrastructure is not applicable to their states. Another observation is that while the topic of assessing the need for, planning, designing, building and maintaining wildlife crossing infrastructure is interdisciplinary by nature, it is typically viewed as the unique purview of environmental staff. This is important to note because environmental staff in most cases tend to become involved only after a project has been identified to require wildlife mitigation and are not necessarily incentivized to initiate projects for the main purpose of wildlife mitigation. In terms of what may be impeding an increasing trend in the implementation of wildlife crossing infrastructure, economics and public perception were the most commonly cited obstacles/challenges.

Three main themes – economics/available funding, proven cost-effectiveness and public support – emerged as the primary barriers to overcome for widespread implementation. Fortunately, these themes are intertwined and provide ARC a clear target for its educational efforts. Showing that wildlife crossing infrastructure (i.e., overpasses or underpasses in combination with fencing and escape routes) can have an economic benefit to society would help garner public support especially in tough economic times. Therefore, more effort – in the form of research and education – is needed to mainstream the philosophy that implementing wildlife crossing infrastructure as a standard practice makes more economic sense than the “do nothing” alternative.

The findings in this report may assist ARC and its partners to promote new solutions by gaining an insider perspective of what obstacles exist to building wildlife crossing structures wherever they are needed across the United States and, ultimately, North America.

1. INTRODUCTION

In 2010, the Western Transportation Institute at Montana State University, as part of a public-private partnership named ARC, held an international competition to design the next generation of wildlife overpass. Wildlife overpasses and underpasses in combination with wildlife fencing are proven to reduce vehicle collisions with animals deer-sized and larger by 87% (Huijser et al. 2008). In addition to the obvious increase in safety, this type of mitigation also has the dual benefit of economic savings to society and accommodating animal movements from one side of the road to the other to fulfill biological and ecological needs.

Five finalist designs emerged from the ARC challenge, embodying new thinking, new methods and/or new materials (http://competition.arc-solutions.org/video.php). In order to move beyond idea generation, the partnership sought to better understand how state departments of transportation (DOT) personnel evaluate on-the-ground implementation of new technologies. In 2012, the ARC Technology Transfer Initiative undertook a study of DOT culture (i.e., an interview and survey) in relation to the implementation of wildlife crossing infrastructure.

The emphasis of the interview and survey efforts described in this report was on better understanding agency values, beliefs, frames, attitudes, norms and behaviors. The survey also attempted to document DOT practices and current trends related to the implementation of wildlife crossing infrastructure.

Currently, the decision to implement wildlife crossing infrastructure comes down to individual state DOTs. The findings in this report may assist ARC and its partners to promote new solutions by gaining an insider perspective of what obstacles exist to building wildlife crossing structures wherever they are needed across the United States and, ultimately, North America.

The methods, results and discussion for the phone interview and web-based survey are included in Chapters 2 and 3, respectively. Conclusions for both efforts are discussed in Chapter 4. Recommendations for future research and implementation are offered in Chapter 5, followed References (6). Appendices include raw interview responses (7.1), raw survey responses (7.2) and survey tool (7.3).

2. TARGETED PHONE INTERVIEW

2.1. Methods

2.1.1. Interviewee selection

State Departments of Transportation (DOTs) were selected to be interviewed based on their reported number of terrestrial wildlife crossing structures (referred to as "wildlife crossings") in Bissonette and Cramer (2008). The number of wildlife crossings ranged from 0 to 83. Five DOTs were selected for each of the following three categories: a relative high number of wildlife crossings, a midland number of wildlife crossings, and zero wildlife crossings – for a total of 15 agencies.

The five states with the highest reported number of wildlife crossings were Florida (83), Arizona (53), Montana (52), California (49) and Massachusetts (31). There were 12 states that reported zero wildlife crossings. They included six states east of the Mississippi River (i.e., Illinois, Indiana, Kentucky, Maryland, Ohio, and Wisconsin), five states west of the Mississippi River (i.e., Louisiana, Missouri, Nevada, Oklahoma, and South Dakota) and Hawaii. The Mississippi River is commonly used as a natural division between the eastern and western US. Kentucky and Wisconsin were chosen at random to represent the east of the Mississippi category. Nevada and Oklahoma were chosen at random to represent the west of the Mississippi category. The fifth, South Dakota, was chosen at random from the entire zero wildlife crossings set minus those already selected to represent east or west of the Mississippi River. The states with a midland number were selected by identifying the median number of wildlife crossings from those that remained (i.e., 5, 7, and 8 out of the series: 1, 2, 3, 4, 5, 7, 8, 9, 10, 17, 27). If more than one state shared a common number of wildlife crossings, they were placed in alphabetical order. The five states selected to represent the midland number, then, were South Carolina (5), New Jersey, New York, and Virginia (7), and Oregon (8).

The American Association of State Highway and Transportation Officials (AASHTO) aided in identifying the most appropriate individuals within each of the selected DOTs. These individuals generally represented the environmental and/or engineering professions. The goal was for a total of 30 interviewees (i.e., two per selected DOT). Potential interviewees were invited to participate by email. Appointment dates and times for phone interviews were made on a case by case basis. The identities of interviewees will remain anonymous.

2.1.2. Delivery and recording

The interview language was sent to at least four colleagues for review. It was then submitted to the Montana State University's Institutional Review Board for human subjects (IRB identification number 00000799) and was deemed exempt from review (AK032812-EX).

Every attempt was made for consistency in the content and delivery of the interview language. After a brief salutatory exchange, each interview began with the following introduction:

> "Thank you for taking time out of your day to be interviewed. What I'd like to do is ask you a series of questions first and we'll have some time at end if there is anything you would like to add or would like to have more of a conversation then. Does that sound good? (waited for agreement) These are all open-ended questions but they can be answered in a few words or sentences. Answers from interviews like this one will help us develop choices for an expanded multiple choice web-based survey. The emphasis of this survey is on culture and the questions are aimed

> at better understanding agency values, beliefs, frames, attitudes, norms and behaviors. I will be taking notes so if you hear tapping or a pause between questions, that's why. Participation in this interview is voluntary. You may stop at any time and you do not have to answer any questions you do not wish to answer."

Each interview closed with the following comment and an opportunity for the interviewee to make closing comments.

> "If you'd like to learn more about the partnership, you may visit arc-solutions.org."

A concerted attempt was made to type a content-accurate, albeit abbreviated, version of every response to each question. Responses were typed into an Excel spreadsheet and typos were corrected at the first opportunity after the interview was completed.

All interviews were conducted from April 19 through May 3, 2012. The duration of interviews lasted from 10 to 125 minutes for an average of 37 minutes.

After interviewing all interviewees, the responses to each question were compared for similarities and differences and, collectively, formed the basis for the closed-response options in the expanded web-based survey that followed (Chapter 3. Broad Web-based Survey).

2.2. Results

2.2.1. Statistics

Fifteen DOTs were invited to be interviewed, 13 participated (87%). Eight of the DOTs that participated provided both engineering and environmental representation (62%).

Of the DOTs in the highest number of wildlife crossings group, all five states participated (100%) with four out of five providing both engineering and environmental representation (80%). Of the DOTs in the midland number of wildlife crossings group, four out of five states participated (80%) with one out of the four that participated providing both engineering and environmental representation (25%). Of the DOTs in the zero wildlife crossings group, four out of five states participated (80%) with two of the four that participated providing both engineering and environmental representation (50%).

The aim was for 30 interviewees, two per DOT selected, representing both engineering and environmental professions. Thirty-three were invited and 21 participated for a response rate of 64%; or 70% if considering the goal was for 30 interviewees. Ten out of 21 interviewees who participated were different individuals than those invited (48%).

2.2.2. Question responses

Raw responses to all questions are included in Appendix 7.1 Raw interview responses.

Interpreted and summarized responses to each question are included below.

Question 1. What is the name of your agency?

All interviewees were personnel at a selected state DOT (2.1.1. Interviewee selection). Twenty-one representatives from thirteen agencies participated (Table 1).

Table 1. State DOTs and corresponding number of interviewees that participated.

State DOT	# of interviewees
Arizona	2
California	2
Florida	1
Massachusetts	2
Montana	2
New Jersey	2
Nevada	2
New York	1
Oklahoma	2
Oregon	1
South Dakota	1
Virginia	1
Wisconsin	2

Question 2. What is your general role there?

Interviewees described their roles in various ways (Appendix 7.1 Raw interview responses) which could generally be described as engineering- and/or environmental-related (Figure 1).

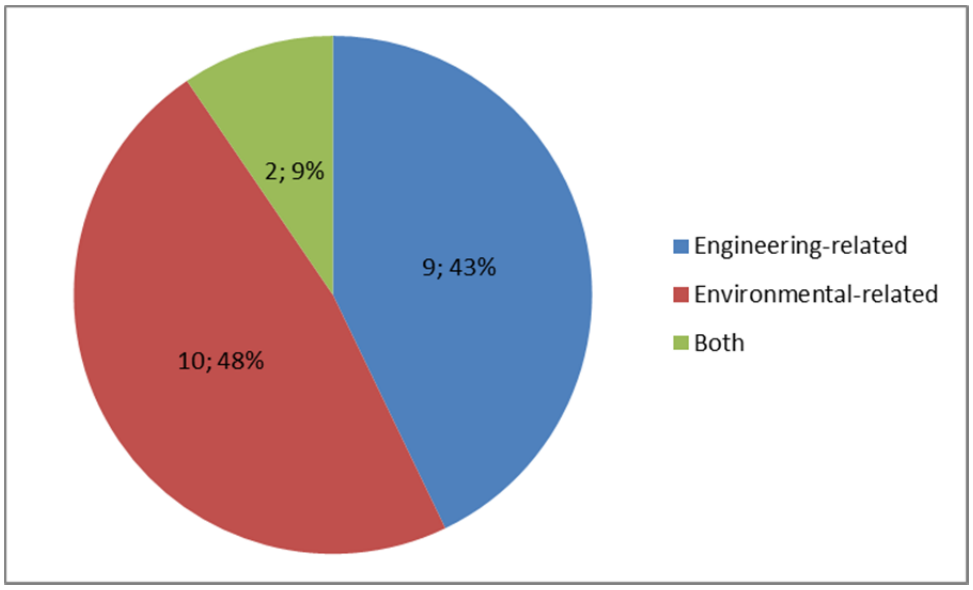

Figure 1. Representative role of interviewees.

Question 3. What motivated you towards your career?
Interviewees described various motivating forces that led them towards their careers (Appendix 7.1 Raw interview responses). The responses could be summarized into five general categories:

- Role model(s) while growing up
- Specific interest in particular subject(s) in school
- Passion for outdoors/natural resources
- Fascination with built structures such as bridges
- Just "fell into it"

Question 4. Why do you continue to do this work?

Interviewees gave a range of responses for why they continue in their line of work (Appendix 7.1 Raw interview responses). The following summarizes the main themes:

- Opportunity for upward mobility in my agency
- Already have an established career
- It's good for the time being
- Like the work environment my agency provides
- Enjoyment/excitement in my work
- Satisfaction of being able to design/permit/build a structure and see it built
- Opportunity to be creative/visionary
- Pride/job satisfaction in serving people/tax payers of my state
- Desire to build transportation infrastructure that is more sensitive to natural and/or cultural resources
- Desire to build transportation infrastructure that better serves public mobility/economy/safety

Question 5. In general, do you believe average people consider that minimizing wildlife-vehicle collisions is a priority?

Seven of 21 interviewees gave unequivocal "yes" or "no" responses to this question (Figure 2). Another interviewee provided a more lengthy response that could be considered "yes." Twelve of 21 interviewees indicated that whether people consider that minimizing wildlife-vehicle collisions is a priority depends on other factors. Some of those factors include 1) whether the people live/travel in rural versus urban environments, 2) the species and size of animal at risk for collision, 3) priority in comparison to other societal issues, and 4) whether the people have been in an accident or witnessed carnage themselves. Raw responses are included in Appendix 7.1 Raw interview responses.

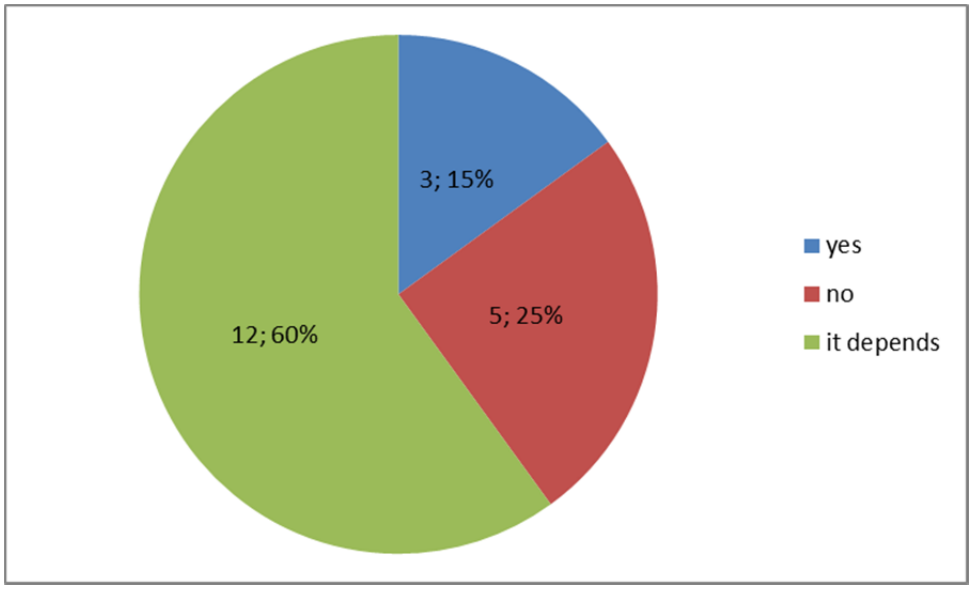

Figure 2. Relative beliefs about whether the average person considers that minimizing wildlife-vehicle collisions is a priority.

Question 6. Is minimizing wildlife-vehicle collisions a priority for your agency?

A minimum of 10 out of 21 interviewees (47%) representing nine out of 13 agencies (69%) clearly responded affirmatively that minimizing wildlife-vehicle collisions is a priority for their agency. Other interviewees also responded relatively positively to this question but made some qualifications to their statements (Appendix 7.1 Raw interview responses).

Question 7. In general, do you believe average people consider that ensuring wildlife can move across the landscape and across roadways is important?

Interviewees were split on whether they believed people consider the needs of wildlife to move across the landscape and roadways as important (Figure 3). Responses that did not give a clear indication of belief or that did not quite answer the question are listed as "other." Raw responses are included in Appendix 7.1 Raw interview responses.

Question 8. Is ensuring that wildlife can move across the landscape and across roadways important to your agency?

A minimum of 12 out of 21 interviewees (57%) representing 10 out of 13 agencies (77%) answered unequivocally that ensuring wildlife can move across the landscape and roadways is important to their agency (Figure 4). Three interviewees (14%) indicated it was not important. Responses that required more explanation are listed as "other." Raw responses are included in Appendix 7.1 Raw interview responses.

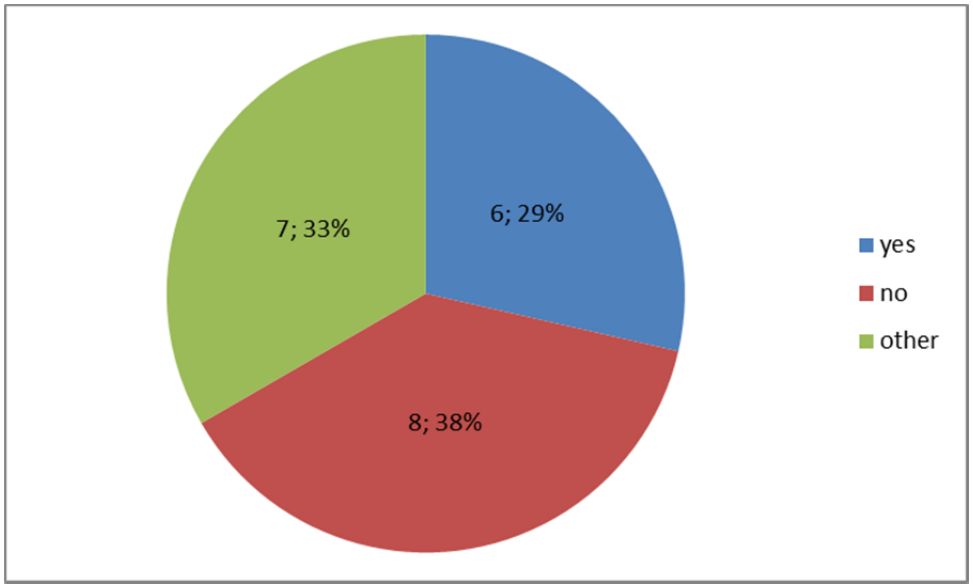

Figure 3. Relative beliefs about whether average people consider that ensuring wildlife can move across the landscape and across roadways is important.

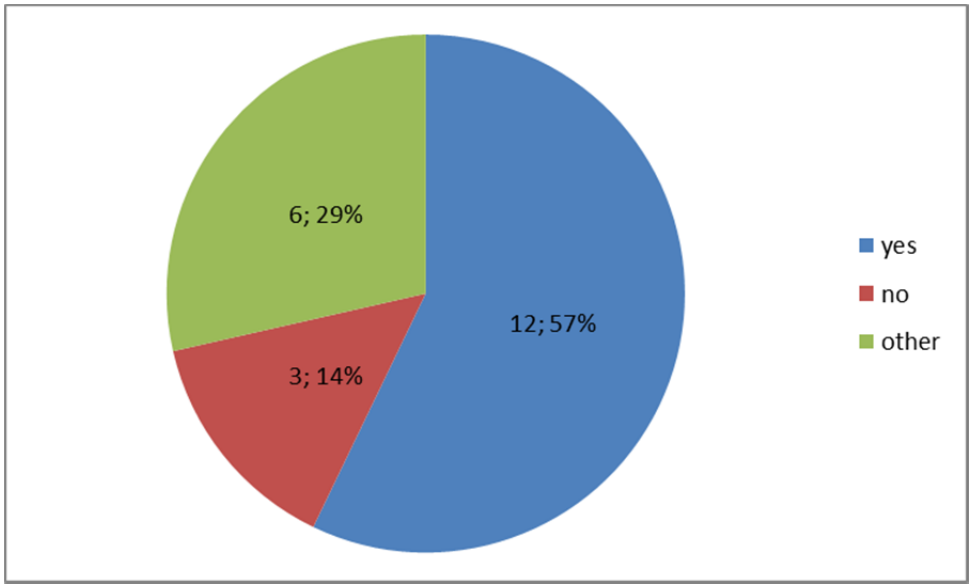

Figure 4. Relative beliefs about whether ensuring that wildlife can move across the landscape and across roadways is important to their agency.

Question 9. Does your agency consider building wildlife crossings to improve safety and habitat connectivity for wildlife?

Twelve of 21 interviewees (57%) representing 10 out of 13 agencies (77%) responded affirmatively that their agency considers building wildlife crossings to improve safety and habitat connectivity for wildlife (Figure 5). Four additional interviewees (19%) qualified their positive responses by stating any consideration for wildlife crossings is mostly due to human safety. Responses that required more explanation are listed as "other." Appendix 7.1 Raw interview responses.

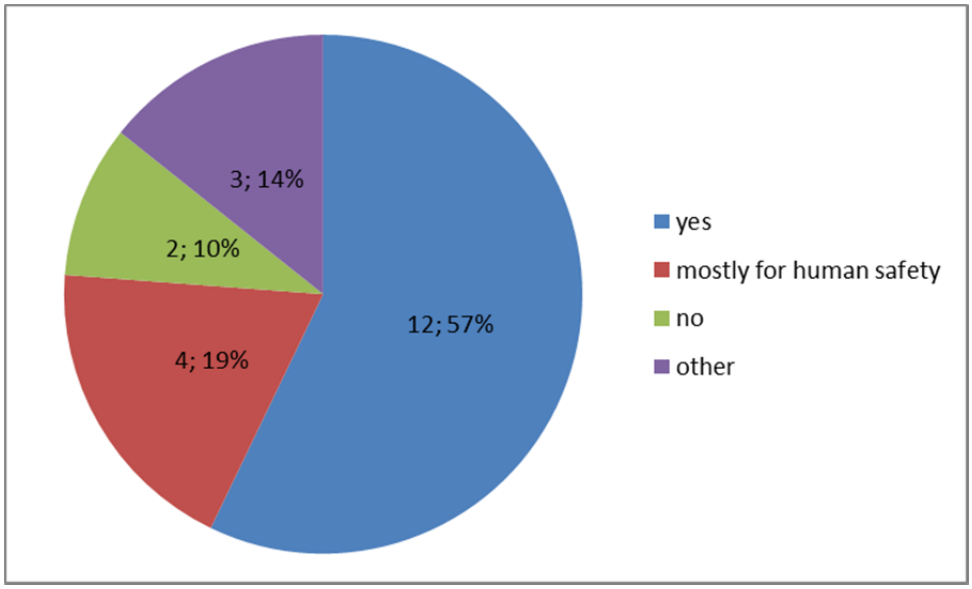

Figure 5. Relative consideration for building wildlife crossings to improve safety and habitat connectivity for wildlife.

Question 10. If yes (to Question 9), at what point is the decision made that a crossing will be built?

The responses to this question varied widely in the terms used to describe the stage(s) in which decisions are made to build wildlife crossings. Some terms may, in effect, be synonymous, however, whether that is the case is unknown at this time. The responses are listed in Table 2.

Table 2. Responses describing at what point an agency decides to build a wildlife crossing.

Responses to Question 10.
Note: __ indicates a place or species name or other identifiable term that was removed to retain anonymity. ( ) indicates a clarifying question by interviewer.
That would be done early during feasibility assessment; earliest stages of project when scope is being developed. Wouldn't wait until late in design. Has to be flushed out early.
Um, boy that's a grey area; we don't really have a protocol when funding is aside for one in particular; the ones we've had of late; boy, nebulous; not a good answer; not really clear to me; maybe somebody else has better idea; last 2-3 years and don't remember how original funding came to be; driving force was department of wildlife, outside nonprofits, me personally, too; not really process.
As part of environmental process.
It's typically at project delivery level. Our idea of establishing a statewide data set is to integrate into long range plans.

That's coming. Currently analysis and responsiveness on mainly large widening projects is where fixes are occurring currently. Long range planning is that we can identify in future where we might want to put emphasis and scope future project budgets; lots regarding TIGER grants and transportation enhancements projects which we get outside of project delivery process. Another thing with data sets is various county entities are adopting in general plans and informing open space zoning so that lined up the department can have a better understanding where to focus efforts and funding. In __ very strong land use authority so that comes into play with long range plans.
We have a fairly specific design process we go thru; gantt charts/cps networks - project flow charts with activities and duration. First part is survey phase - good idea what want to accomplish, finding data, doing surveys including biological and cultural resource surveys which culminates in alignment and grade report and scope report; 1/3 way into design project. During scope work report we make decision if we are going to put a crossing or not or make decision of high probability of there being a connectivity feature we want conceptually; then next 1/3 designing and last 1/3 permitting, ROW acquisition.
Again, difficult question, because are you talking in project development cycle based on safety need?; difficult question to answer because too open-ended.
Um, its typically very early in preliminary design, discuss with state environmental agency and when to accommodate wildlife is when it starts and basically weighing cost and alternatives of how to accommodate.
Permitting stage usually; occasionally in NEPA; late in design.
Usually in planning in environmental assessment; coordinating with various resource agencies and agree to a variety of features for wildlife.
I would say during the early design; when a project is initiated, look at migratory pathways; fish and game and collision data to determine if crossing is warranted then during prelim design review the team looks at appropriate crossing locations.
Um, planning stage (first); environmental stage rather than planning - broad GIS scale; it all depends on coordination; focus on endangered sp. but for major projects looks for accommodating opportunities, reconnecting when severed when interstates built; lot of turtle tunnels; CAPS decision process for model where improvements can be made and habitat connectivity most essential; __ funded and U of __ and Nature Conservancy; when done - we want to know as soon as possible; identifying and prioritizing - endangered sp., invasives, concern in estuaries, tidal flows and so many things people want us to work on; so we ask to prioritize and earlier we know in design easier to incorp into project; questions in project initial form about wildlife; many questions help us frame project need as goes into planning process; to clarify we build 70% are municipally designed projects - they hire consultants and go for it; they started designs and we coord with other agencies and identify areas that make sense to improve habitat connectivity; assessment; planning bigger scale look; projects have larger studies big picture 30,000 elevation help bring down to reasonable alternatives in env process.
Um, different factors, one would be are there lot of WVC happening in that area based on reports?; cost of crossing?, whether or not permit condition env agency wants us to; all those factors tied together; state department of env protection recently put together GIS layer that shows wildlife conflict areas primarily T&E; ideally if use as screening tool in early stages can come with ideas for hot spot areas if it looks like area critters getting killed, early in decision but cost because right now fiscal situation isn't good, unfortunate but realistic; so if low cost, effective solution then possible; better to do early on rather than wait til permitting stage and not cost effective.
When going through env process make determination if needed or not; (when env process happen?) it's the beginning steps of designing a project; once determined need a transportation facility, so env process phases 1-4 select alternate (is that pretty early?)- very early.
Um, kind of a big question. Decision usually after need has been shown, research done; accidents or wildlife movement done; stakeholders involved not just __ DOT decision; if have that plus funding than usually some time in decision process if all comes together; management decides if willing to do that sort of thing.
Uh, hopefully in scoping stages, planning stages (earliest or stage before that?) planning stage is earlier stage; in this agency planning comes before scoping.
Well, um, we try to use process in place in __. Get early agency input; paid liaisons from each resource agencies that specifically work on transportation projects; early planning and programming stages we are sharing through web-based system for resource agencies and public; gives opportunity to provide early input, give guidance on using agency data, identify resources, recommendations early on so include for wildlife mitigation - either non-structural or structural, reducing speed limits or at night for __, __, black beer; rumble strips, signage to fencing and crossings.
Um, so many variables because have to identify safety justification for the crossing but then also have to identify funding appropriate for level of effort needed; can identify the high probability crossings but if no money doesn't

matter; has to be both; region manager level at __DOT and area managers, local agencies interactions with traveling public; weigh importance of project with other projects; public involvement process drives decisions.
Typically early discussion in initial project scoping and definitely prior to release of a draft env doc; commitment made by that point.

Note: List includes all "yes," all "mostly for human safety," and two of the "other" responses from Question 9.

Question 11. Are you familiar with the ARC competition which focused on designing the next generation of wildlife crossing?

The majority, 13 of 21 interviewees (62%) were not familiar with the ARC competition prior to the interview (Figure 6). Raw responses are included in Appendix 7.1 Raw interview responses.

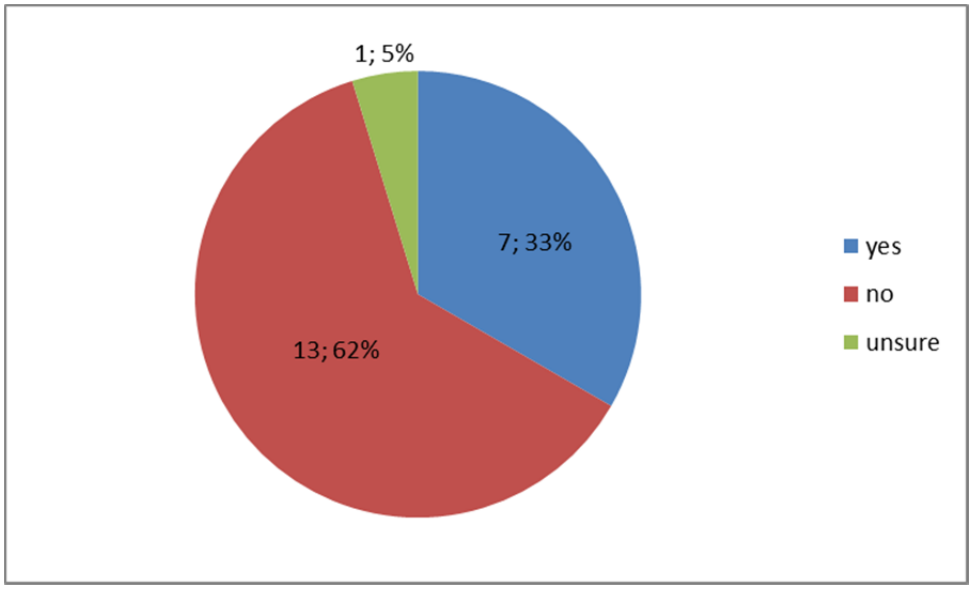

Figure 6. Relative familiarity with the ARC competition.

Question 12. In general, if the average person were presented with a structural design to reduce wildlife vehicle collisions and to allow animals to move safely over a busy highway, what kind of information do you think they would want or need before constructing it?

Question 13. If your agency was presented with a structural design to reduce wildlife vehicle collisions and to allow animals to move safely over a busy highway in your jurisdiction, what kind of information would it want or need before constructing it?

The raw responses to questions 12 and 13 are shown side by side in Table 3.

Table 3. Side by side comparison of the type of information the average person and the interviewee's agency would seek about a structural design before constructing it.

Responses to Question 12 – Information sought by the average person	Responses to Question 13. - Information sought by the interviewee's agency
Note: __ indicates a place or species name or other identifiable term that was removed to retain anonymity. ( ) indicates clarifications by interviewer.	
Depends on what wildlife it is. Good community partnering, permitting agencies and public as well; whether tunnel or culvert to pass wildlife.	Well, first of all, if it was a project on state highway system, um, DOT would be managing that project and would be directing consultant or in-house on what to do, scope would be laid out. So whatever design was developed to account for a certain issue, we have subject matter experts for acceptance. If federal money, FHWA would review before job being constructed.
I guess if this is an actual or natural crossing point for animals; flow of traffic, is there a high likelihood of being used after constructed, the cost of the structure.	Savings in y'know vehicle-animal collisions, that'd be about it.
Obviously cost; that it wouldn't cause roadside hazard. Probably the two I can real quickly come up with.	I think there would have to be evidence that there was a problem in that particular location; known habitat that maybe the life cycle was indicating there was a lot movement between places and we were fragmenting it. In __ we have a lot of undeveloped land so not a huge outcry; mostly crossings are along stretches of median barrier but only in urban areas; have to have documented problem we were solving; issue raised to a level of attention like NEPA or agency review.
Probably want to know the cost being spent I assume; I know the questions I ask - what size of herd; how many animals 5 or 5,000? People would want to know that.	I guess… these are interesting questions, what are they based on? - is this for a particular group that wants to know? (explained ARC purpose) There was limited info out there when we built ours and if trying to dazzle us with one as far as acceptable width, span, ratios, what kind of dimensions animals comfortable to cross; not sure what kind of information looking for. If something new obviously we want to know cost too; I know we struggled when we jumped into it. A lot of states have a lot of undercrossings. When we started building overcrossings, no basic design criteria, what successful, what species prone to use; berms, solid or open fencing? A lot of information we were trying to find; always cost implications, too. Obviously general public to remote area and people not familiar; we're trying to appease general public doing best we can to make economical like structure to benefit more people in urban areas.
Y'know, good question. Don't know because not involved in public hearing part of process. In general if decision is made as part of env permitting process usually small not big. General public doesn't see what we're building just road construction signs. Not policy to build individual crossing. We need to permit and need for crossings are included as part of mitigation for the project. We don't go to public to say we need to mitigate, probably we mention it because need in the scope; not just for road kill because small animals and people don't see large animals killed to warrant specialized crossing just for animals.	Well, we would need to look at structural design/detailing, what calculations are based on. Need site specific info such as geotechnical borings taken, report and evaluation of foundations and substructures, regular engineering type info to be able to evaluate.

Um, I think they'd want to know cost first, how successful they are, is it worth the money; structurally how to hold up with earthquakes, saturation/rain/snow; since __ is liability associated, how to make safe should somebody get onto it.	All the ones listed above (at left) and maintenance as well as anticipated life span. I know in ARC competition, the focus was on natural materials. I don't know how those were spec'd out and if up to AASHTO and FHWA standards so that would be of interest. In terms of maintenance, not structural maintenance understanding required but from vegetation maintenance standpoint. Also __ has a real interest in having these types of investments integrated into trail system for access to public so whether or not variations for designs. Department is asked by partners would this tie into open space access and multi-use for USFS and things like that. Structural support, steep topography on one side and fill on other side, how to touch down given constraints of ROW. I know things become more expensive as become longer so dealing with touchdown factor. In past has been a major impediment to doing overpass designs. Other info, in __ because lots of freeways on fill is tunneling techniques and cost, largest diameter using them? 15 ft max depending on existing facility. Techniques with building underpasses; how to build without shutting freeway is issue; in __ dealing with 8-20 lanes. Are other states trying to connect areas between huge freeways/interchanges?
Based on my own thinking… how effective, what can we expect in terms of reduction, increase in permeability; how much cost? Cost is # 1 or 2. What's it going to look like?	What's it going to cost; sad to say but everything revolves around money, how effective, what species is effective for? Ungulates, forest carnivores? What's its purpose? What's it going to look like? For __ we have to strike balance between aesthetics and cost. Public likes nice features but equally why build Cadillac when Chevy might be fine. Balance. Construction, how to construct, material, readily available here in__?
I think to construct you have to understand what it's going to cost and what benefit really seeing; solving a real problem or imaginary problem? Very difficult topic to get true handle on. But what you asked was structure over a transportation facility, very expensive. What are we solving? Many priorities out there and need to determine what priorities are.	Again, same sort of thing - what is the site specific benefit, safety and connectivity benefit; is it worthwhile? Difficult funding times, many safety - what makes this a priority over others? Quantifying makes very difficult.
Um, probably say cost, if evidence whether crossing is being used, effectiveness of structure.	Um, we would probably consult with env agency to establish whether design would accommodate wildlife passage and be effective in reducing collisions; would rely on env state agency and consult with them of effectiveness of design.
Uh, cost effectiveness, um, how impact adjacent property owners - two biggest.	Uh, structural engineers would have to tell me.
Not sure you build anything; not sure what kind of info to provide other than how it works.	Specifications, as built drawings that typically have worked in other places.
The first question we always get asked is how much will it cost and what's the purpose; how we know it's going to work.	The collision data, the animal data, the design, and the cost estimate.
Well, we've a lot of under, no overpasses. Experience is that need to know why need and have to have habitat on both sides. Sometimes people just want to connect a trail but might not be worth it; if good movement already might not be	Same as before (at left) didn't realize what group talking about. Whenever wildlife passages, need practical approach and when it makes sense. If already doing something, don't want to miss opportunity to do wildlife passage;

best use of funds; topography.	at least do study to achieve goals. Obviously cost and, for me, when siting a lot about topography. Don't want to create a series of walls to feed wildlife there; want topography already there to be successful.
Cost, time frame of construction/delays? Likelihood that its effective; info if whether worked in past and will it work now. Is there a problem there?	Probably all of those (at left).Definitely cost, how effective will it be? Thinking of other things… making sure right location, if structure is installed would we have to install barrier fencing to lead to the structure to funnel critters in? Future maintenance cost.
How do we convince animals to use it? How much of a problem it is and how much cost.	Absolutely identified need, similar to what public wants. How to convince deer or moose or skunks to use it versus going across pavement?
Would have to have a lot of info but average person wouldn't understand structural components of building a bridge. Multidisciplinary - would need to know a lot; not just one person, it takes a team - wildlife biology-engineering, combination, also structural design and roadway engineering, bridge, drainage as well as resource agencies that understate NEPA compliance.	Um, need to know where it would go, appropriate for what species. Need to know landownership, protection on both sides, whether connectivity maintained into future. Structure itself whether appropriate for size and if animals will go thru or over it. __ will go over but hesitate to go under, although they will. Target species. Can there be a wildlife crossing? A lot of thought and maintenance.
Um, sure, cost would be one. How would it affect their usage of roadway, would it restrict people's mobility? Visual aspects another important factor.	Uh, probably three stated before (at left) and in addition we would be interested in life cycle costs, maintenance and that we are meeting guidelines, policies, standards of agency, AASHTO and FHWA.
Probably some info on frequency of accidents that occur, associated property damage, dollar value.	Similar as above (at left). What experience has been. Areas of state that are likely to have crossings are usually not the high traffic volume areas of the state.
Can tell what we would want! Largest crossing that could be built to help all species. And cost of doing business, they think DOTs have all this money and put up promptly. That's what I think average person thinks. They don't really how complicated really is; some more informed people like NGOs have GIS mapping and think, ok, green on both sides of road need crossing and needs to be at least 1,000 ft long just because green on both sides.	First of all, we work very closely with USFWS and __, two main wildlife resource agencies, also USFS and also national parks, all as env tech advisory team - a team for each district. We're looking for have guidelines to determine appropriateness for considering crossings, criteria for minimum for appropriateness - after all wouldn't want one in downtown. __. is based on scientific-based need. A lot using expertise of wildlife biology to help determine whether crossing is needed. Some things we need to know - is it capacity improvement project, new alignment, adding lanes? Versus just resurfacing project, etc. or is it retrofit specifically requested by agency or NGO because amount of reported road kills generated enough attention to provide mitigations? What type of project, where located, details, dimensions, to know if agencies expressed science-based need for it? Need to know target species. Certain segments or roadways known for road kills. Web-based program in __ - over 400 databases in that program updated every year. Documented species in project area? Is project within primary or secondary range of listed species? Does progress cross documented landscape level linkage? Is project in known area of WVCs, or safety issues? Another big deal is need to have public lands or conservation easement present by time of design in adequate amount on adjacent sides of roads in order that future land use compatible with species needs. No one size fits all; are animals actually crossing there?

	Need data.
Um, want to see visual impacts because if structural either lifting or lowering something to allow through. What is it going to do to my commute, time during and after construction; how affect me and how going to change the chances of running into things? Analysis results.	Everything, because it will be our facility, that it follows all standards, env clearances completed, appropriate pub involvement/input. Make sure it spends money in right place. Is there another way of accomplishing problem to be solved?
We face that issue here on projects, kneejerk is what's the basis of the request or need. What types of animals are expected, what are the dimensions? Ultimately our concern is in initial scoping is cost; a lot of times engineers think they can get by with enlarged culvert. and when prop for structure the how, what, why, where, more substantiation.	Fairly simple, as long as conforms to current design and seismic standards, technical clearance, funding, forge ahead when know design is adequate and is in the budget.

Question 14. How do you think most people would think or feel about the following statement? "Just like crosswalks for pedestrian safety, it makes sense to also create safe passages for wildlife to cross roads."

Nine of 21 interviewees (43%) indicated they thought most people would agree that it makes sense to create safe passages for wildlife to cross roads just as efforts are made for pedestrian safety (Figure 7). Raw responses are included in Appendix 7.1 Raw interview responses.

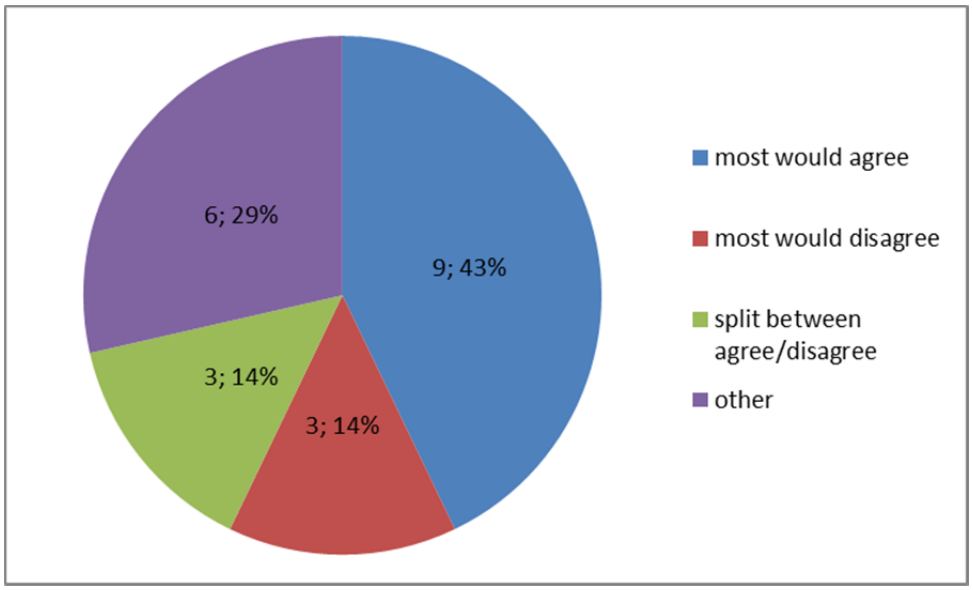

Figure 7. Relative thoughts about how most people would think or feel about the statement "Just like crosswalks for pedestrian safety, it makes sense to also create safe passages for wildlife to cross roads."

Question 15. How do you think most people would think or feel about the following vision statement? "We envision a systemic network of wildlife crossings wherever they are needed to make highways safer for people and wildlife and to make habitats more connected for wildlife."

The majority of interviewees (16 out of 21; 76%) indicated they thought most people would have a positive response to the vision statement (Figure 8). Some of the responses classified as "other" also had positive aspects but with caveats. Raw responses are included in Appendix 7.1 Raw interview responses.

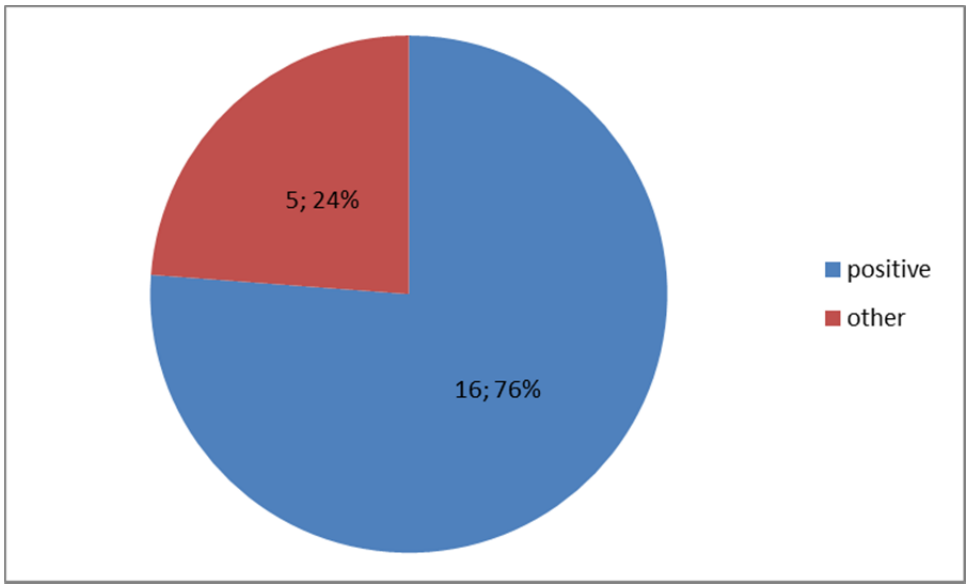

Figure 8. Relative thoughts about how most people would think or feel about the vision statement "We envision a systemic network of wildlife crossings wherever they are needed to make highways safer for people and wildlife and to make habitats more connected for wildlife."

Question 16. Do you believe it is possible that all DOTs could share and work toward this vision? Why or why not?

All interviewees (21 out of 21; 100%) indicated they believe in the possibility of some, most, if not all, DOTs sharing and working towards this vision. Most responses included caveats, however, pertaining mostly to financial constraints, regional differences in topography and ecology, and the need for leadership (Table 4).

Table 4. Responses about belief in the possibility that all DOTs could share and work toward the stated vision. "We envision a systemic network of wildlife crossings wherever they are needed to make highways safer for people and wildlife and to make habitats more connected for wildlife."

Responses to Question 16.
Note: __ indicates a place or species name or other identifiable term that was removed to retain anonymity.
Well, as it works now, the DOTs, we do exchange, uh, specs and designs standards. I think globally working through AASHTO can get something done. That's plausible.
Yes; if, um, there is, uh, especially in the western states wildlife crossings are much more of an issue than in the east; western states very important thing. Not nearly as important in the eastern states. Why? Because there's a lot more public pressure to develop some kind of safe crossings so people don't hit them. Not as important issue in east.
Uh, I think that if you'd get the right groups involved AASHTO, SCOE and SCOD and tools and techniques, could be accepted in a cost-effective manner; have to get the right groups involved; buy in.
I mean, I guess for anything to be developed at a national level eventually; I know proposed funding legislation for wildlife crossings; in future, national program for constructing and installing. Anything doable if enough drive to do it.
I think, uh, if it's, uh - yes, short answer is yes. I think probably best place to start is AASHTO from their env group to work to the executive committee as vision to improve. I would almost stress to sell it to the public this isn't just to build roads better for animals but stress safety aspects that AVCs can be dangerous for humans so best to separate the two so animals go where they want to go, naturally inclined to go; we build bridges over highways for vehicles so do that for animals; starting from AASHTO as vision statement for all DOTs - this is aspect for making roads safer for humans.
Yes, I think that, um, as the culture within env communities, regulatory and transportation agencies come to realize this is something we can and should do. There will be a sharing of info like quiet pavement is catching on at national level and engineers are seeing this could be a solution to sound wall. I think if DOTs work collectively to understand best management practices, how to do more cheaply. Where larger vision from federal level of our responsibilities and how lines up with federal and state lands uses can become more attainable goal. Progression to need to provide everywhere - ok let's take a look at this from conservation aspect, does it make sense? Moving a to b, who are property owners? All things needs to be looked at and understood. Natural resource managers are understanding need to provide roadmap for DOTs so can plan. As more sophisticated can understand where we should put them, cost and how to cooperate better with partners with investment in the issue.
… I don't know. I know __ certainly would and does, um, probably sister states would agree at least in some regard but no concept outside of __ states if possible; presume wildlife connectivity in __ states dramatically different than (other regions). Sorry, not good feel for outside __ states. Why or why not? Basic part of why not is cost again. When a highway department commits to statement like that, implying, indicating they are going to use some resources to devote to infrastructure to promote connectivity and that can be a hard position to take when so many infrastructure needs. Why want to do it? Sensitivity to env, doing the right thing for part agency culture.
Now that's a loaded question because share and work toward, yes, however what does that mean? And how's that going to be interpreted? If I say yes, some beat me up because not living up to word when in reality I'm doing best I can. Like saying will urban well-connected bike trail - can support? Yes, but have to buy out businesses to make it; soon as make sentence get boxed in used against me and I do not like that. I believe DOTs are interested in wildlife connectivity and promoting but how do you do it cost effectively and prioritize budgets? Big issues.
Yes, I would think so; there's a lot of common areas that DOTs can share info and share research of what

works and effective and economical designs. Cause, in my mind, biggest obstacle is economics. How do you accomplish passage and find designs that are economical?
Yes; uh, we all do the same thing - deliver transportation system for the people but it's different in different states, on the needs.
Sure, think they could but takes states of similar geology and topography; a lot of things that work in __ or __ aren't going to work in __.
Absolutely; think we're starting to; because people are understanding the system - the connectivity of systems is important no matter what system and when transportation system has effect and there are ways to mitigate effect on natural systems out there.
Yes it's all a matter of money and priorities. When failing bridges and roads, hard to dedicate money to wildlife passages, unfortunately; even states with active wildlife programs scaled back in last couple of years. Easier to look towards active projects so when doing major economy of scale; mobilized; $100 million project a $2 million crossing, for example, is more palatable. $70 million project, $1 million crossing.. One issue env agencies raised reconnected two state forests, very successful! Review everything in advance case by case; if env agencies say priorities then we try to get it built - usually a few hundred thousand projects> So work with fencing - even __ turtle federal endangered species slaughtered - env agencies told and the next week __ DOT out there fencing to initial stop slaughter and then ways to improve project for connectivity but that's a bigger project in future.
All is kind of a hard word but I would think a lot of them could and could learn from each other. Think would be good to see what other states able to do; see obstacles faced in states, how got around those issues and how dealt with cost.
Yeah, but understand that there's all kinds of financial restraints that limit what can and can't do; existing aging infrastructure and not enough money for that so added burden of adding structures for wildlife only put us further behind for maintaining highway structures.
Yeah I think, big help if built-in mechanism in federal aid funding process to fund these. Big difference to bring states together on this; federal highway bill, line item; but right now FHWA not even on board judging with language of bills that have been passed; if specific, big difference. There are some states that might be difficult but certainly __ and other states in __ have opportunity to make a difference but other states not opportunities because fragmentation. With open space and public lands, can come together on these processes. Maybe not all but a big group that could.
Sure, we share and work towards many other visions I don't see why not this one. Well, just using word possible, everything is possible; biggest problem everyone has is cost and whether divert funding and infrastructure, suffer some, but it is possible.
Yeah, think so; well AASHTO mechanism for DOTs to come together and talk about issues; would allow that to happen; allow that dialogue to begin. FHWA is another but not sure they want to mandate this. AASHTO more viable way to get this going.
Yes, I think as we discussed transportation ecology really advancing very quickly, more people, more highways, more wildlife in a lot of cases - most DOTs look at safety issue, one of number 1 issues in mission statements and do believe communication with DOTs improvement such as ICOET, more states have transportation ecology conferences.
Anything possible but think you'd get a lot of push back (why) funding, example is if had to make choice between new wildlife crossing versus fixing bridge about to collapse where spend money, because that's where most DOTs are.
Yes, think so, the next progression -extreme example 50 years ago... ROW from private property not big deal and now long and extended process. People realize wildlife and env is shrinking and need to do what we can to preserve.

Question 17. How willing is your agency to invest in things that have not been done before?

Roughly half of the interviewees (11 out of 21; 52%) indicated their agency would have some level of willingness to invest in things that have not been done before (Figure 9). The remainder indicated a lack of willingness and/or expressed that it depends on other factors. Raw responses are included in Appendix 7.1 Raw interview responses.

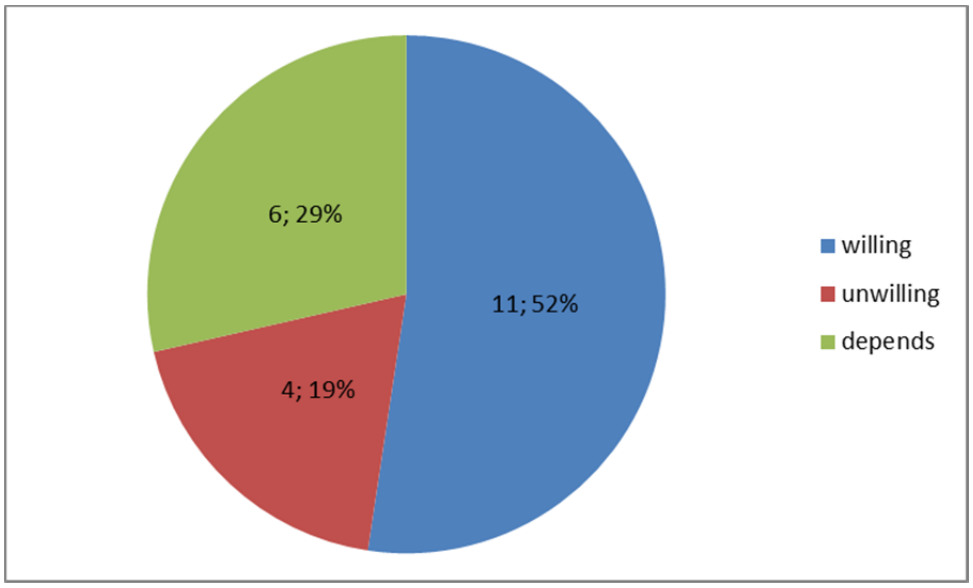

Figure 9. Relative responses about agency willingness to invest in things that have not been done before.

Question 18. Is your agency more likely to implement designs and programs that have been proven elsewhere even if they are expensive –or– is it more likely to be the first to implement new designs and programs that promise to be effective and save money?

Almost half of the interviewees (10 out of 21; 48%) indicated their agencies were more likely to be the first to implement new designs and programs that promise to be effective and save money compared to 14% (3 out of 21) who indicated their agencies are more likely to implement designs and programs that have been proven elsewhere even if they are expensive (Figure 10). Six interviewees (29%) stated it depends on such things as risk to reward ratio, project type, and/or whether their agency is in a phase of building new structures. Raw responses are included in Appendix 7.1 Raw interview responses.

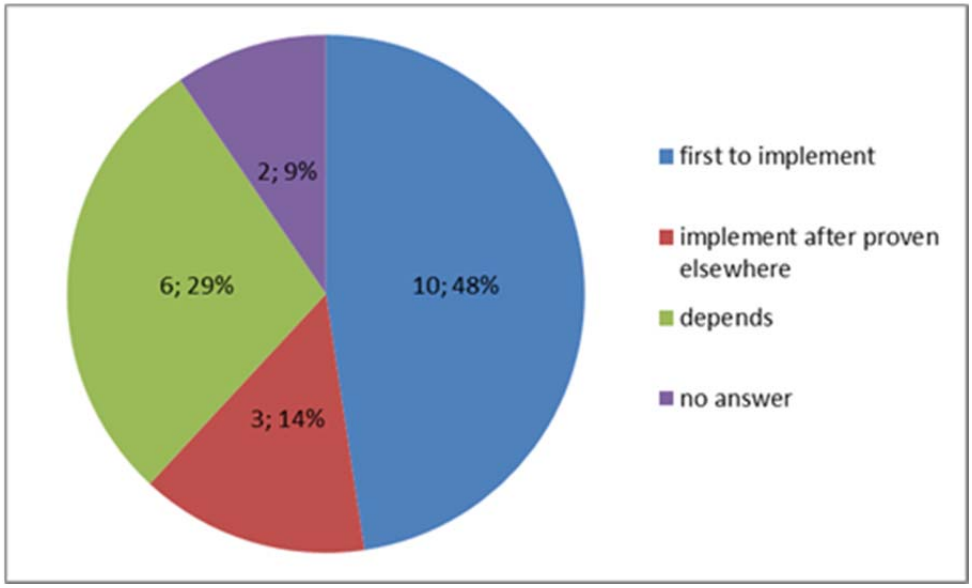

Figure 10. Relative response as to whether their agency is more likely to be the first to implement a new design or program or wait until it has been proven elsewhere.

Question 19. Please give one example of a reason why your agency would *not* be the first to implement a new design or program that promises to be effective and save money?

The responses to this question varied widely and highlighted some of the possible barriers to the implementation of innovative technologies (e.g., influence of state legislature; agency culture; lack of data, time, financial resources, champions/leadership) (Table 5).

Table 5. Examples of reasons why an agency would not be the first to implement a new design or program that promises to be effective and save money.

Responses to Question 19.
Note: __ indicates a place or species name or other identifiable term that was removed to retain anonymity.
Um, it could be that there is a state statute that prevents us from doing something like pure design-build. We have open mind for basically anything but things like that prevent us from moving forward.
We're not rewarded for taking risks here in the department at all; we're only reprimanded if we mess up.
Um, just the, uh, I don't want to say culture; the system of way projects are developed are set in stone so to break out that routine takes an outside influence (like AASHTO, NCHRP, new technology shared, learned about through peers at technical meetings, a lot disseminated through AASHTO and TRB), then without an internal champion who would expend personal capital it wouldn't happen; too busy to focus on work to do

anything different.
I don’t know if there is any reason; if guaranteed then wouldn’t be any reason to not be forefront. Always risks to manage and foresee. I don't know if any underlying reason we wouldn’t if something of great promise and success.
I think if there was some documentation that it doesn't line up to its billing or people who are marketing it; or it didn’t work well we would say let them work out the bugs and then we may look at it; if looks too good to be true in partial engineering evaluation and the designs don’t match up to the promise of the marketers.
Um, the dedicated funding for this isn't available. Strides in grants but esp __ where so many routes and lands and species it will be major effort if we're gonna really try to implement at a program level as opposed to project by project; the planning and coordination of design isn't funded unless associated to project so staff is not dedicated to be able to be proactive. With fish passage can be a project killer if explore and adding millions of dollars the project becomes infeasible. That programming piece is key and can be a major impediment to addressing in project delivery standpoint. Need infrastructure in place, we're largely improving existing roads and opportunities to do new things.
When you say it like that how could you say no? Not sure can answer fully based on what you tell me; golly how can you say no to that; certainly investigate but if effective and save money that's what we're all about. Can't think of reason why say no, I hope not say no.
Uncertainty about longevity of the product.
Mmm, exhale, sometimes very tight budgets for project and in those cases we may be saving problem and money in long term may not proceed because initial cost too expensive for us.
Because we are over-scrutinized by our legislature and we do not have a sustainable source of funding for transportation currently.
If it's a crossing system out on the __ they would probably not be willing simply because never spoken to anybody that can do it. 10,000 deer, raccoon nobody's been able to solve it; can't channelize, they just jump over fences and go.
If there's no experience with that particular design or material; the less experience with any particular element, as added elements together, less likely experimentation - so if new design, new material and new way of building is less likely than if only one element is new.
If not convinced it’s a safe product.
If still debatable if it works at all, might not want to put money out until know its effective.
If we're not convinced the public would buy into it and accept technology decision that it's a prudent thing to do, governor’s office would not like us to spend the money if public outcry.
"Promises to," if evidence, that's one thing but if can't make assurances than a mixed question. Would if knew that it could; if it showed promise but without data or info would try to show evidence to taxpayer doing right thing.
That's slightly different; I don't think my agency wouldn't; tough to answer because happen to be trail blazers in wildlife crossing; maybe example if something jeopardizes safety but just because new, innovative may implement; don’t have to wait for others.
I don't think we have, compared to __ for e.g., don't have department of research to prepare something new. A large percentage of work in highway and bridge system, not near as much money in research; eliminating purely research in this agency - no personnel, funding, no cutting edge.
Uh, can't think of an instance unless some think couldn't do because certain agency against it; categorical exclusion so didn't need public workshop but it did and good thing because tribe considered adjacent land to be sacred burial sites. Instead of building crossings we had to put in different features like warning signage, RADS not sure if effective for ___ or not but trying. If someone could prove effective and save money… only reason not first is if other agency objected or no funding.
Ok, um, because implementation would require dedicated staff/resources to sustain in perpetuity so it might be great idea and save money but have to balance where to put resources.
Um, I would think size of agency; one of few nationwide that has a lot of in-house staff _,000 employees so just size and bureaucracy often behind curve because so many reviews; that’s why not the first.

Question 20. Is there anything else you'd like to share on this topic?

Most interviewees had additional information to share (15 out of 21; 71%) (Table 6). Six out of 21 (28%) did not provide additional information.

Table 6. Additional/closing comments from interviewees.

Responses to Question 20.
Note: __ indicates a place or species name or other identifiable term that was removed to retain anonymity.
Um, maybe just to give you a general idea of the culture; 5-8 years ago much more willing to stick neck out. Last couple of years department tries to save money wherever possibly can. If something we are spending money on and group of people that doesn't agree with it, there's some reprimands that go around. Have become a lot more cost conscience than previously.
I think that at least for our state we focused on compliance and so being we have to do this to comply with ESA for e.g. we don't have state level protection of wildlife regulation; if we knew fragmentation happening and maybe other actions and public and agency comments bringing issue to forefront then perhaps implement something like mitigation measure; without regulatory mandate or public/agency call for action we are so focused on public safety, first and foremost, and compliance with existing regulations - so outside of those things existing would have to be very unusual; that's the culture of agency here.
Um, no I think that it's great the research community is looking at these types of schematics and designs and as more knowledge added for costs, departments like mine would hopefully adopt more often. It's going to be tough though given federal budget issues and our infrastructure is in need of major repair simply for safety. Money needs incentive or flexibility with partnering with other federal agencies. Some creativity needs to come from federal level to help DOTs moving in this direction. It's a tough one.
…I'll share a little bit, careful, talking to fella who pushes for this, singing to choir; it's my job to push this agency to get us doing some more env friendly features so sometimes within big infrastructure organization some reservation can simply be to old attitudes and sometimes take time to change. Not a huge problem at __ it's not, but env initiatives can be more progressive than state government and takes while for government to catch up, constant effort.
I believe wildlife connectivity is a real issue, the difficulty is balancing load of differing needs and realistic scenarios that try to fit all things trying to do.
Um, maybe just the fact that our agency is very early in using wildlife mitigation, we don't have any procedures or guidance in our manuals and when we need to provide and how; we're very early in designing for wildlife passage.
Um, I know the country well; we don't have the migratory species like out __ - __, __; so have to manage differently.
Only that I wish there would be some forward thinking ideas to try; we can get research folks to test facilities; has to be reasonable, chance of success. Worked with insurance company and governor to minimize but out __ __ different since wildlife goes anywhere they want; even six-eight ft. fences; jump over and under; difficult in controlling and like herding cats can't make go where want to; in __ good success with terrain; __ and can protect pretty well.
I think it's an important topic and getting more press and reaching wider range of audience which is helpful.
Just say for __DOT have design guide, green DOT all about sustainability, many aspects including wildlife accommodations; implementing all over highways, air, rail, etc. one way to educate is the __ of Motor Vehicles; at __DOT with liaison __Wildlife funded position we pay for and that person is our liaison helped us do good things on projects; working constantly to protect species and improve passage; mostly endangered species.
Um, let's see, trying to think - several questions ago regarding structure given to agency - what questions what species designed for? The other issue we face as obstacle is permitting regulations themselves, discussion about retrofit existing culvert, shelf or something since takes up cross sectional for flood waters but not get permitting from state wildlife agencies to do it; large flood events in state so stringent flood control regulations.
No, just that I'm not an environmental scientist, I'm bridge engineer haven't given this a lot of thought; looked at wildlife passages over years. 25 years ago Saudi Arabia visitor showing us their wildlife crossings for animals - wild camels but that involved huge stretches of fencing to control it.

Um, in general, I don't know exactly but think one of the wildlife crossing pioneers in the US to do that; we've done under and overpasses; __ new overpasses built for __ and we started many, many years ago. 10 yrs building electric fencing for __ and directing to cross under highway at certain crossings so as far as __DOT is concerned.
Yeah, just want to say - going back to determine crossing design - also consider once decision is made, have to make sure doesn't compromise federal/state safety, can't restrict access to adjacent property owners, can't negatively impacts adjacent properties or allow access for __ on cattle ranch; important - cannot negatively affect existing drainage patterns or cause flooding; can't add significant additional habitat impacts from constructing crossing. Sometimes through state park or unique habitat and not realizing creating more impact by creating building crossing that is too big. Also can't result in significant modification, like excess in roadway grade.
Um, I did send the one email, article about crossing we installed, demonstrates we did the study, identified need and constructed the crossing, then need to do more work - just crossing itself because wildlife still crossing roads instead of bridge so fencing directed and much improved performance; many types - wetland banking, fish passages - all need to realize need to tweak it and make successful. Willing to try new stuff, tweak and work right more in support than research report that tells how to do even though never tried in the field.

Question 21. If you were invited to a face-to-face meeting to continue this dialogue with other DOTs and transportation and natural resource professionals, would you be interested in attending?

Fourteen of 21 interviewees (67%) indicated that they would be interested in attending a face-to-face meeting to continue this dialogue, however, 38% of them signaled the obstacle of funding and/or travel restrictions (Figure 11). Six of 21 (29%) indicated that other staff with more applicable expertise and knowledge would be more appropriate to attend. Raw responses are included in Appendix 7.1 Raw interview responses.

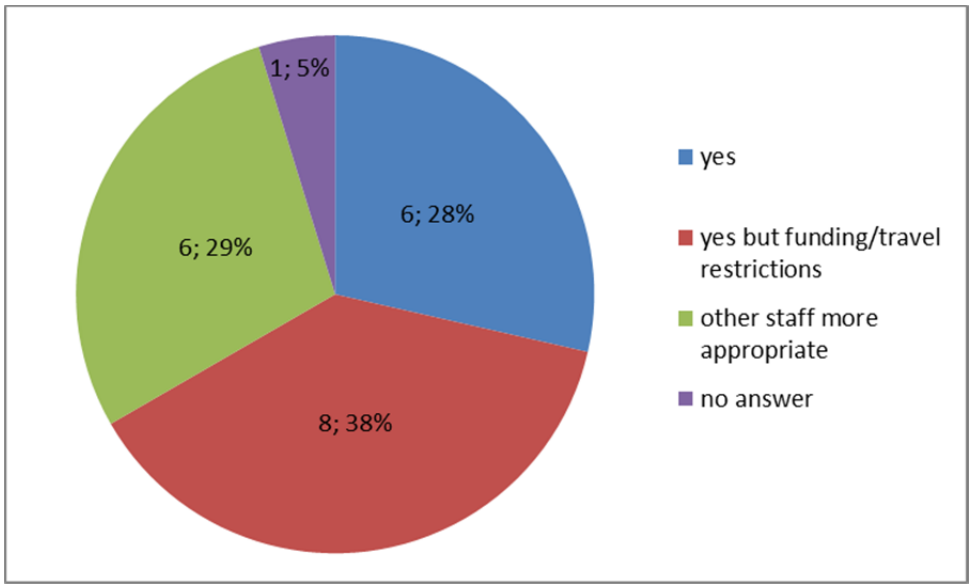

Figure 11. Relative response on interviewee interest in attending face-to-face meeting to continue dialogue on this topic.

Question 22. Is it likely that your agency would provide financial support to do so?

Nine out of 21 interviewees (43%) indicated a negative response to this question meaning that it would be unlikely that their agency would provide financial support to attend a face-to-face meeting compared to five out of 21 (24%) who indicated a positive response (Figure 12). The remainder (33%) indicated approval would depend on available funding and the potential benefits of attending. Raw responses are included in Appendix 7.1 Raw interview responses.

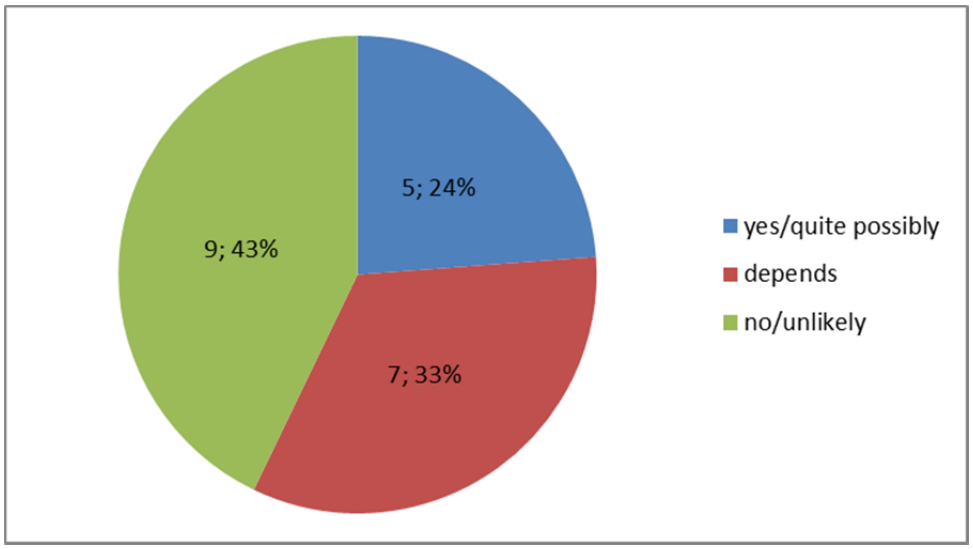

Figure 12. Relative response concerning whether an agency would provide financial support to attend a face-to-face meeting.

Question 23. We're planning a broader survey of DOTs on this topic. Who or what job titles do you think we should invite?

Interviewees suggested inviting a wide variety of disciplines, with environmental-related experts ranking as the most popular response (Figure 13). In terms of organizational structure, there were suggestions for inviting staff, and district, bureau and division chiefs/managers but most suggested focusing on middle and upper management. Three interviewees also suggested inviting representatives of state divisions of wildlife/departments of environmental protection.

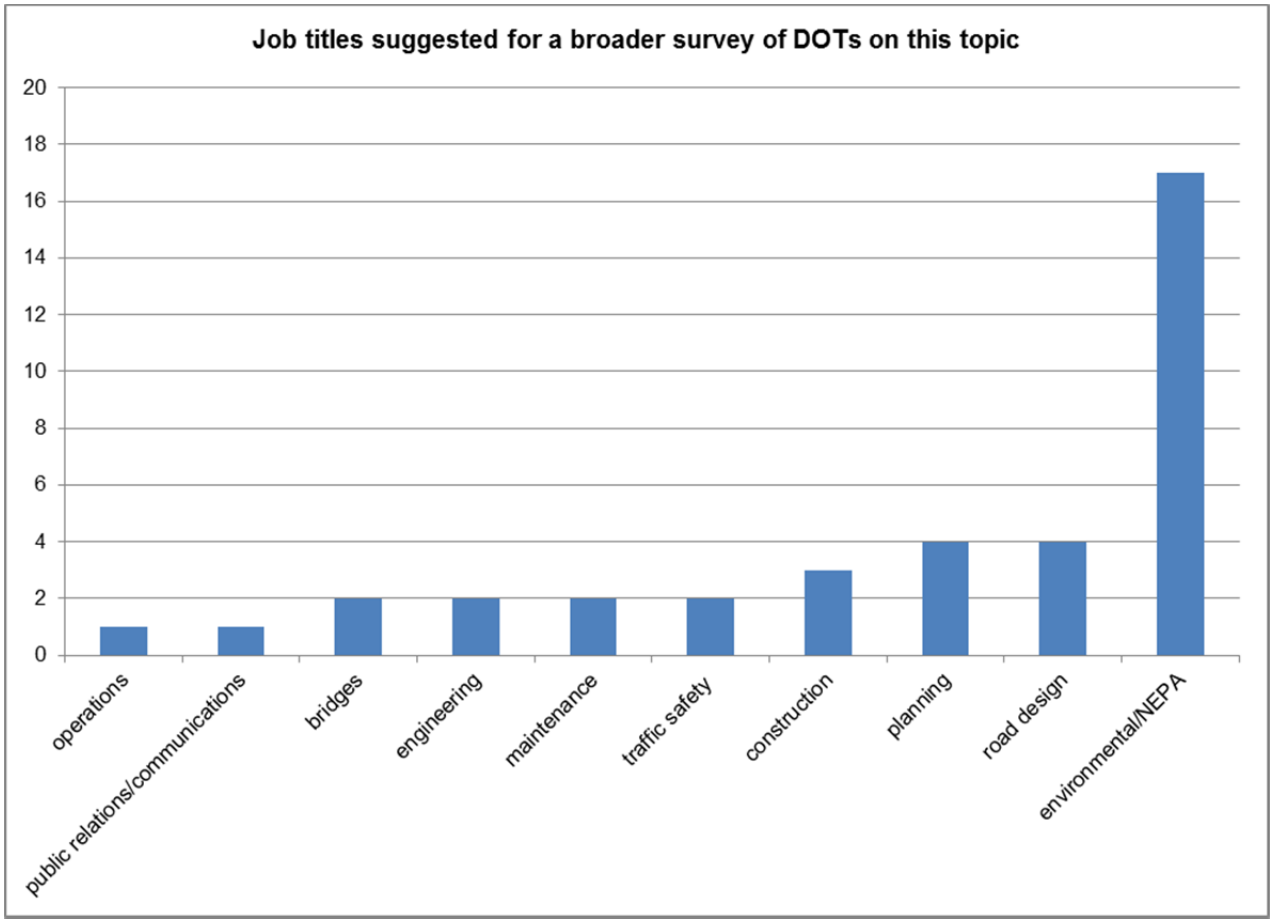

Figure 13. Number of interviewees who suggested job titles to survey. (NEPA stands for the National Environmental Policy Act.)

2.3. Discussion

It is an inherently difficult task to relay open-ended responses without subjective interpretation while attempting to consolidate the responses into meaningful pieces of information. The method used herein represents one way to approach this challenge.

Every attempt was made to transcribe the open-ended responses of interviewees verbatim. Inevitably, however, some words were dropped or abbreviated in favor of capturing the essence of interviewees' intent. The raw response transcriptions in the body and the Appendix, therefore, cannot be considered 100% representations of the spoken words. However, they can be considered very close approximations of actual spoken words. For readability, most words that were abbreviated or omitted in the transcription process were spelled out or re-added during the reporting phase. As a result, subtle differences in delivery may have occurred. Any deviation from the original intent of the interviewee should be considered unintentional and minor.

Responses to some questions were consolidated, analyzed and presented graphically while others were presented in raw tabular format. The complexity of, and range of responses to, question-answer pairs dictated the method used. Raw responses not found in Section 2.2.2 may be found in Appendix 7.1 Raw interview responses.

3. BROAD WEB-BASED SURVEY

3.1. Methods

3.1.1. Survey invitation

Unlike the phone interviewee selection process which targeted a narrow set of individuals within particular agencies (2.1.1 Interviewee selection), the survey invitation was sent to a wide range of job titles in all 50 state DOTs. The specific job title list was generated largely with the input of interviewees (2.2.2. Question responses; Question 24). In order to create a personalized contact list reflecting the specified job titles for each DOT, a request for assistance was sent to AASHTO. They were unable to provide a contact list, however, and suggested contacting each state DOT directly. In July 2012, the following request was emailed to a central administrative representative at each DOT:

> "Greetings,
>
> I am writing in the hopes that you'll be able to help us. We're preparing to send out a voluntary survey for DOT personnel nationwide and would like to generate an email contact list of appropriate survey invitees in __DOT.
>
> We are interested in obtaining a comprehensive list of email addresses for transportation professionals in the following roles:
>
> Road designers
> Road planners
> Bridge/structural engineers
> Road operations experts
> Road safety engineers
> Environmental scientists
> NEPA experts
> Environmental permitting experts
> Road construction experts
>
> We're interested in staff, management, division administrators and directors for all of the areas of expertise above.
>
> Thank you very much for your time and assistance. Please let me know if you'd like to me clarify anything in my request.
>
> Kind regards,
> Angela Kociolek
> Research Scientist, Western Transportation Institute & ARC Solutions Technology Transfer Initiative Leader"

Responses to the above request for assistance varied widely. Some agencies have a policy of not sharing employee email addresses. Some agencies provided a comprehensive contact list of every staff person in each job title while other agencies used their discretion in providing contacts for only select key employees. Some other agencies did not reply to the request for assistance at all. Therefore, depending on the agency in question, the survey invitation contact list was generated in the following ways:

1. A DOT representative provided email addresses for specific individuals in the range of specified job titles;
2. In lieu of sharing employee email addresses, a DOT representative agreed to receive the survey invitation at his/her email address and distribute to appropriate personnel;
3. Individual email addresses were found on the DOT website with little or no direct assistance from an agency representative.

All email addresses (i.e., for those employees in job titles deemed appropriate for surveying and for those agency representatives who agreed to distribute the survey within their agencies) were loaded into the web-based survey tool (www.surveymonkey.com). While it is not possible to know the exact number of recipients, approximately 1,621 state DOT employees received the survey invitation directly plus an unknown number received it via distribution from their agency representative. The survey invitation was first emailed on September 18, 2012. The language of the emailed survey invitation follows:

> "Greetings,
>
> We are requesting your participation in this AASHTO-endorsed survey being sent to state transportation professionals nationwide.
>
> Your participation will help us obtain a better understanding of the criteria for and/or obstacles preventing the systemic implementation of wildlife crossing infrastructure across the US road network.
>
> Recently signed into law, MAP-21 grants state, federal, and tribal agencies the authority to reduce wildlife-vehicle collisions and improve habitat connectivity – making this a timely and important topic nationally.
>
> A focus group comprised of DOT employees indicated that input from your area of focus would be useful. We obtained your email address either directly from a representative in your agency or your agency's public website.
>
> Your participation in this survey is voluntary and your responses will be anonymous.
>
> The survey will remain open through October 3, 2012.
>
> Please consider forwarding this invitation to others within your DOT (both at Central Headquarters and within Districts) who you think might be able to provide input on this topic (see also "Audience" below).
>
> You may read more about background information, purpose, audience, and important details of the survey below.
>
> Thank you for your consideration. Your participation is greatly appreciated!
>
> Sincerely,
>
> Angela Kociolek
> Research Scientist, Western Transportation Institute & ARC Solutions Technology Transfer Initiative Leader

If you received this message directly from angela.kociolek@coe.montana.edu, please use this link. http://www.surveymonkey.com/s.aspx?sm=U3NDc2QW_2fOrECAhxMTTGEA_3d_3d
If you do not wish to receive further emails from us, please use this link and you will be automatically removed from our mailing list.
http://www.surveymonkey.com/optout.aspx?sm=U3NDc2QW_2fOrECAhxMTTGEA_3d_3d

If you received this message from a colleague, please use this URL:
http://www.surveymonkey.com/s/Forwardtocolleagues

Background
In 2010, the Western Transportation Institute at Montana State University, as part of a public-private partnership named ARC, held an international competition to design the next generation of wildlife overpass. In order to move beyond idea generation, the partnership now known as ARC Solutions seeks to understand how Department of Transportation (DOT) personnel evaluate on-the-ground implementation of new technologies.

Purpose
The emphasis of this survey is on culture and the questions are aimed at better understanding agency values, beliefs, frames, attitudes, norms and behaviors. The survey also provides a means to document DOT practices and trends related to the implementation of wildlife crossing infrastructure.

Audience
We seek and value feedback from a wide spectrum of expertise within DOTs, including bridge and structural engineering, environmental, operations, planning, road design, construction, maintenance and safety personnel, at staff and managerial levels.

Details
The survey consists of 38 questions, and it will require approximately 25 minutes to complete.

The survey may be completed in multiple sessions – just be sure to click “next” to save answers before exiting.

The following items may require some research prior to beginning the survey:

Number of crossing structures (0, 1-10, 11-50, >50) designed and built specifically for terrestrial wildlife in your state (count overpasses and underpasses but do not count retrofits or drainage structures opportunistically used by wildlife).
- As of 10 years ago
- As of 2012

Number of retrofits (0, 1-10, 11-50, >50) done specifically to benefit terrestrial wildlife in your state.
- As of 10 years ago
- As of 2012

Whether structures have associated elements to prevent animals from crossing at-grade (i.e., fencing).

Whether agency provides escape routes (i.e., jump outs) if animals do enter fenced roadway.

Whether agency maintains structures to ensure they are passable by terrestrial wildlife.

Whether agency monitors terrestrial animal use of crossing structures.

Whether agency shares/publishes monitoring results."

In order to reach the goal of participation by all 50 state DOTs, several reminder emails were sent until at least one employee from all 50 state DOTs participated. The survey was closed on November 13, 2012.

3.1.2. Survey language

The survey language may be viewed in its entirety in Appendix 7.3.

3.2. Survey results

Question1. Please select your state.

Six hundred and fifty nine (659) respondents answered this question. All fifty state DOTs were represented. At least one (.2%) and as many as 177 respondents (26.9%) participated from each state (Figure 14). More than half of the respondents (55%) represented three states: Texas, Washington and Pennsylvania (Table 7).

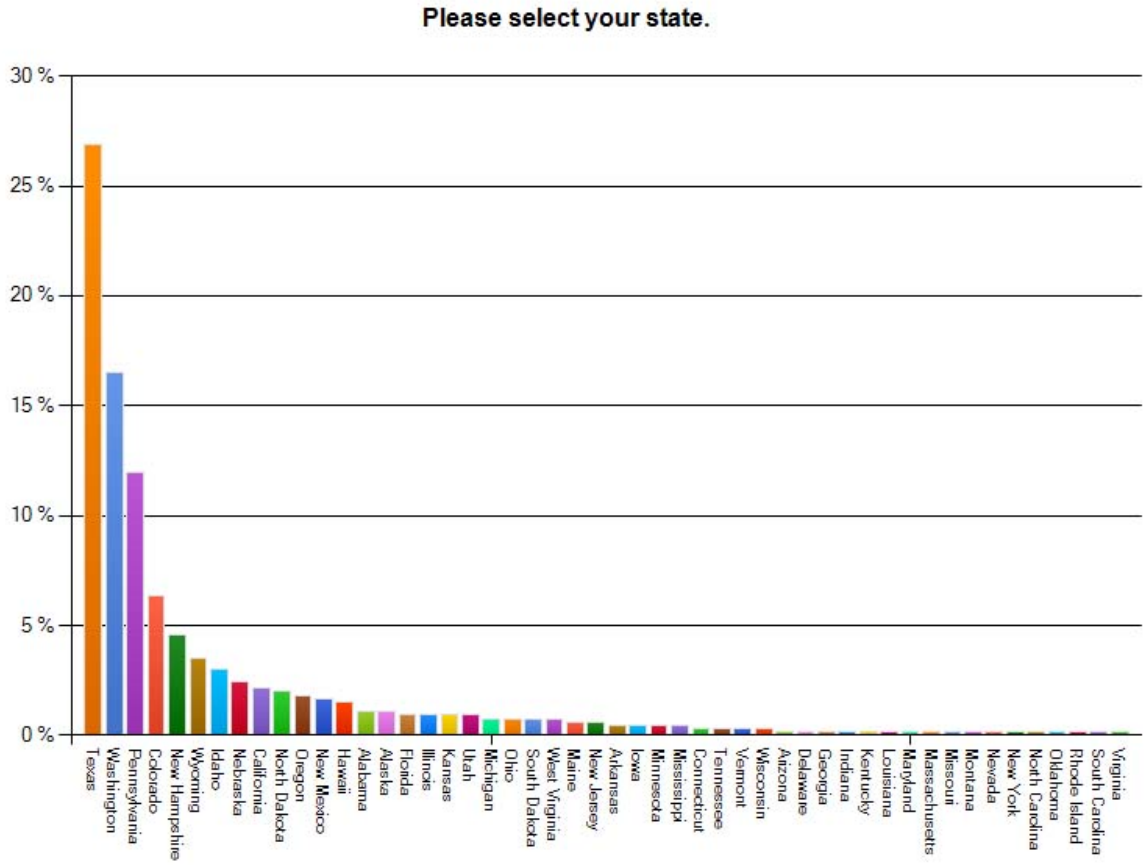

Figure 14. Relative percent of respondents per state.

Table 7. Percent and number of respondents per state.

State	Percent	Count
Alabama	1.1%	7
Alaska	1.1%	7
Arizona	0.2%	1
Arkansas	0.5%	3
California	2.1%	14
Colorado	6.4%	42
Connecticut	0.3%	2
Delaware	0.2%	1
Florida	0.9%	6
Georgia	0.2%	1
Hawaii	1.5%	10
Idaho	3.0%	20
Illinois	0.9%	6
Indiana	0.2%	1
Iowa	0.5%	3
Kansas	0.9%	6
Kentucky	0.2%	1
Louisiana	0.2%	1
Maine	0.6%	4
Maryland	0.2%	1
Massachusetts	0.2%	1
Michigan	0.8%	5
Minnesota	0.5%	3
Mississippi	0.5%	3
Missouri	0.2%	1
Montana	0.2%	1
Nebraska	2.4%	16
Nevada	0.2%	1
New Hampshire	4.6%	30
New Jersey	0.6%	4
New Mexico	1.7%	11
New York	0.2%	1
North Carolina	0.2%	1
North Dakota	2.0%	13
Ohio	0.8%	5
Oklahoma	0.2%	1
Oregon	1.8%	12
Pennsylvania	12.0%	79
Rhode Island	0.2%	1
South Carolina	0.2%	1
South Dakota	0.8%	5
Tennessee	0.3%	2
Texas	26.9%	177
Utah	0.9%	6
Vermont	0.3%	2
Virginia	0.2%	1
Washington	16.5%	109
West Virginia	0.8%	5
Wisconsin	0.3%	2
Wyoming	3.5%	23
		659

Question 2. Please select the option that most closely describes your main area of focus in your DOT.

Almost half of the respondents (324; 49.2%) identified "promoting human mobility" as their main area of focus. An additional 255 respondents (38.7%) indicated they are "equally focused on promoting human mobility and protecting natural resources/wildlife" (Figure 15).

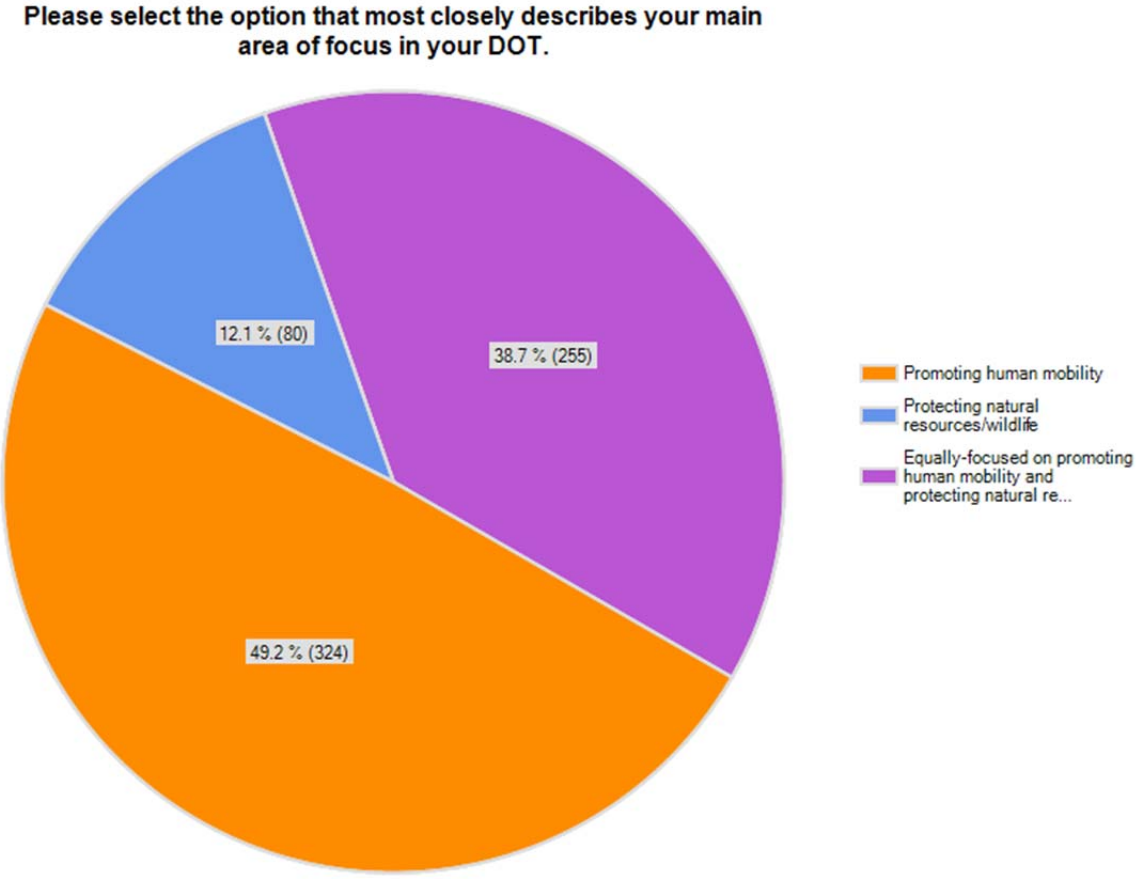

Figure 15. Relative area of focus of respondents.

Question 3. In general, which of the following do you deal with most?

Six hundred and fifty nine (659) respondents answered this question. The majority of respondents (62.4%) indicated they deal with "project delivery" compared to 17.8% who deal mostly with "policies and standards" (Figure 16). "Other" responses are listed in Appendix 7.2 Raw survey responses.

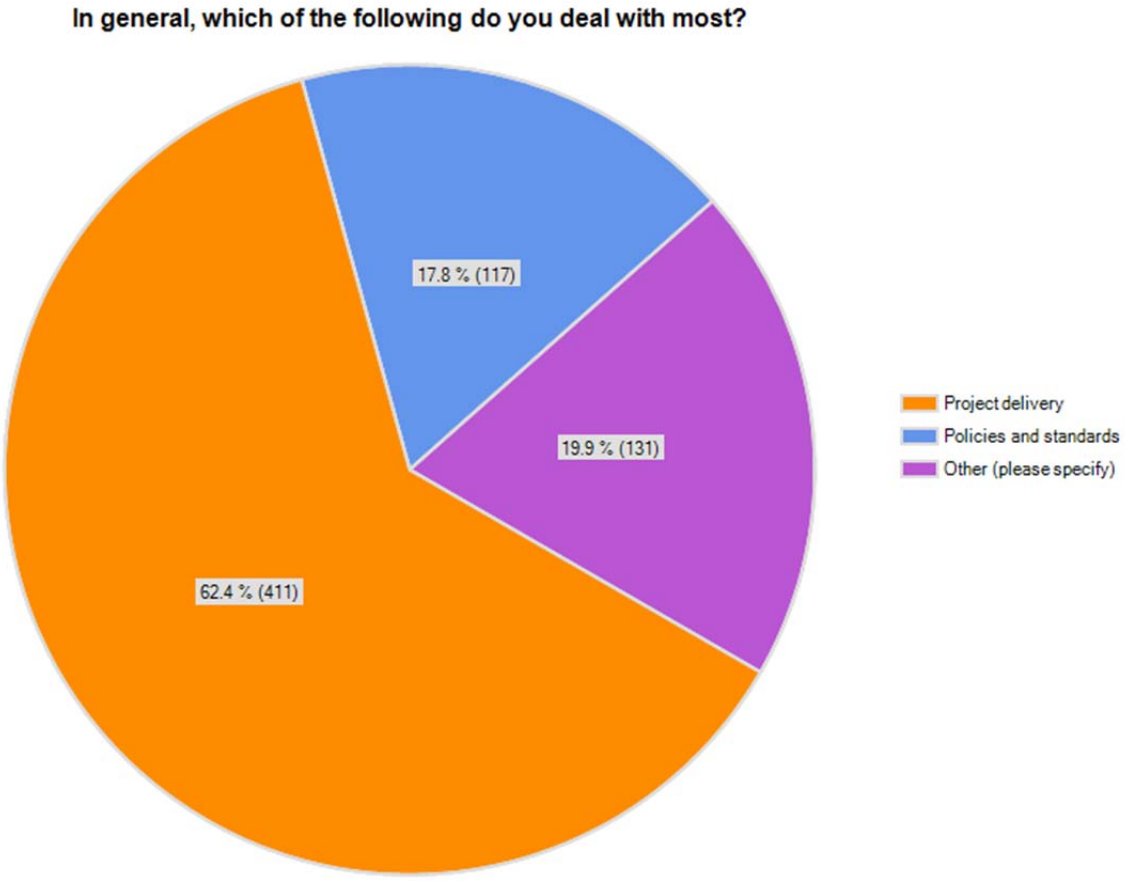

Figure 16. Relative topics/dealings of respondents.

Question 4. Do you supervise/manage the work of other staff?

Six hundred and fifty nine (659) respondents answered this question. The majority (64.5%) answered "yes."

Question 5. If yes, are you in upper, middle or lower management?

Four hundred and twenty six (426) respondents answered this question. Most respondents indicated they are either in middle or lower management; 42.5% and 46.7%, respectively (Figure 17).

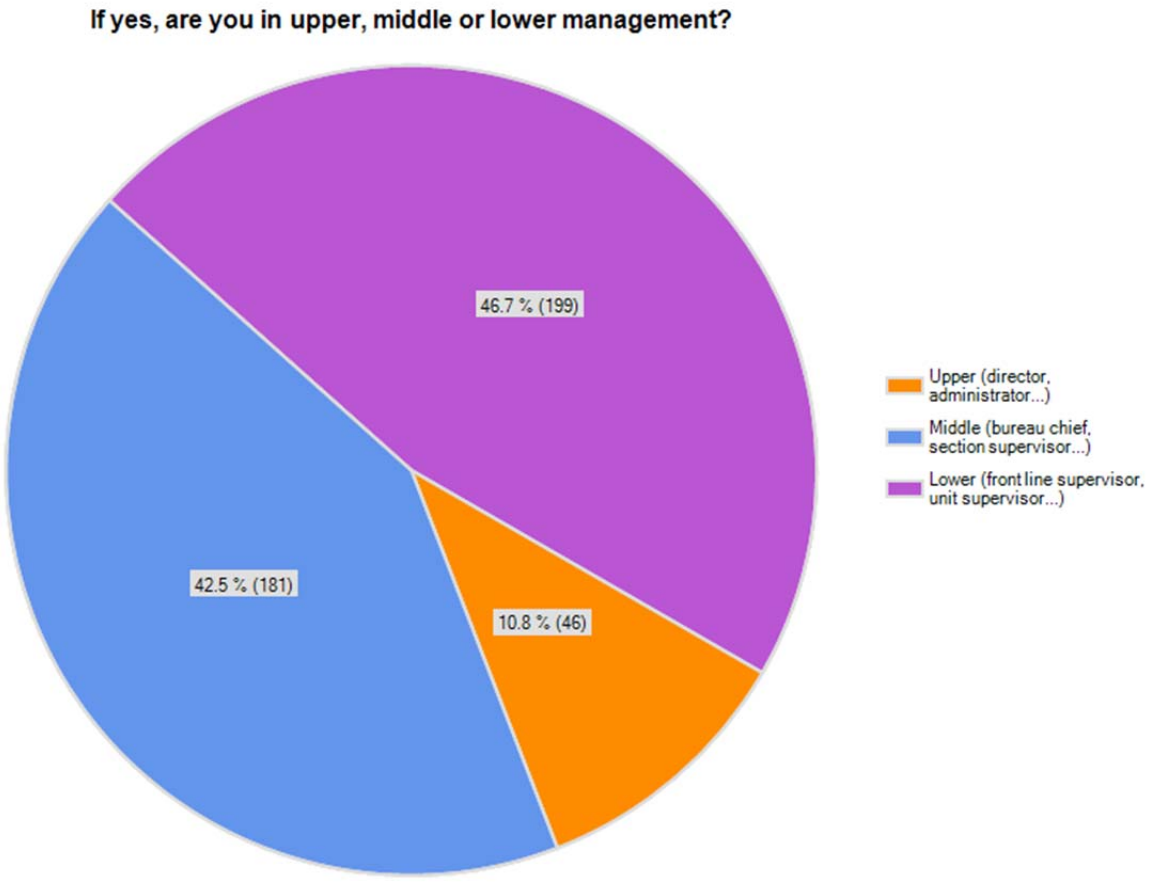

Figure 17. Relative supervisory duty/management level of respondents.

Question 6. Which best describes the main force that motivated you toward your current career?

Five hundred and eighty nine (589) respondents answered this question. The most popular response (30.9%) was "specific interest in particular subject(s) in school (Figure 18).

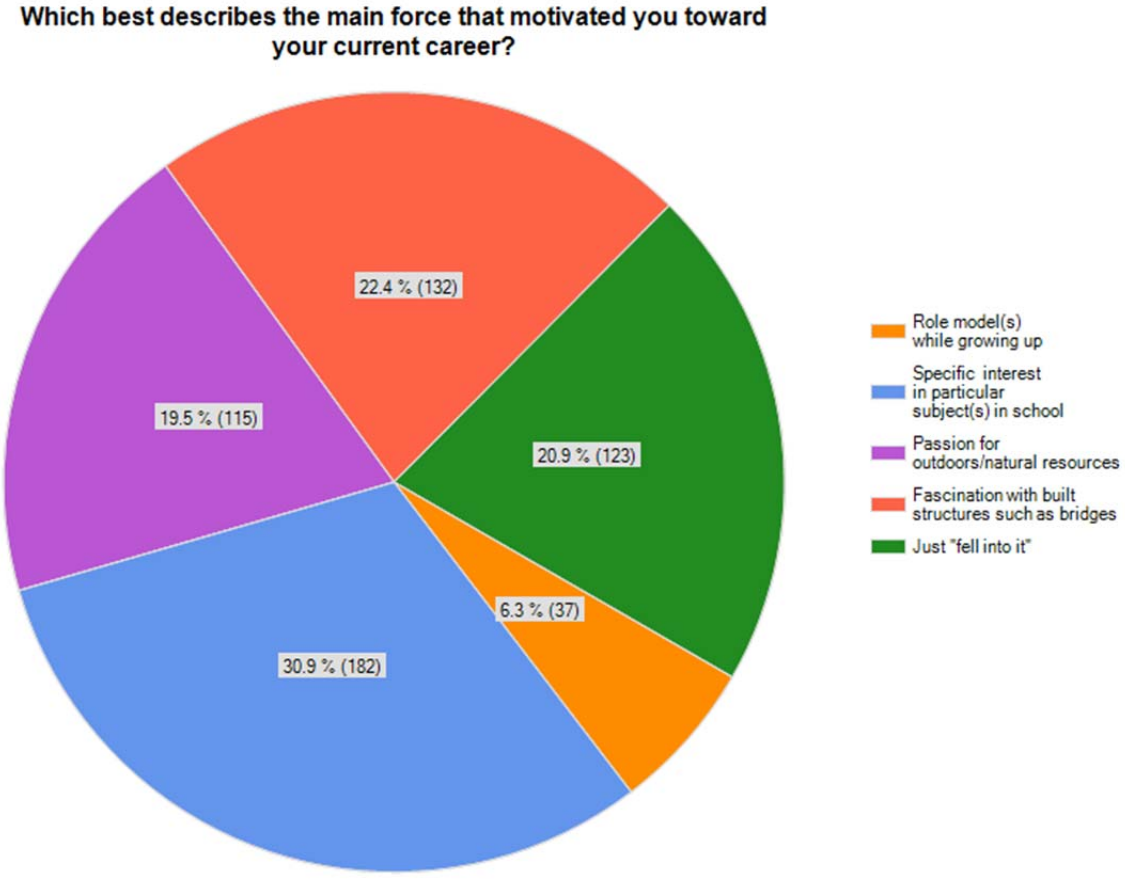

Figure 18. Relative motivation for career choice.

Question 7. Why do you continue to do this work? (Choose your top three reasons.)
Five hundred and eighty nine (589) respondents answered this question. The two most popular answers, "Already have an established career" and "pride/job satisfaction in serving people/tax payers of my state" garnered 48.7% and 45.6% of the vote, respectively (Figure 19). The complete language for choices and "other" responses may be found in Appendix 7.2 Raw survey responses.

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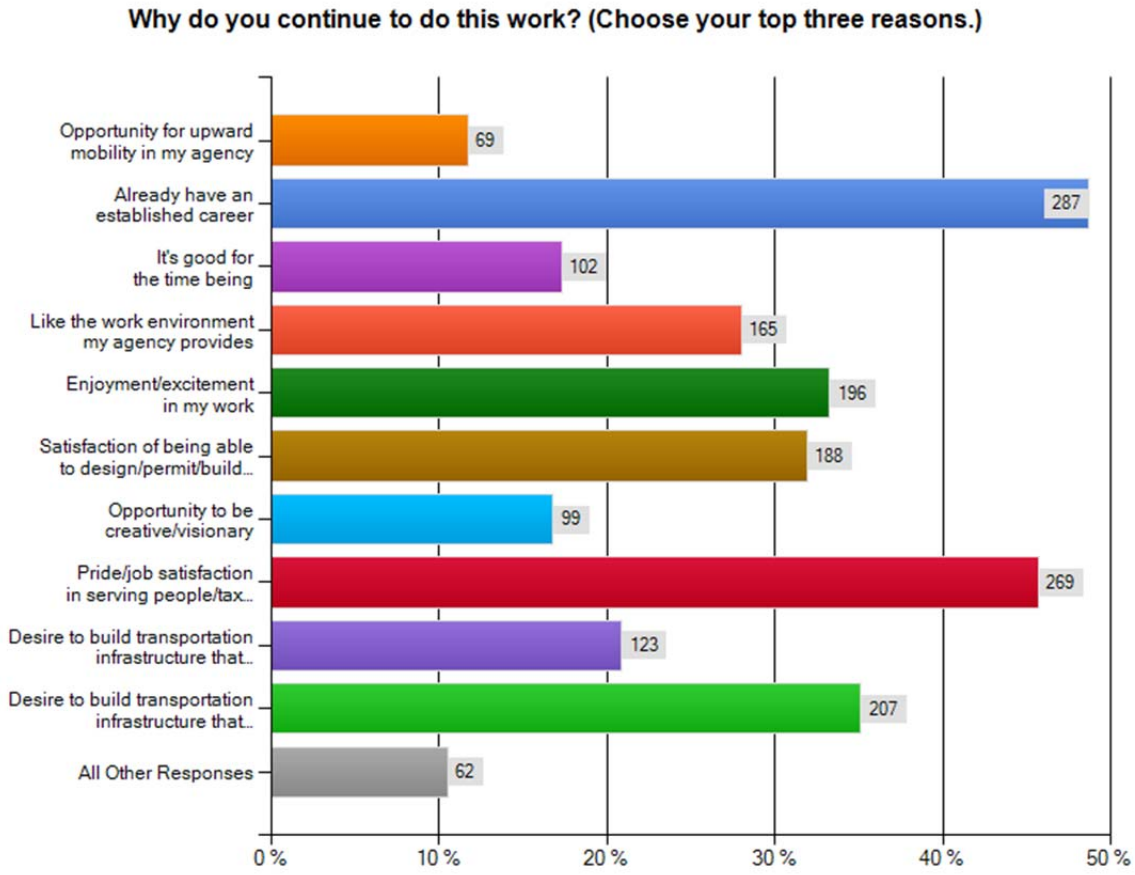

Figure 19. Relative reasons that respondents continue their chosen work.

Question 8. Please select your level of agreement with the following statements.
Five hundred and eighty nine (589) respondents answered this question. The majority of respondents agreed or strongly agreed with each of three statements about agency culture; 69.9%, 75.5% and 67.2%, respectively (Figure 20). The complete language for the second and third statements was "My agency is committed to minimizing impacts to wildlife and the environment." and "My agency welcomes new ideas, new collaborations and/or ways of doing things."

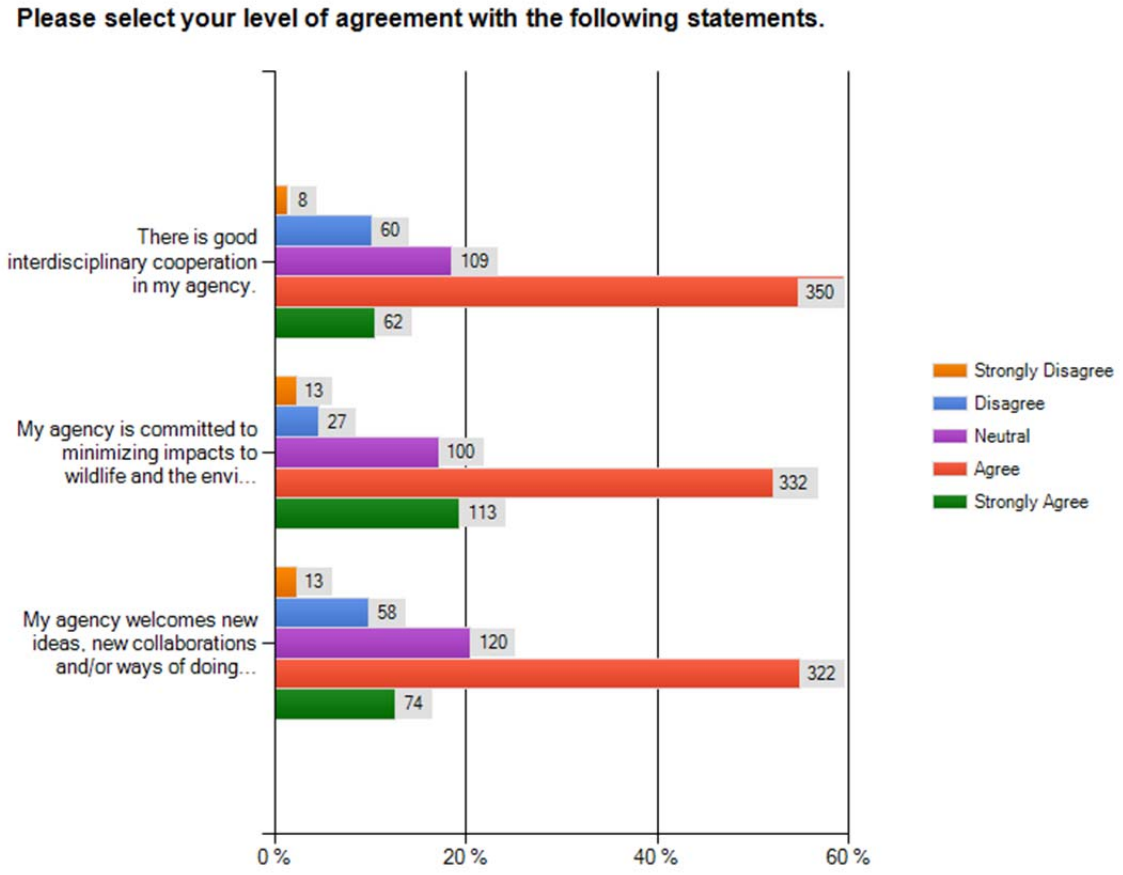

Figure 20. Relative level of agreement with a series of statements describing agency culture.

Question 9. Would you say that most tax payers in your state believe that minimizing wildlife-vehicle collisions should be a priority?

Five hundred and eighty nine (589) respondents answered this question. More than half of respondents (53.7%) selected the choice "Only those who live/work/travel in rural areas with a higher risk of hitting larger animals believe that." The remainder was split between "Yes, most believe that" (24.6%) and "No, most do not believe that" (21.7%; Figure 21).

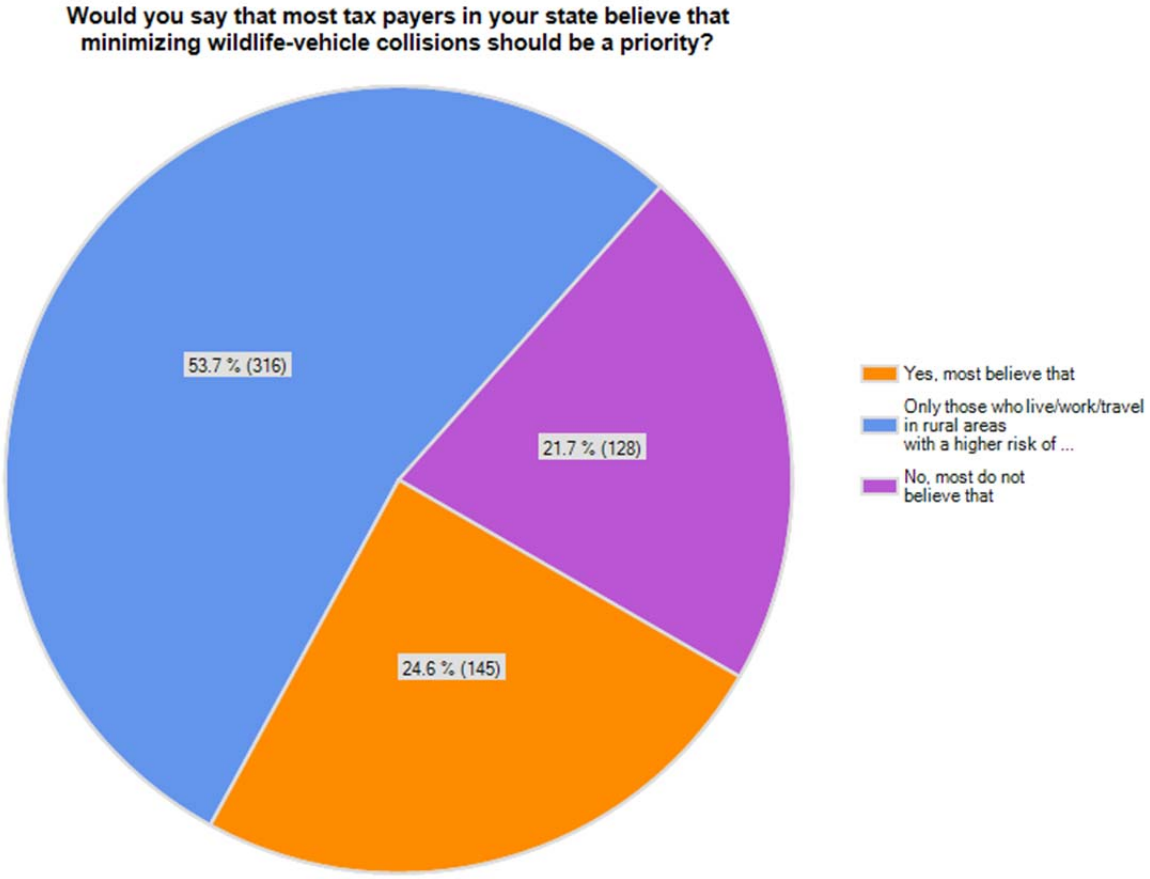

Figure 21. Relative perception of state tax payer beliefs about whether minimizing wildlife-vehicle collisions should be a priority.

Question 10. Is minimizing wildlife-vehicle collisions a priority for your agency? (Choose best fit.)

Five hundred and eighty nine (589) respondents answered this question. The majority (67.7%) selected the option "It's a priority only under certain circumstances." Approximately thirteen percent (13.1%) selected the option "Yes, it's one of our top priorities across the state" while 18.5% selected "No, it's not a priority at all because we have more important things to focus on." Four respondents (.7%) selected the "Not applicable because our state does not have any wildlife large enough to cause a collision" (Figure 22).

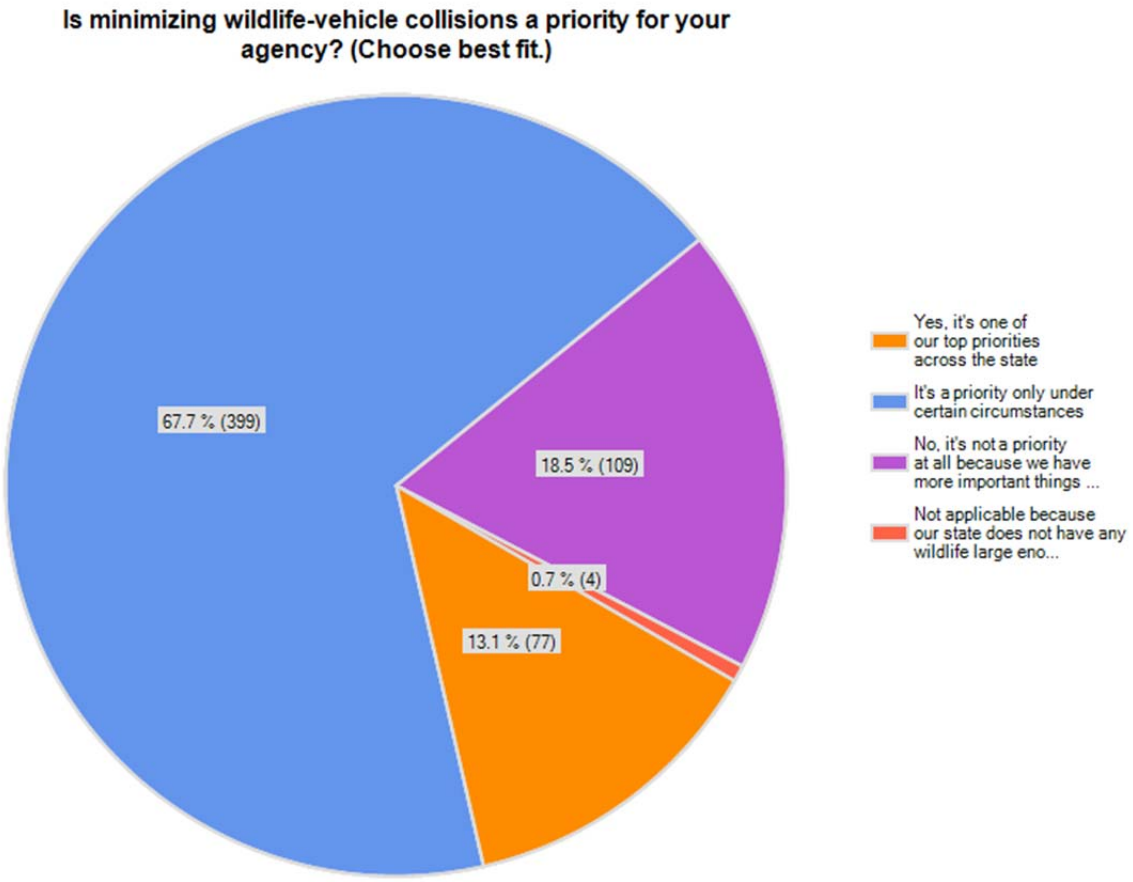

Figure 22. Relative perception of whether the minimizing of wildlife-vehicle collisions is a priority for the respondent's agency.

Question. 11. Would you say that most tax payers in your state believe it is important to ensure that terrestrial wildlife can move across the landscape and across roadways?
Five hundred and eighty nine (589) respondents answered this question. The majority of respondents (71.6%) selected the option "Most have probably never even considered it, only those who are aware of wildlife believe that." The remainder were split between "Yes, most believe that" (24.6%) and "No, most do not believe that" (21.7%; Figure 23).

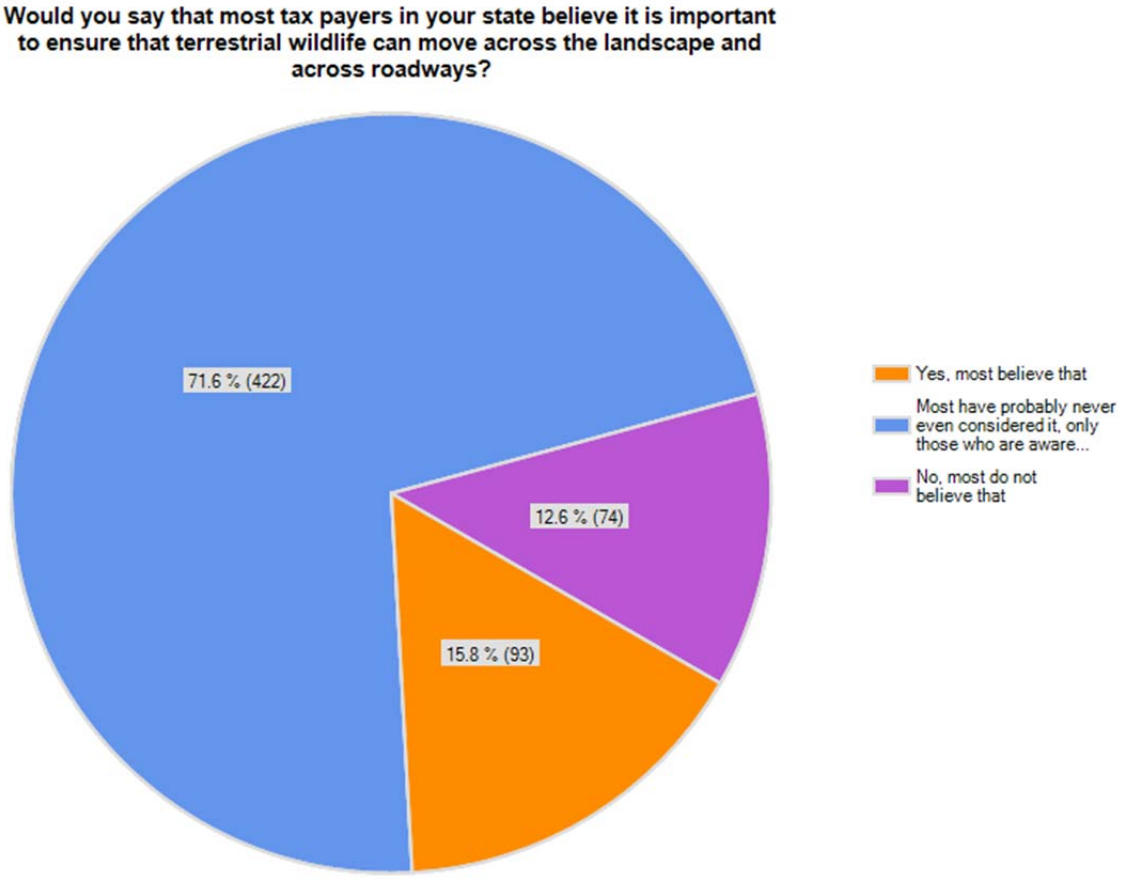

Figure 23. Relative perception of tax payer beliefs about the importance of ensuring terrestrial wildlife can move across the landscape and across roadways.

Question 12. Is ensuring that terrestrial wildlife can move across the landscape and across roadways important to your agency? (Choose best fit.)

Five hundred and eighty nine (589) respondents answered this question. Slightly more than half of respondents (52.3%) selected the option "It's becoming more of a focus with increased awareness but it's not a standard practice yet." The second most common selection was "Yes, it's important, it's a standard part of our environmental review process and addressed, if needed" (27.2%). The remainder was split between "No, it's not important" (12.1%) and "We'll ensure it only if some other entity pays for it" (8.5%; Figure 24).

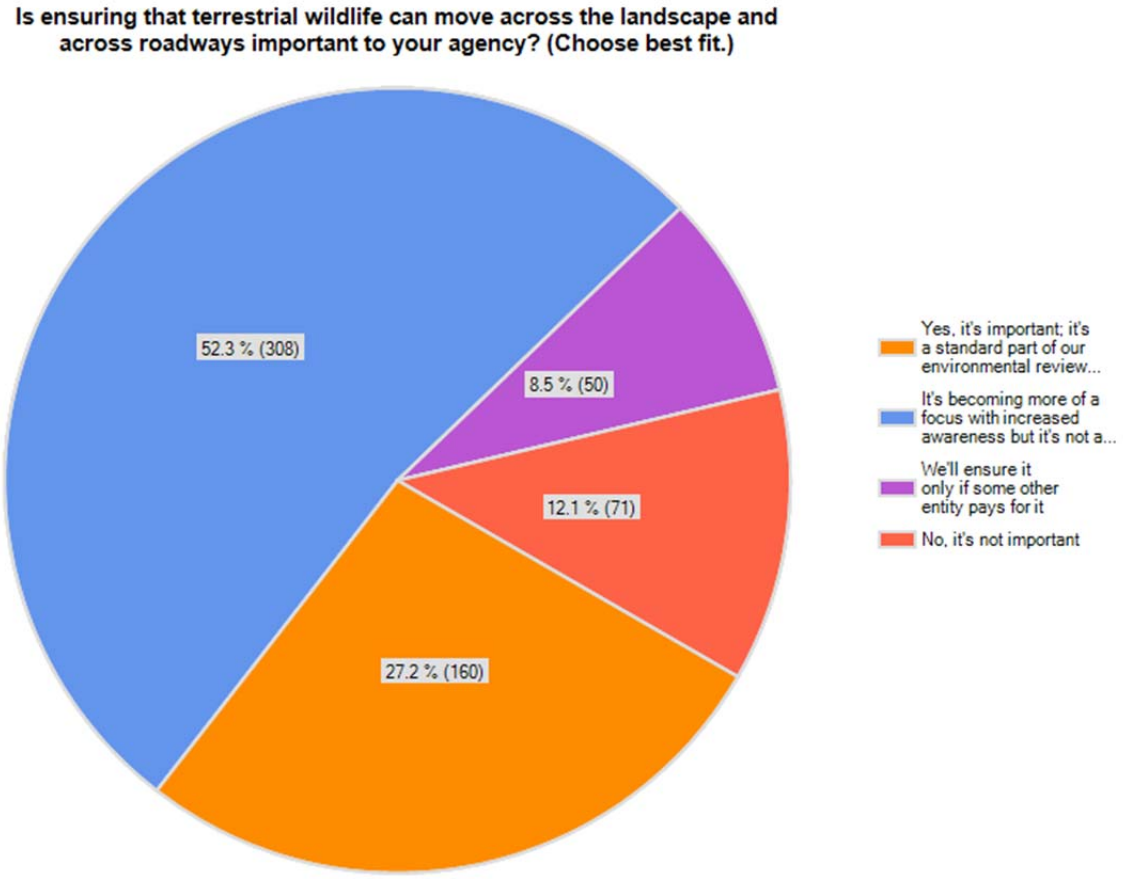

Figure 24. Relative perception of whether the ensuring of terrestrial wildlife movement across the landscape and across roadways is important to the respondent's agency.

Question 13. Does your agency consider building wildlife crossings to improve safety and habitat connectivity for wildlife? (Choose best fit.)

Five hundred and eighty nine (589) respondents answered this question. Approximately eighty four percent of respondents (84.2%) selected a "Yes" response:

- "Yes, in theory, but funding is the limiting factor." (32.3%)
- "Yes, on a case by case basis and only if human safety is the real issue." (23.4%)
- "Yes, definitely, we follow it as a best management practice from policy level down to project delivery" (17.1%)
- "Yes, in theory, but we are very limited by topography, habitat and/or land ownership." (11.4%)

The remaining 15.8% selected "No, up until now we have not." (Figure 25).

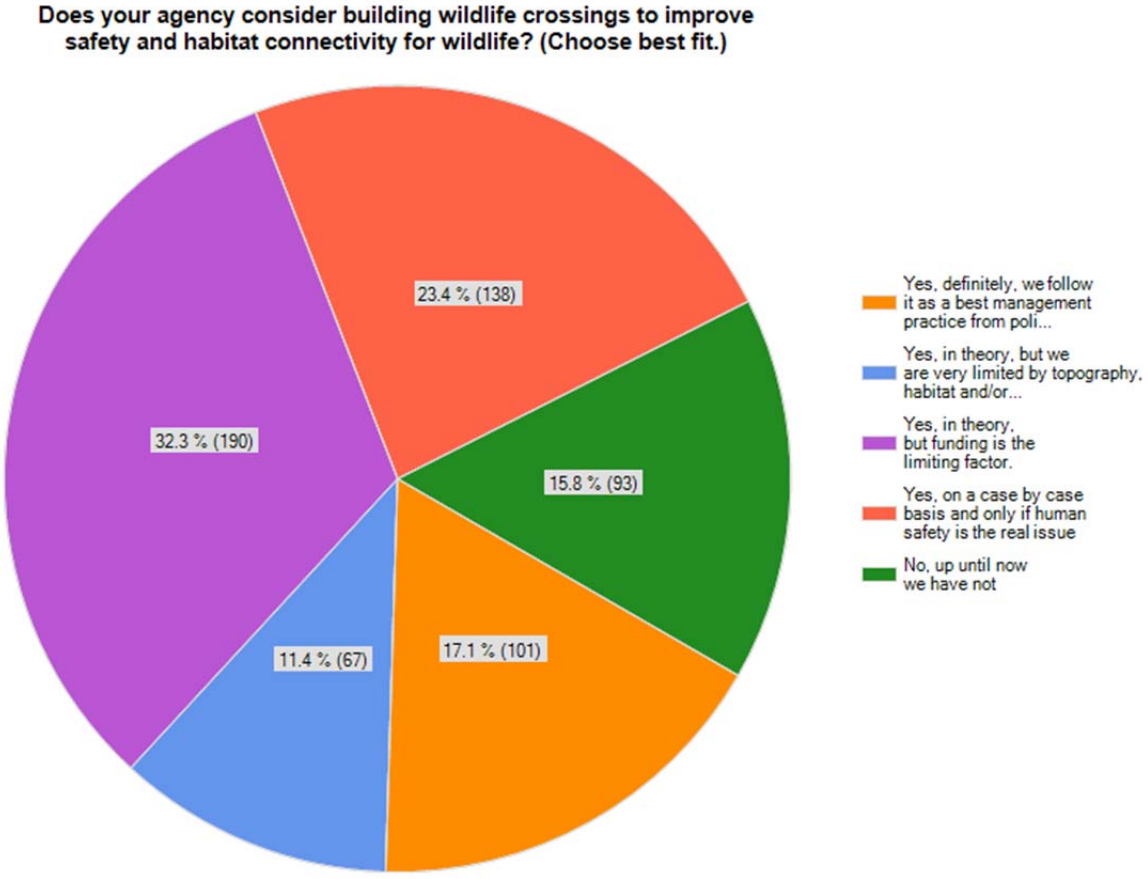

Figure 25. Relative perception of whether and the conditions under which the respondent's agency considers building wildlife crossings to improve safety and habitat connectivity for wildlife.

Question 14. If yes, during what planning stage is the decision made that a crossing will be built? (Choose best fit.)

Four hundred and eighty four (484) respondents answered this question. The most common response was during "Project delivery" (58.9%); either in the "environmental review process" (33.3%) or preliminary design stage (feasibility/concepts/interdisciplinary collaboration; 25.6%). The least common option selected was "Project delivery: final design stage (construction plans/permitting)" (1.7%; Figure 26). The full text of the final two truncated options were:

- "No clear protocol: just depends on whether there is an apparent safety issue"
- "No clear protocol: decision is made whenever there are both a justified need and available funding"

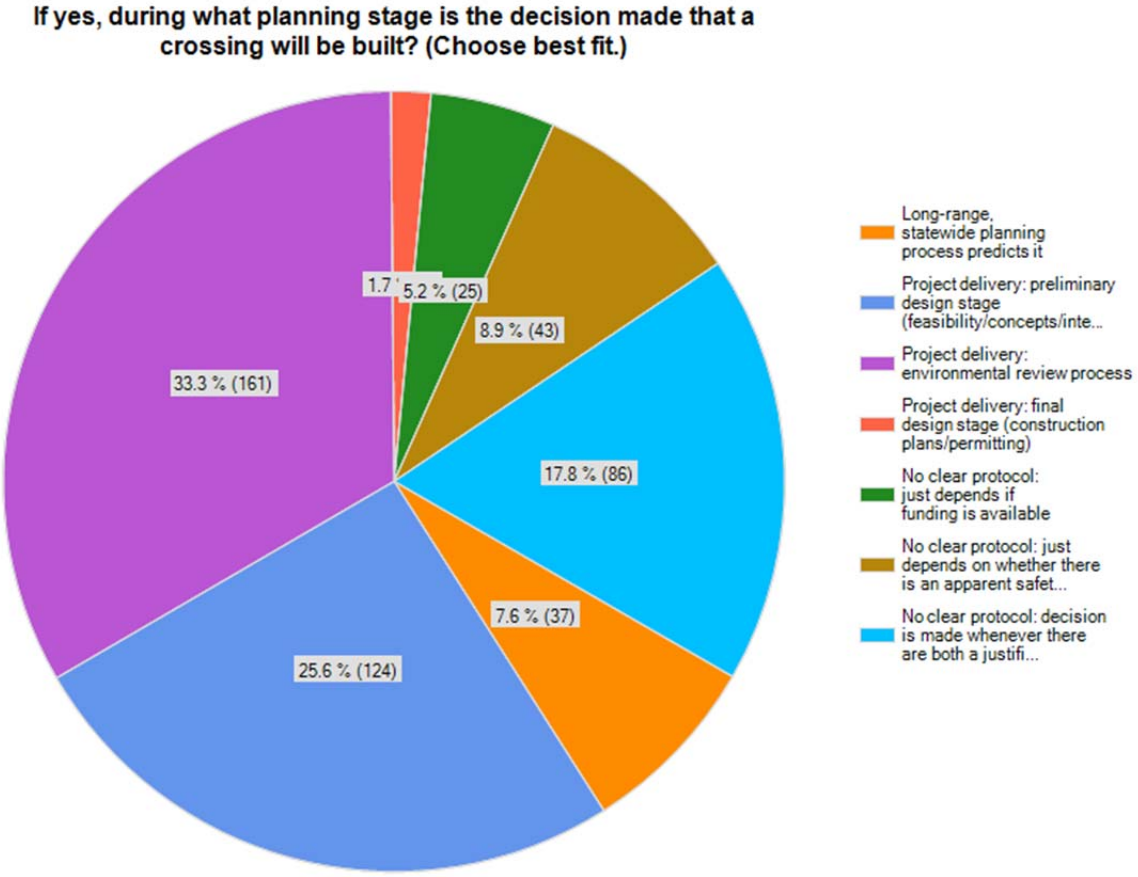

Figure 26. Relative response about the planning stage during which the decision is made that a crossing will be built.

Question 15. Prior to this survey were you familiar with the ARC competition which focused on designing the next generation of wildlife crossing? (For future reference, visit http://arc-solutions.org/what-is-arc/.)

Five hundred and eight (508) respondents answered this question. The majority of respondents (70.3%) selected the "No" option. The remainder were split between "Yes (Saw a presentation, read an article, saw the model exhibition, perused the website, saw the video and/or even tried to participate)" (15.0%) and "I'm not sure, sounds familiar" (14.8%; Figure 27).

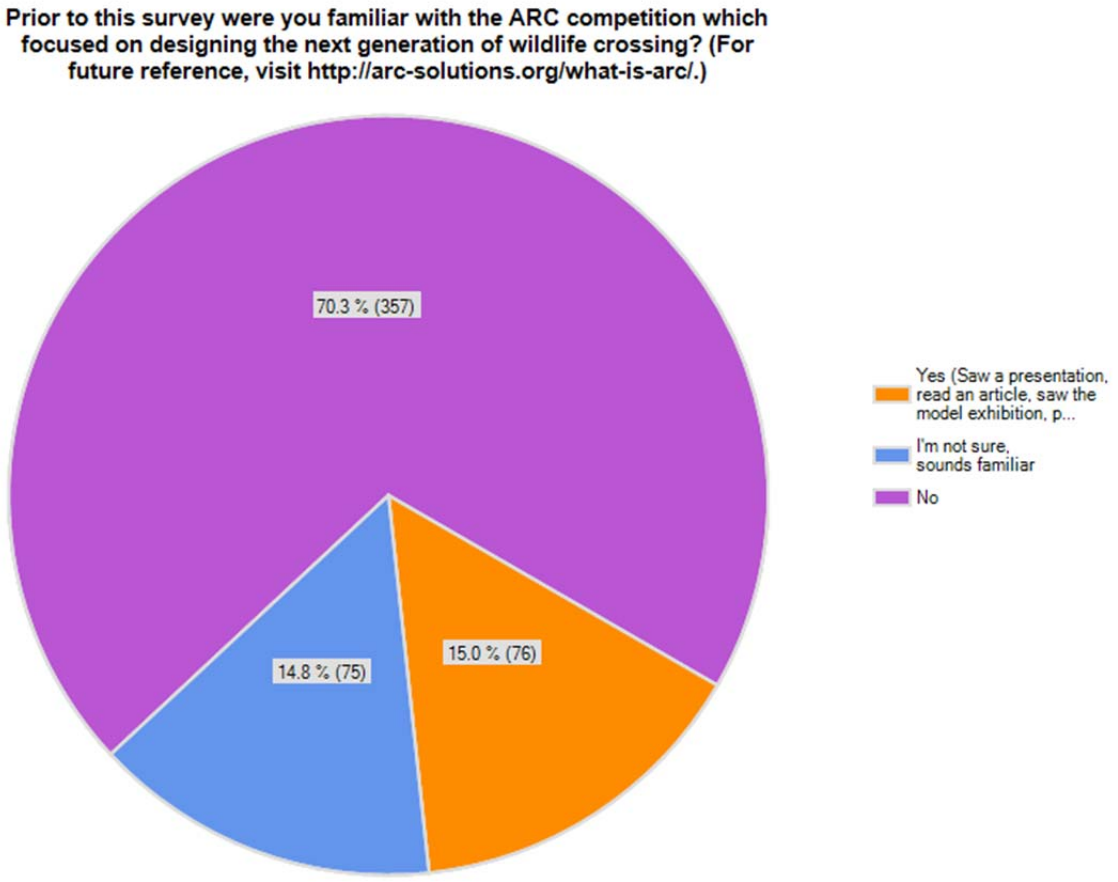

Figure 27. Relative familiarity with the ARC competition.

Question 16. If your agency was presented with a structural design to reduce wildlife vehicle collisions and to allow animals to move safely over a busy highway in its jurisdiction, it would likely want and need various types of information before constructing it. Assume that:
1. There is a scientifically-documented need for mitigation in a particular location based on accident reports, roadkill surveys and wildlife movement data for at least one focal species.

2. Land ownership is such that habitat connectivity on both sides of the highway will be maintained into the future.

3. The topography and substructure are conducive to supporting a built structure.

4. Wildlife fencing would be installed to prevent at-grade crossing and to funnel animals towards the structure.

Drag and drop choices to re-arrange them into your order of importance; 1 being the most important.

Five hundred and eight (508) respondents answered this question (Figure 28). The top five choices selected as the most important information that an agency would want and need before constructing a newly presented structural design were:

- "Cost-effectiveness (probability of use by focal species, probability of successful reduction of wildlife-vehicle collisions, estimated savings because of reduction, etc.)"
- "Cost estimates and funding (life cycle cost, vegetation maintenance, availability of construction materials, funding sources, etc.)"
- "Risk (potential safety hazards [roadside obstacle, earthquake, rain/snow saturation, liability], etc.)"
- "Alternatives and prioritization (societal costs of no action, comparison of alternative ways to solve problem, ranking among other priorities, etc.)"
- "Federal assessment (meets guidelines, policies and standards of AASHTO and FHWA)"

The top five choices selected as the least important types of information were:

- "Partner assessment (interdisciplinary expert approval; peer agency acceptance, etc.)"
- "As-built drawings that have worked in other places"
- "Risk (potential safety hazards [roadside obstacle, earthquake, rain/snow saturation, liability], etc.)"
- "Aesthetics and land owner impacts (visual appearance, potential effects to adjacent property owners, etc.)"
- "Commuter impacts (time and space required for construction, potential delays or detours, etc.)"

The full text of the remaining three choices were:

- "Engineering (design details, dimensions, ratios, calculations and rationale, etc.)"
- "Environmental (materials used, effect on geological, hydrological and biological patterns and processes, etc.)"
- "Internal assessment (in-house expert approval; meets guidelines, policies and/or standards of your agency, etc.)"

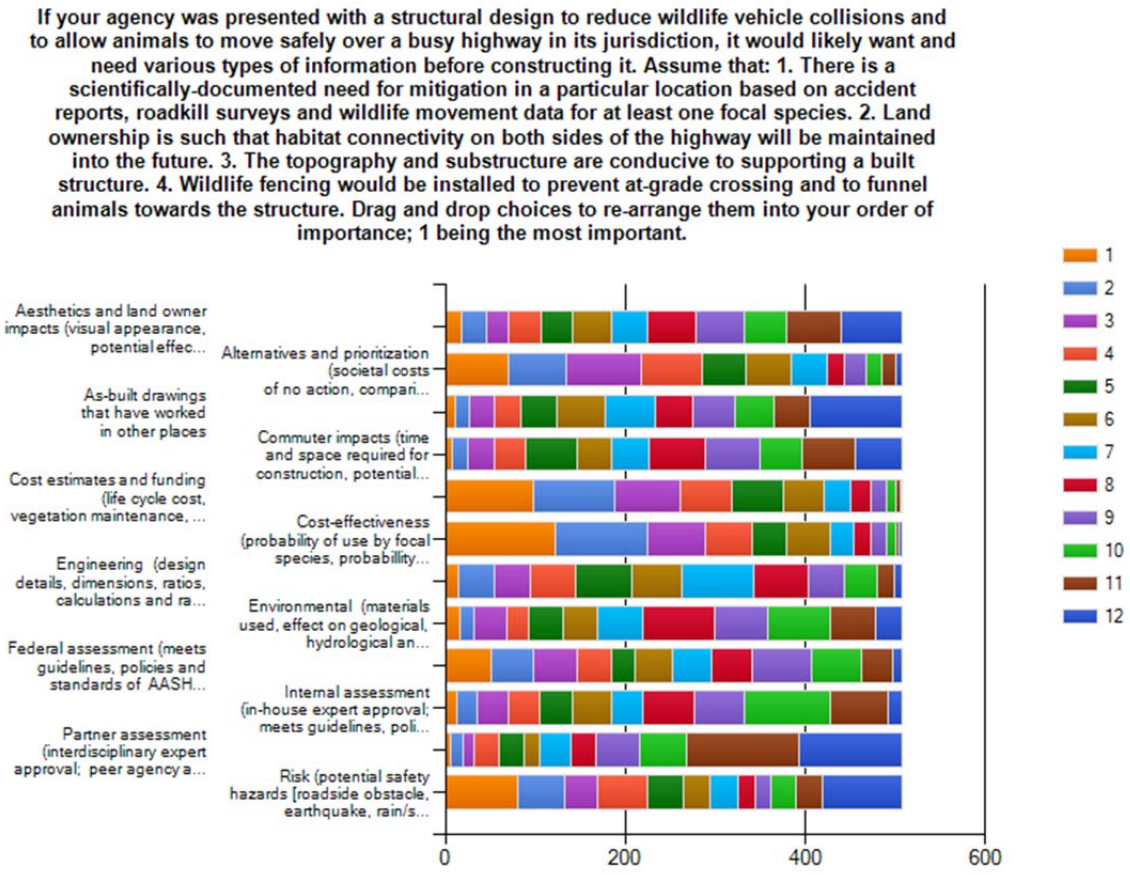

Figure 28. Relative importance of various types of information an agency would want and need before constructing a structural design with which it was presented.

Question 17. Please list any other necessary information not included in the list above.
Forty five respondents (45) offered open-ended comments (Appendix 7.2 Raw survey responses).

Question 18. Please indicate the level of agreement you think most tax payers would have about the following statements.
Four hundred and eighty (480) respondents answered this question for the first ARC-generated statement "Just as we plan for pedestrian safety, it makes sense to also ensure safe passages for wildlife to cross roads." Four seventy four (474) answered for the second statement "We envision a systemic network of wildlife crossings wherever they are needed to make highways safer for people and wildlife and to make habitats more connected for wildlife. The most common response was "Most would generally agree," 46.2% and 43.0% for the first and second statements, respectively. The second most common response was "Most would generally disagree," 28.3% and 27.4% for the first and second statements, respectively. Approximately 18-22% selected the option "Not applicable - most tax payers do not understand the practical or economic implications of providing safe passages for wildlife to have an informed opinion." (Figure 29).

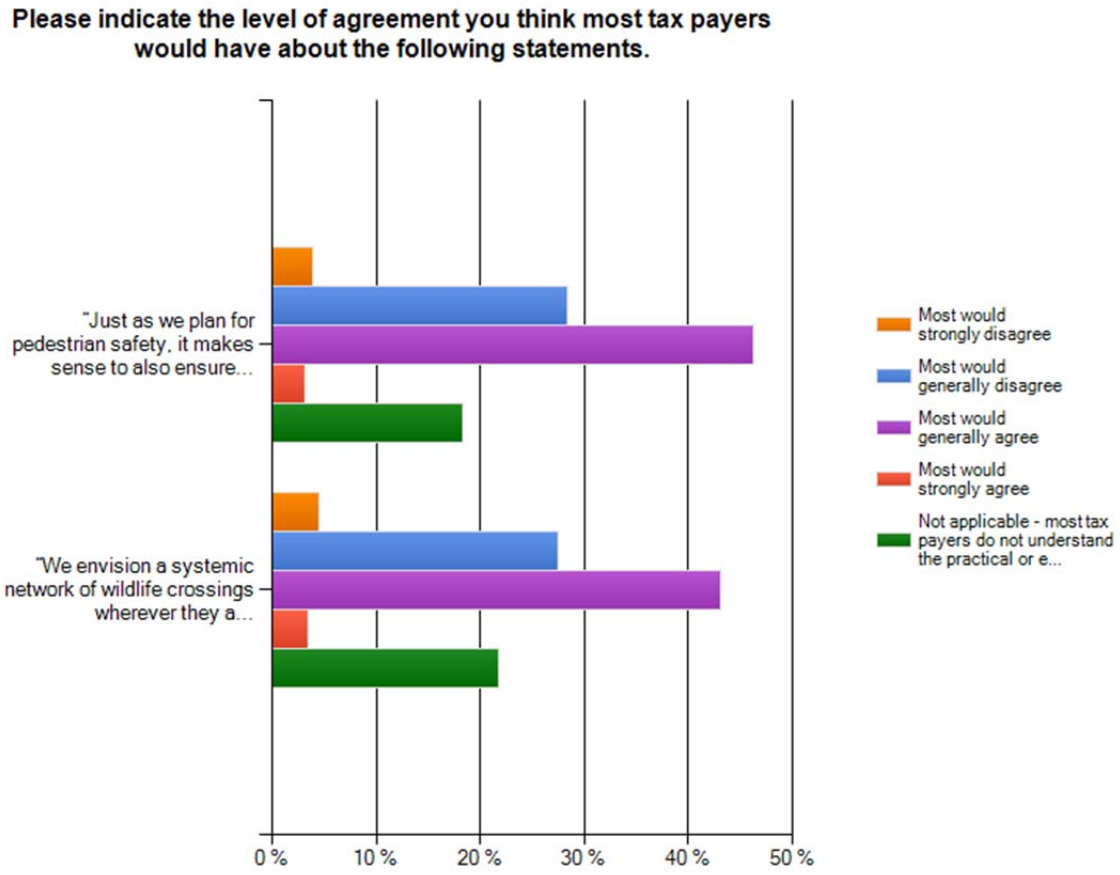

Figure 29. Relative perception about the level of agreement most tax payers would have about ARC-generated statements.

Question 19. Do you believe it is possible that all US DOTs could share and work toward this vision, "We envision a systemic network of wildlife crossings wherever they are needed to make highways safer for people and wildlife and to make habitats more connected for wildlife." ? (Choose best fit.)

Four hundred and eighty (480) respondents answered this question. A total of 88.7% selected a "Yes" answer; 70.2% selected "Yes, it is possible but cost and how-to are limiting factors" and an additional 18.5% selected "Yes, it is undoubtedly possible, especially if AASHTO and FHWA are involved." (Figure 30).

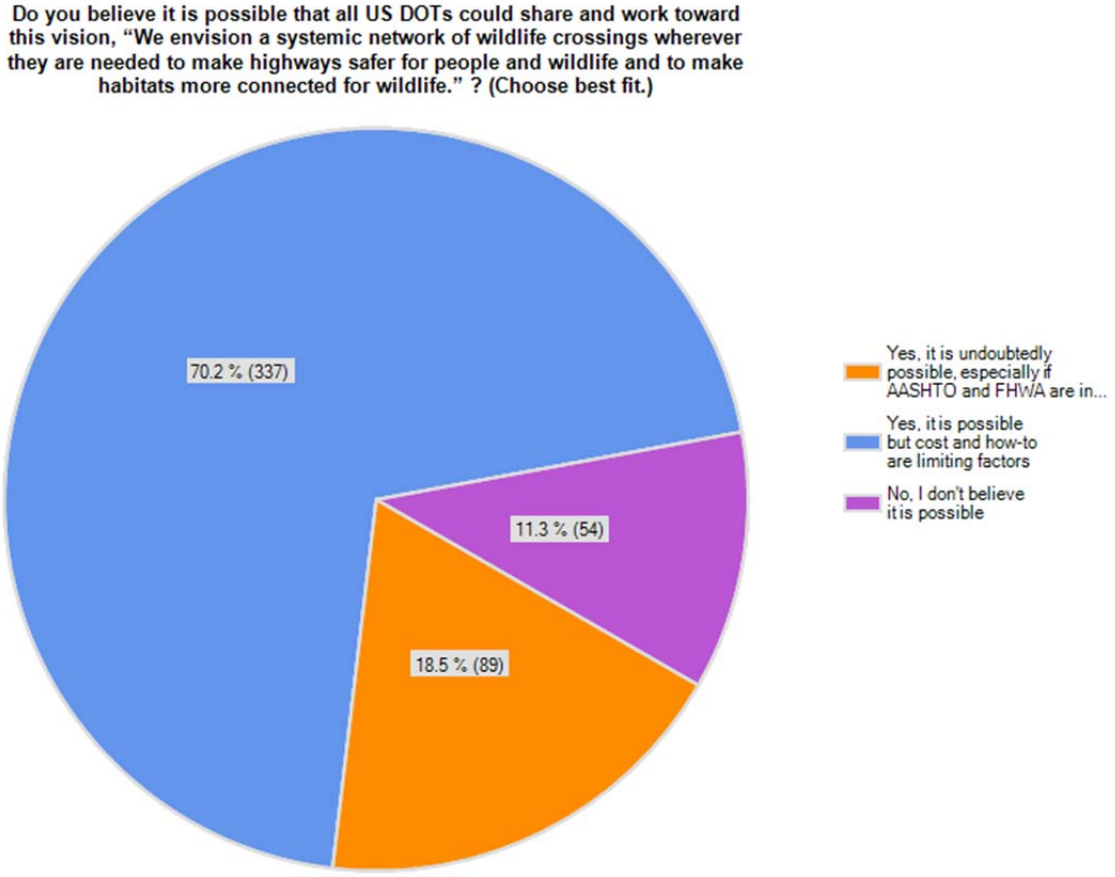

Figure 30. Relative belief in the possibility that all US DOTs could share and work towards the stated vision.

Question 20. In one word, how do you respond to the idea of having a nationwide systemic network of wildlife crossings wherever they are needed to make highways safer for people and wildlife and to make habitats more connected for wildlife? (for example, "reasonable", "unrealistic", "hopeful", etc...).

Four hundred and eighty (480) respondents participated in answering this question. The three most common responses are the same three words given in the example in the question above. One hundred and two respondents (102; 21%) answered "Hopeful," making it the most popular response. The second most common response (72; 15%) was "Unrealistic." The third most common response (42; 8%) was "Reasonable." The complete tally of respondent-generated responses is in Table 8.

Table 8. One-word responses to the stated vision.

Respondent-generated one word response	Count
appropriate	1
awesome	1
beneficial?	1
benificial (misspelling)	1
bold	1
complicated	1
desirable	1
dreaming	1
essential	1
eventually	1
excellent	1
excessive	1
exciting	1
exspensive (misspelling)	1
far-sighted	1
favorable	1
feasibilty (misspelling)	1
finally	1
frivolous	1
future?	1
hopeless	1
improbable	1
improving	1
inconsequential	1
indifference	1
inefficient	1
Inevitable	1
interesting	1
limited	1
locality	1
low-priority	1
maybe	1
money	1
never	1
nonsense	1
nuts	1
pessimism	1
practical	1
pragmatic	1
probable	1
progressive	1
rational	1
realistic	1
right	1
sensible	1
stupid	1
super	1
sustainability	1
typical	1
unaffordable	1
unbeliviable (misspelling)	1
uneconomical	1
unfundable	1
uniformity	1

unjustifiable	1
unpracticable	1
unusable	1
useful	1
utopia	1
utopian	1
utopianism	1
waste	1
wherever	1
why	1
wishfull (misspelling)	1
wonderful	1
woohoo	1
worthy	1
attainable	2
encouraging	2
fantastic	2
great	2
ideal	2
overdue	2
promising	2
skeptical	2
unfunded	2
challenging	3
funding	3
futuristic	3
needed	3
visionary	3
wasteful	3
doubtful	4
dream	4
resonable (misspelling)	4
unnecessary (misspelling)	4
difficult	6
necessary	6
wishful	6
unlikely	7
impractical	8
costly	11
ambitious	12
optimistic	13
idealistic	15
expensive	19
possible	20
reasonable	42
unrealistic	72
hopeful	102
NA – Provided more than a one-word response	21
Total number of respondents	**480**

Question 21. If there were obstacles or barriers to nationwide systemic deployment of terrestrial wildlife crossing structures, to what single reason would they most likely be related?

Four hundred and eighty (480) respondents answered this question. Almost sixty eight percent of respondents (67.7%) chose the option "Economy and available funding." (Figure 31). Sixteen (16) respondents chose the option "Other (please specify)" but the a technical issue prevented them from entering their open-ended comments. The full text for the first option reads "Personal belief that it is not possible to balance human mobility with habitat connectivity for wildlife."

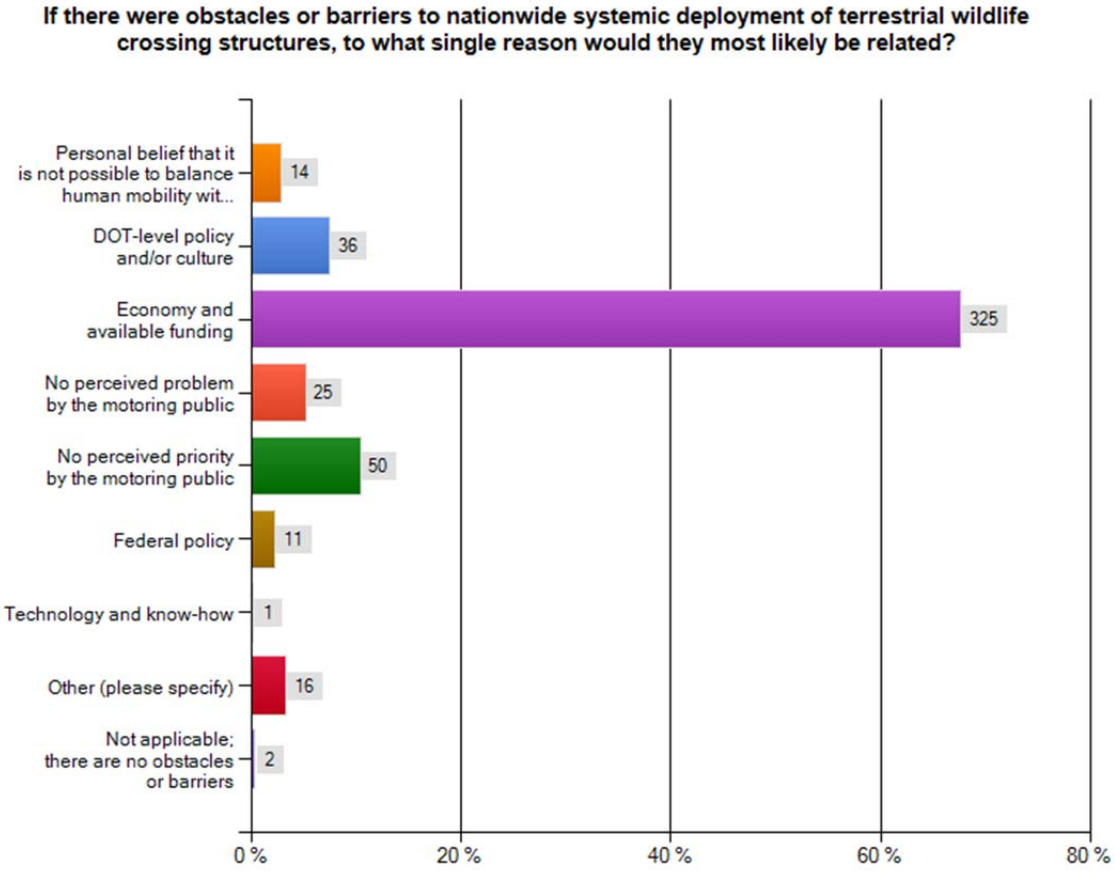

Figure 31. Relative perception of the main obstacle or barrier to nationwide system deployment of tesrrestrial wildlife crossing structures.

Question 22. How willing is your agency to invest in things that have not been done before? (Choose best fit.)

Four hundred and eighty respondents (480) answered this question. The top two most popular responses were “My agency is willing to consider such investments but we're more likely to follow another agency's lead to have proof that it worked” (39.0%) and “My agency is very willing because it's always looking to be on the cutting edge to be more efficient and save money” (35.6%). The two least popular responses were “My agency is willing only if there are partners to distribute the risk if it doesn't work” (13.8%) and “My agency is resistant to consider such investments” (11.7%). (Figure 32).

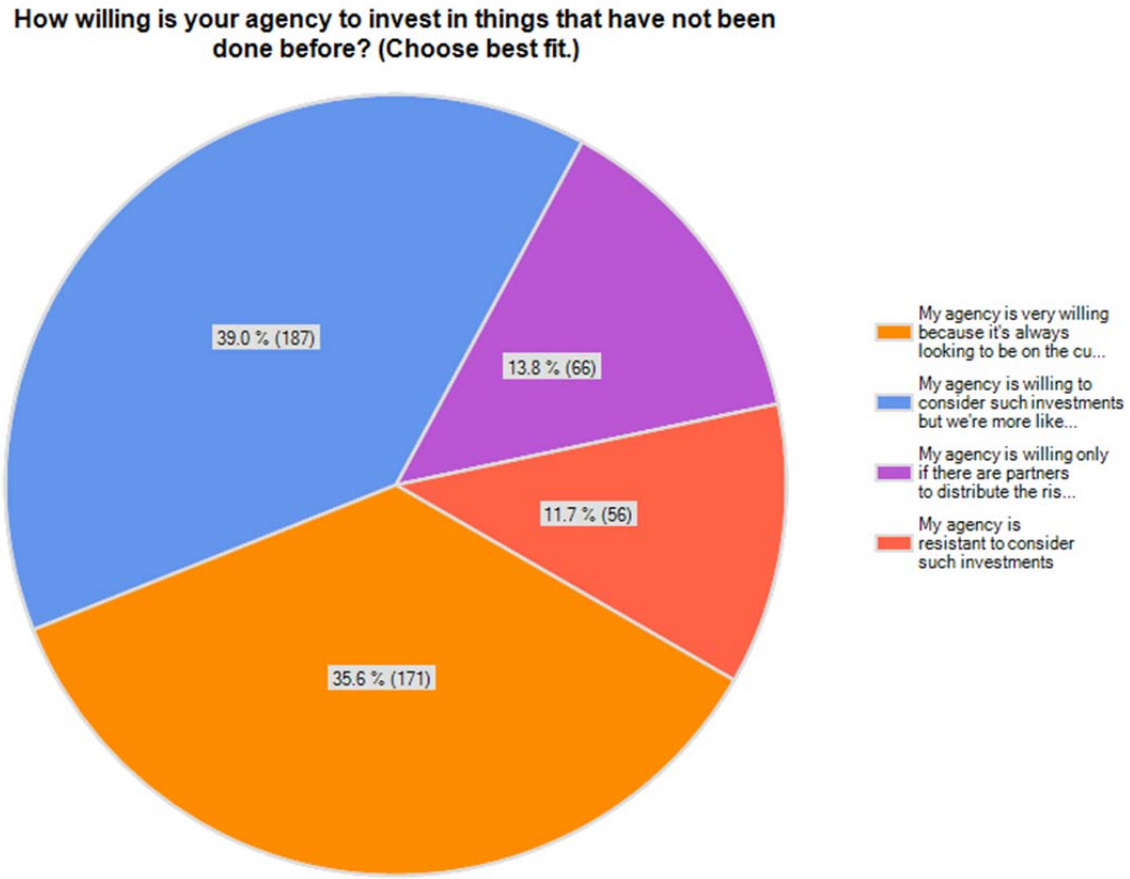

Figure 32. Relative perception of agency willingness to invest in things that have not been done before.

Question 23. Which of the following best describes your agency? (Choose best fit.)
Four hundred and eighty respondents (480) answered this question. Most respondents chose the option "We tend not to be one way or the other, it depends on risk-reward scenario of the project or program being addressed" (46.0%), closely followed by "More likely to be the first to implement new designs and programs that promise to be effective and save money" (41.3%). The option selected the least was "More likely to implement designs and programs that have been proven elsewhere even if they are expensive" (12.7%). (Figure 33).

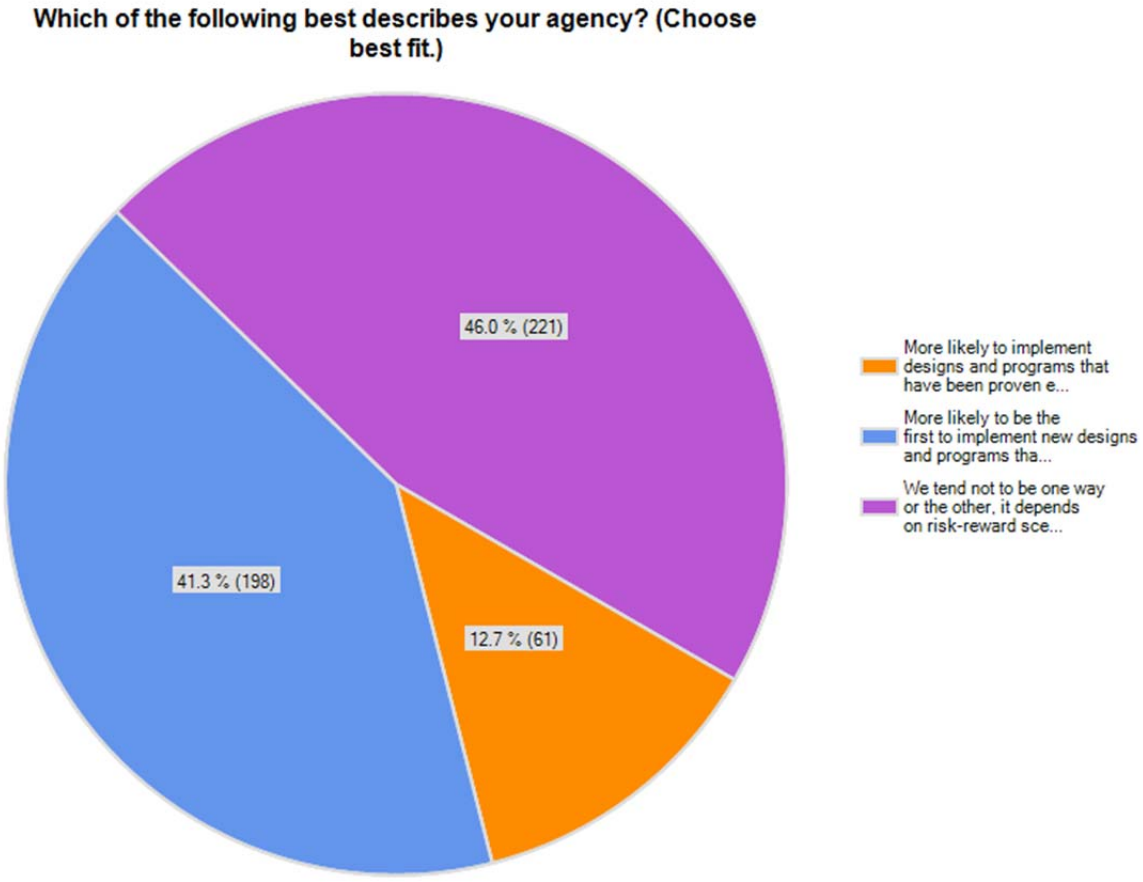

Figure 33. Relative perception of agency behavior when it comes to implementing new designs and programs.

Question 24. Which are the most likely reasons your agency would not be the first to implement a new design or program that promises to be effective and save money? (Select top three.)

Four hundred and eighty respondents (480) answered this question. The complete text for the choices were as follows:

- A state or tribal statute against it
- My agency's bureacracy makes it slow to accept new ideas
- No dedicated funding for building and maintaining the new design or program
- No pressure from external entities to do so
- Not convinced the public would support it
- Not enough data to show that it is safe
- Not enough data to support the claims of cost-effectiveness
- Not rewarded for taking risks, only reprimanded if something does not go as planned
- Too busy with regular work for anyone to be a champion of something new
- Not applicable - there is no underlying reason we wouldn't do it if there is a reasonable promise of success

The top three reasons selected were “No dedicated funding for building and maintaining the new design or program” (64.2%), “Not enough data to support the claims of cost-effectiveness” (43.8%) and “Not convinced the public would support it” (33.3%). (Figure 34).

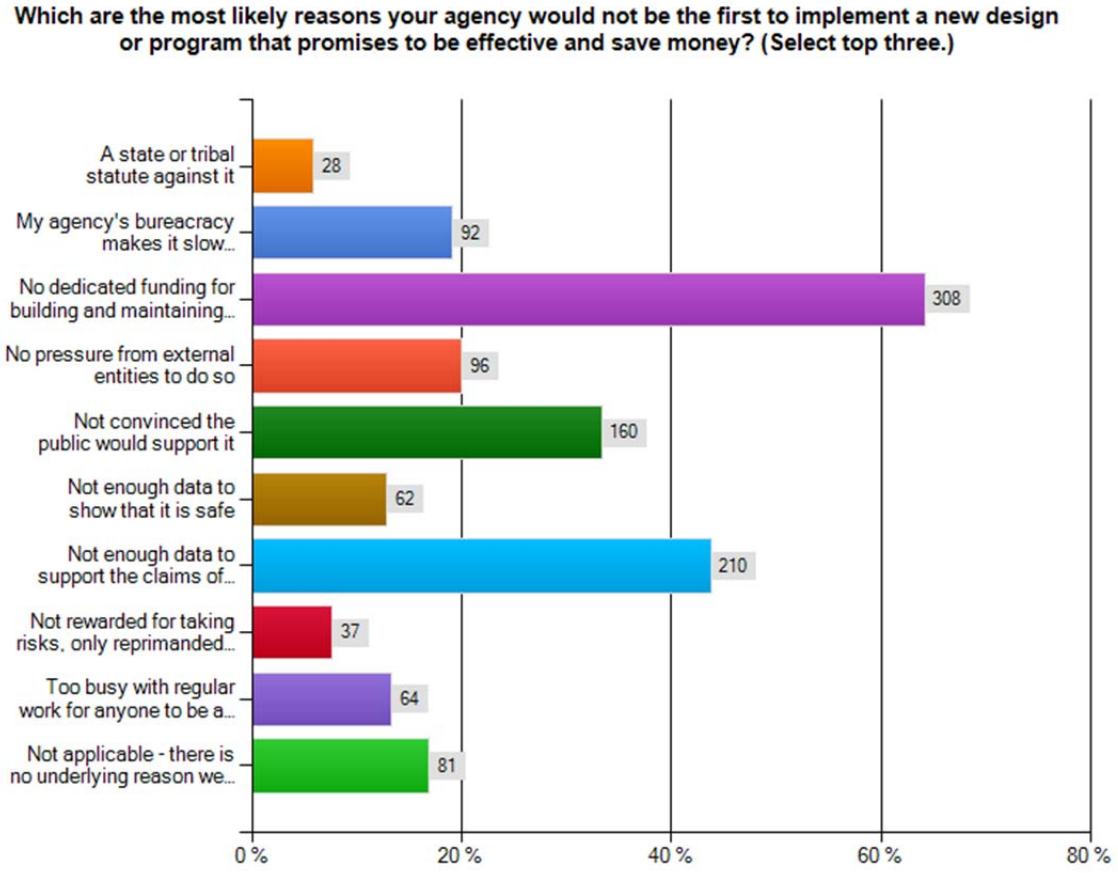

Figure 34. Relative perception of agency rationale about being the first to implement a new design or program that promises to be effective and same money.

Question 25. In terms of how your agency conducts business of building and maintaining safe roads, on which of the following are its choices MOST dependent?
Four hundred and eighty respondents (480) answered this question. Most selected the option "The economic situation" (59.8%). (Figure 35).

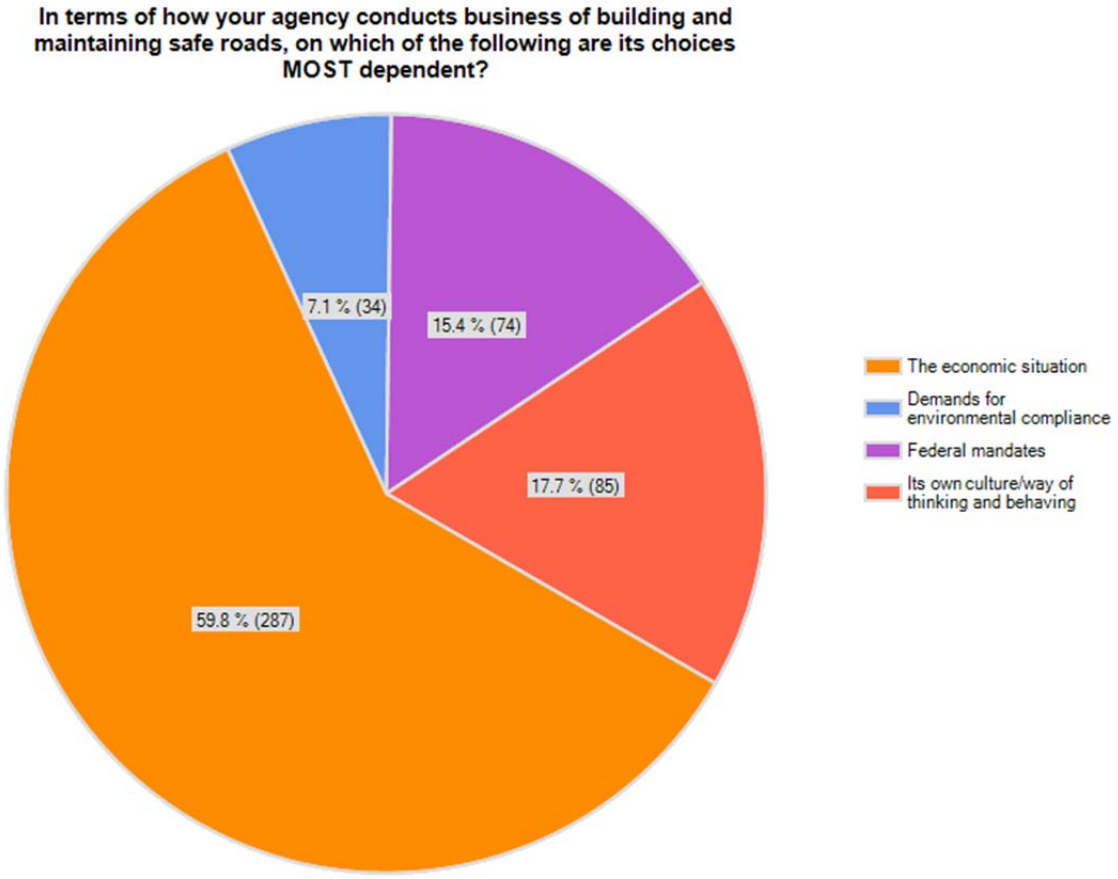

Figure 35. Relative perception of what most influences how the respondent's agency conducts business of building and maintaining safe roads.

Question 26. If applicable, please share one practice employed by your agency that benefits wildlife.

Two hundred and eighty three respondents (283) participated in this question. The practices shared are listed in (Appendix 7.2 Raw survey responses). Note that 13 of the responses provided were not applicable.

Questions 27 through 31 delved into agency-specific practices pertaining to terrestrial wildlife crossing structures (WCs). All responses have been consolidated into (Table 9). Column 1 shows state abbreviations. Column 2 provides the total number of respondents from corresponding state DOT. (Compare to column 3 which lists the number of respondents who answered this subset of questions). Note that five states (shown in gray shading) had no representation on this set of questions.

Question 27. What was the number of crossing structures designed and built specifically for terrestrial wildlife in your state… As of 10 years ago? As of 2012? (Please count overpasses and underpasses but do NOT count retrofits or drainage structures opportunistically used by wildlife.)

Column 4 lists the number range of WCs as of ten years ago (in 2002). Column 5 lists the number range of WCs as of 2012. The options provided were "0," "1-10," "11-50" ">50" and "Don't know." Only numeric responses were included in the column. "Don't know" responses were omitted if others from the same agency provided a numeric response or they were marked with a – if it was the only response provided. Column 6 offers a comparison to numbers of WCs reported in the 2008 NCHRP report by Bissonette and Cramer.

Question 28. What is the number of retrofits done specifically to benefit terrestrial wildlife in your state… As of 10 years ago? As of 2012?

Column 7 lists the number range of retrofits as of ten years ago (in 2002). Column 8 lists the number range of retrofits as of 2012. The options provided were "0," "1-10," "11-50" ">50" and "Don't know." Only numeric responses were included in the column. "Don't know" responses were omitted if others from the same agency provided a numeric response or they were marked with a – if it was the only response provided.

Question 29. Please answer the following as they pertain to your agency and its wildlife crossing structures.

The options provided for this set of questions were "Yes" (Y), "No" (N), "Don't know" (DK), and "Not applicable" (NA). Entries include the number of responses for each of the selected options. For example, if two respondents selected "Yes" and one respondent selected "Don't know" the entry reads "2 Y, 1 DK."

- **Do the structures have associated elements to prevent animals from crossing at-grade (e.g., fencing)?**

Column 9 lists the number of all Y, N, DK and/or NA responses as well as if a respondent skipped the question. The numbers total the value of Column 3 (the number of respondents who answered this subset of questions).

- **Does your agency provide escape routes (e.g., jump outs) if animals did find themselves on a fenced roadway?**
  Column 10 lists the number of all Y, N, DK and/or NA responses as well as if a respondent skipped the question. The numbers total the value of Column 3.
- **Does your agency maintain structures to ensure they are passable by terrestrial wildlife?**
  Column 11 lists the number of all Y, N, DK and/or NA responses. The numbers total the value of Column 3.

Question 30. Does your agency monitor terrestrial animal use of your crossing structures as a matter of course?

Column 12 lists the number of all Y, N, DK and/or NA responses. The numbers total the value of Column 3.

Question 31. If yes, does it share/publish results from its monitoring efforts?

The options provided for this set of questions were “Yes” (Y), “No” (N), and “Don’t know” (DK). Column 13 accounts only for the responses of those who answered “Yes” to Question 30 (Y values in column 12).

Table 9. Summarized responses to agency-specific practices pertaining to terrestrial wildlife crossing structures.

1	2	3	4 Q27	5 Q27	6	7 Q28	8 Q28	9 Q29	10 Q29	11 Q29	12 Q30	13 Q31
State	Total respondent count	# who answered WC-specific questions	Range of WCs in 2002*	Range of WCs in 2012*	*# WCs in 2008 (NCHRP Report)*	Range of retrofits in 2002*	Range of retrofits in 2012*	Prevent at-grade crossing? **	Provide escape routes? **	Maintain passability? **	Monitor use? **	If yes to monitor, publish results? ***
AK	7	3	1-10	1-50	*3*	0	0	3 Y	2 Y 1 DK	1 Y 1 N 1 DK	1 N 2 DK	-
AL	7	0	-	-	*1*	-	-	-	-	-	-	-
AR	3	2	1-10	1-10	*4*	0	-	2 Y	1 N 1 DK	1 Y 1 DK	1 Y 1 DK	1 N
AZ	1	1	1-10	11-50	*53*	0	1-10	1 Y	1 Y	1 Y	1 Y	1 Y
CA	14	13	0-50	1->50	*49*	0-10	1-50	7 Y 3 N 3 DK	6 Y 2 N 4 DK 1 NA	6 Y 7 DK	3 Y 4 N 6 DK	3 Y
CO	42	33	0-50	0-50	*27*	0-10	0-50	23 Y 4 N 3 DK 3 NA	27 Y 1 N 3 DK 2 NA	22 Y 8 DK 3 NA	14 Y 5 N 14 DK	4 Y 2 N 8 DK
CT	2	0	-	-	*1*	-	-	-	-	-	-	-
DE	1	1	0	1-10	*3*	0	0	1 Y	1 N	1 Y	1 N	-
FL	6	5	11->50	1->50	*83*	1-50	1-50	4 Y 1 DK	1 N 4 DK	3 Y 2 DK	2 Y 3 DK	2 Y
GA	1	1	1-10	1-10	*3*	1-10	1-10	1 Y	1 N	1 DK	1 N	-
HI	10	8	0-10	0-10	*0*	0-10	0-10	3 Y 1 N 2 DK 2 NA	2 Y 3 N 1 DK 2 NA	1 Y 2 N 2 DK 3 NA	1 Y 3 N 3 DK 1 NA	1 N
IA	3	2	0	0-10	*1*	0-10	1-10	2 Y	2 Y	2 Y	2 N	-
ID	20	19	0-10	0-50	*8*	0-50	0->50	17 Y 1 DK 1 skip	17 Y 2 DK	12 Y 6 DK 1 NA	8 Y 4 N 7 DK	5 Y 1 N 2 DK

Q# = question #; WC = wildlife crossing; * = summary of the *numeric* responses to the question; ** = # Y (yes), # N (no), # DK (don't know), and/or # NA; * = # Y (yes), # N (no), and/or # DK (don't know).**

1	2	3	4 Q27	5 Q27	6	7 Q28	8 Q28	9 Q29	10 Q29	11 Q29	12 Q30	13 Q31
State	**Total respondent count**	**# who answered WC-specific questions**	**Range of WCs in 2002***	**Range of WCs in 2012***	***# WCs in 2008 (NCHRP Report)***	**Range of retrofits in 2002***	**Range of retrofits in 2012***	**Prevent at-grade crossing? ******	**Provide escape routes? ********	**Maintain passability? ********	**Monitor use? ********	**If yes to monitor, publish results? ********
IL	6	3	(1-10)	0-10	*(0)*	0	0	2 Y 1 NA	1 N 1 DK 1 NA	1 Y 1 DK 1 NA	2 DK 1 NA	-
IN	1	0	-	-	*0*	-	-	-	-	-	-	-
KS	6	3	0-10	0-50	*1*	0	0	I Y 1 DK 1 NA	1 N 1 DK 1 NA	1 N 1 DK 1 NA	1 N 1 DK 1 NA	-
KY	1	1	-	-	*0*	-	-	1 DK	1 DK	1 DK	1 DK	-
LA	1	1	0	0	*0*	-	-	1 Y	1 N	1 Y	1 N	-
MA	1	1	1-10	11-50	*31*	1-10	11-50	1 N	1 N	1 DK	1 N	-
MD	1	1	(1-10)	-	*(0)*	1-10	1-10	I DK	1 Y	1 N	1 Y	1 DK
ME	4	4	0-10	1-10	*2*	0-10	0->50	2 Y 1 N 1 DK	2 N 1 DK 1 NA	3 Y 1 DK	2 Y 2 DK	1 Y 1 DK
MI	5	5	0	0-10	*4*	1-10	-	3 Y 1 DK 1 NA	1 N 2 DK 2 NA	2 N 2 DK 1 NA	1 N 3 DK 1 NA	-
MN	3	2	-	-	*5*	-	-	1 N 1 DK	1 N 1 DK	2 N	2 N	-
MO	1	0	-	-	*0*	-	-	-	-	-	-	-
MS	3	2	1-10	0	*1*	1-10	-	1 Y 1 DK	2 N	1 Y 1 N	1 Y 1 NA	1 N
MT	1	1	1-10	11-50	*52*	0	0	1 Y	1 Y	1 Y	1 Y	1 Y

Q# = question #; WC = wildlife crossing; ( ) = discrepancy between columns 4 and 6; * = summary of the *quantitative* responses to the question; ** = # Y (yes), # N (no), # DK (don't know), and/or # NA; * = # Y (yes), # N (no), and/or # DK (don't know).**

1	2	3	4 Q27	5 Q27	6	7 Q28	8 Q28	9 Q29	10 Q29	11 Q29	12 Q30	13 Q31
State	Total respondent count	# who answered WC-specific questions	Range of WCs in 2002*	Range of WCs in 2012*	*# WCs in 2008 (NCHRP Report)*	Range of retrofits in 2002*	Range of retrofits in 2012*	Prevent at-grade crossing? **	Provide escape routes? **	Maintain passability? **	Monitor use? **	If yes to monitor, publish results? ***
NC	1	1	1-10	1-10	*5*	11-50	>50	1 Y	1 N	1 Y	1 N	-
ND	13	8	0-10	0-10	*2*	0	0	1 Y 2 N 1 DK 4 NA	1 N 2 DK 5 NA	1 Y 2 N 1 DK 4 NA	3 N 1 DK 4 NA	-
NE	16	10	0-10	0-50	*3*	0-10	0-50	6 Y 1 N 3 NA	5 Y 1 N 3 NA	6 Y 1 N 1 DK 2 NA	5 Y 2 N 2 DK 1 NA	1 Y 1 N 3 DK
NH	30	22	0-10	0-50	*5*	0-10	0-50	6 Y 3 N 11 DK 2 NA	1 Y 5 N 12 DK 3 NA	5 Y 2 N 13 DK 2 NA	5 Y 5 N 10 DK 2 NA	1 N 4 DK
NJ	4	3	1-10	1-10	*7*	0-10	0-10	2 Y 1DK	1 Y 2 N	2 N 1 DK	1 N 2 DK	-
NM	11	8	1-50	0->50	*3*	1-10	1-10	6 Y 2 DK	5 Y 3 DK	5 Y 3 DK	3 N 5 DK	-
NV	1	1	-	-	*0*	-	-	1 Y	1 Y	1 Y	1 Y	1 Y
NY	1	1	1-10	1-10	*7*	1-10	11--50	I Y	1 N	1 Y	1 Y	1 Y
OH	5	8	0-10	0-10	*0*	0	0	1 Y 2 N 1 DK 4 NA	1 N 2 DK 5 NA	1 Y 2 N 1 DK 4NA	3 N 1 DK 4 NA	-
OK	1	1	0	0	*0*	0	0	1 NA	1 NA	1 NA	1 N	-
OR	12	9	0-10	1-10	*8*	0-10	0-10	7 Y 1 N 1 DK	6 Y 3 DK	6 Y 1 N 2 DK	6 Y 2 N 1 DK	4 Y 2 DK

Q# = question #; WC = wildlife crossing; * = summary of the *quantitative* responses to the question;
**** = # Y (yes), # N (no), # DK (don't know), and/or # NA; *** = # Y (yes), # N (no), and/or # DK (don't know).**

1	2	3	4 Q27	5 Q27	6	7 Q28	8 Q28	9 Q29	10 Q29	11 Q29	12 Q30	13 Q31
State	**Total respondent count**	**# who answered WC-specific questions**	**Range of WCs in 2002***	**Range of WCs in 2012***	***# WCs in 2008 (NCHRP Report)***	**Range of retrofits in 2002***	**Range of retrofits in 2012***	**Prevent at-grade crossing? ******	**Provide escape routes? ********	**Maintain passability? ********	**Monitor use? ********	**If yes to monitor, publish results? *******
PA	79	51	0-10	0-50	*4*	0-10	0-50	19 Y 7 N 20 DK 5 NA	3 Y 15 N 28 DK 4 NA	6 Y 10 N 30 DK 4 NA	8 Y 13 N 28 DK 2 NA	3 Y 1 N 4 DK
RI	1	0	-	-	*4*	-	-	-	-	-	-	-
SC	1	1	-	-	*5*	-	-	1 NA	1 NA	1 NA	1 NA	-
SD	5	3	0	0	*0*	0	0	2 N 1 NA	1 N 2 NA	2 N 1 NA	1 DK 2 NA	-
TN	2	2	1-10	1-10	*2*	0	0	1 Y 1 N	1 N 1 DK	1 Y 1 DK	2 DK	-
TX	177	130	0->50	0->50	*10*	0->50	0->50	27 Y 17 N 69 DK 17 NA	2 Y 28 N 84 DK 15 NA	20 Y 20 N 75 DK 15 NA	8 Y 32 N 86 DK 4 NA	1 Y 2 N 5 DK
UT	6	5	-	1-10	*17*	-	1-10	5 Y	4 Y 1 DK	5 Y	3 Y 2 DK	3 Y
VA	1	1	1-10	1-10	*7*	0	0	1 Y	1 N	1 DK	1 N	-
VT	2	2	1-50	1-10	*8*	1-10	1-50	1 Y 1 NA	1 NA 1 skip	2 DK	1 N 1 DK	-
WA	109	79	0-50	0-50	*2*	0->50	0->50	53 Y 25 DK 1 NA	31 Y 45 DK 2 NA	35 Y 2 N 38 DK 3 NA	41 Y 1 N 37 DK	25 Y 1 N 15 DK
WI	2	2	0	0	*0*	0	1-10	1 Y 1 N	1 N 1 DK	1 Y 1 N	1 N 1 DK	-
WV	5	5	0-10	0-50	*3*	0	0-10	2 Y 2 N 1 NA	4 N 1 NA	2 Y 2 N 1 NA	3 N 1 DK 1 NA	-
WY	23	19	0-10	1-50	*2*	0-50	1-10	18 Y 1 DK	18 Y 1 N	17 Y 2 DK	12 Y 1 N 6 DK	6 Y 6 DK

Q# = question #; WC = wildlife crossing; * = summary of the *quantitative* responses to the question;
**** = # Y (yes), # N (no), # DK (don't know), and/or # NA; *** = # Y (yes), # N (no), and/or # DK (don't know).**

Question 32. If someone from your agency were invited to a face-to-face meeting to continue this dialogue with other DOTs and transportation and natural resource professionals, what two staff role(s) would be the most appropriate to invite?

Four hundred and fifty four respondents (454) answered this question. The top three choices selected were “Environmental head supervisor “ (59.7%), “Upper-level management” (33.7%) and “Chief Engineer” (25.6%). The least commonly selected option was “Staff planner” (1.5%). (Figure 36).

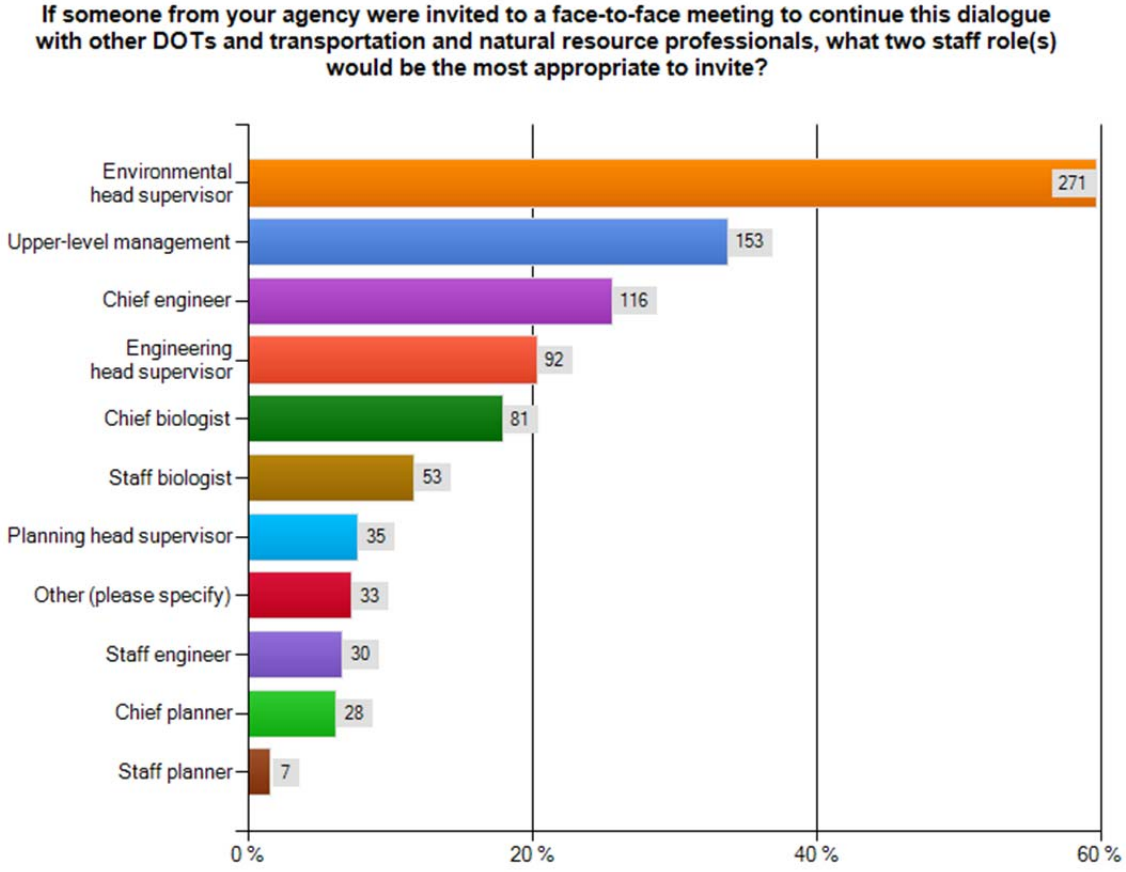

Figure 36. Relative opinion about staff roles that should be invited to a face-to-face meeting to continue this dialogue.

Question 33. Would your agency allow out-of-state travel if the meeting coincided with a major international conference on ecology and transportation in late June 2013?
Four hundred and fifty four respondents answered this question. The response was fairly evenly split between "Likely yes" (55.1%) and "Likely no" (44.9%).

Question 34. Is it likely that your agency would provide financial support to attend?

Four hundred and fifty four respondents (454) answered this question. Most respondents chose the option "Somewhat, funding is tight but they approve on a case by case basis" (52.9%). The full text of the last option is "No and it would not allow out-of-state travel even if another entity paid for it." (Figure 37).

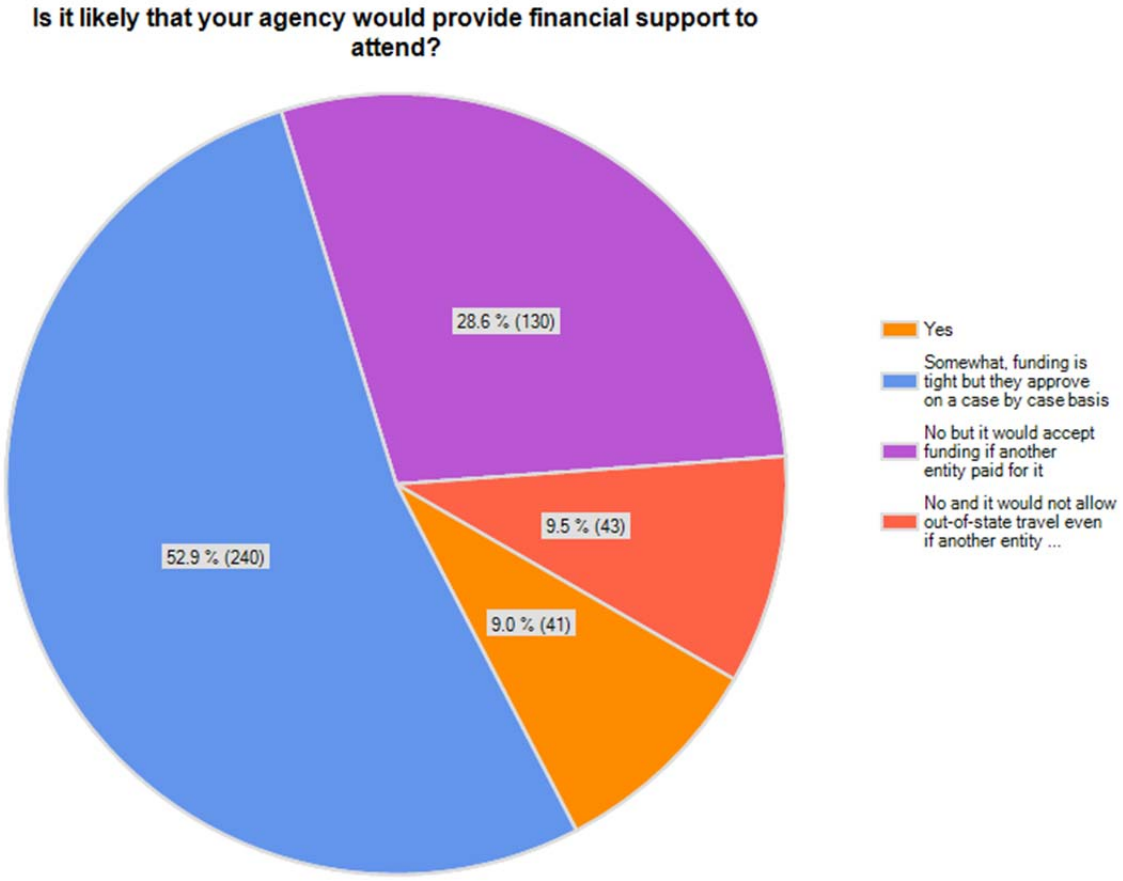

Figure 37. Relative opinion of the likelihood that respondent agency would provide financial support to attend a face-to-face meeting.

Question 35. Please provide one or two names and contact info for the most appropriate agency staff to attend such a meeting. (Alternatively, have those individuals contact Angela Kociolek angela.kociolek@coe.montana.edu to express their interest.)

Four hundred and fifty four respondents (454) participated in answering this question. however, only 184 actually provided names of individuals. The names will not be shared in this report but they will be consulted in the forum planning process.

Question 36. Is there anything you would like share with regard to DOT culture when it comes to implementing wildlife crossing infrastructure?

One hundred and ninety one respondents (191) participated in answering this question, however, only 116 shared an actual comment – not all of which pertained to the question (Table 10). Entries such as "N/A,", "no," "I don't know," "no comment" were not included.

Table 10. Closing comments about DOT culture and the survey, in general

Respondent-generated comments (unedited; __ indicates identifying information removed)
A considerable amount of time would be consumed getting everyone to agree where the crossings should be placed on every project. The environmental process is already lengthy. Consideration and evaluation of wildlife crossings on every project would extend the amount of time it takes to acheive environmental clearance for a project(s). Some would argue that they are needed on every project even if there is no demonstrated need.
A wildlife crossing checklist is prepared by a biologist and this is helpful. At meetings, biologists, environmental coordinators are intimidated to speak. An executive manager made a few comments to support a wildlife crossing project and fencing. He directed the program manager to find funds for the fencing because __ said without fencing the project's benefit was minimal. Funding was found for fencing and the project is being constructed. Executive Managers get points for supporting wildlife crossing infrastructure so they use their influence to support wildlife crossing projects.
As DOT's work for the public, I think it is beneficial to work with the public and get them to understand the importance of these crossings (i.e. safety, monetarily, etc.). I think until we get the public on the side of wildlife crossings that it will be hard to get DOTs to follow.
As I see it the biggest obstacle right now is going to be the lack of funding & the poor condition of our existing infrastructure. I think our agency is going to be focused soley on maintaining our existing roadway networks & bridges. If additional federal funding would become available to "Rebuild America" the oppertunity to incorporate wildlife crossings could be possible. One area that I would like to see some innovative designs or animal friendly designs would be the standard "jersey barrier" or concrete median barrier. This barrier is often used as a divider or safety barrier while shifting traffic patterns on high volume, multilane roads. Often this barrier can be hundreds of feet to miles long & small mamals, amphibians, ect. become trapped by this new obstruction to their previous travel routes. There needs to be some type of opening on the base of the barrier to allow these animals an escape option. This opening would need to be designed in a manner so that it doesn't present a safety liability to the vehicles.
At __DOT, we are continually looking for cost effective ways to enhance all forms of wildlife crossings and open up new habitat areas.. We are working diligently with all Regulatory Agencies and other stakeholders to enhance, preserve and protect out native species. I would also like to share why I marked down the two photographic designs included in this survey: The first had an unsafe end treatment on the leading edges of the traffic barriers creating a ramping/flipping risk as well as questionable Clear Zone protection from the Earth Embankment in the Median. The second design had inadequate shy distance from the traffic barriers and also must have pinned barriers since there was also inadequate deflection distance. The second design also looked like wildlife could easily jump the traffic barriers and wind up in the roadway. Neither design demonstrated how it would funnel wildlife to use the crossings although the first did show a fence crossing the roadway. Good luck and thank you for your efforts! __
__ is a very large state and how receptive district level management is to implementing wildlife crossing infrastructure depends on the location in the state and who's at the table. It is also highly dependent on the experience and determination of individual biologist assigned to projects.
Change is slow, so education of benefits is a must!
common sense

Cooperation between various Districts within state would be important to achieveing a crossing.
Cost Benefit analyses of these rarely prove they are beneficial mostly due to the very rural conditions in __ with relatively very low volumes of traffic.
Current tight economy makes this type of investment improbable but as economics improves so will responses to the eliments in this survey.
Do we need animal crossings? Or, is this like fish passage culverts, federally mandated but not applicable in our state because we have no migratory fish? This needs some serious consideration. Remember the __; we built tunnels under SH __ to give safe passage. However, the __'s predators discovered that the tunnel exits were feeding troughs!
Economy is not good at this time and we don't have enough money to maintain existing roadways and structures let alone design for environmental issues.
Education
Engineers are skeptical, roll their eyes at these new concepts. Biologists/Env. Planners are supportive. The public is so used to deer collisions they accept it as part of their day. Everyone agrees there is no "extra" money available to be spent.
FHWA would have to take a stronger role in ensuring funding: require Safety funds be used for wildlife crossings, require states to prioritize use of Transportation Enhancement funds for wildlife crossings, fund maintenance and monitoring, require that transportation research institutions prioritize wildlife crossings, etc. Right now, all FHWA does is 'promote' without any teeth or funding. Also, there is plenty of education/support at the Environmental level in our state - it's the management that needs better education/support.
__DOT has a process developed in it's __ manual to consider wildlife crossings.
Funding and Federal Policy are the some of the most critical factors.
good information intersting
Good luck with this important initiative.
GOOD LUCK!
I am going to say there is no perceived problem in __ to justify structures as presented in this state. To my knowledge, there are no similar structures in __. Perhaps some arch tin culverts here and there.
I am personally an advocate for wildlife crossing structures. My belief is that they were here before "we" were here and it's important to provide that connectivity that they need. We have encroached on their habitat and we're putting their future species re-distribution/re-colonization at risk. Unfortunately, the public generally doesn't think that way but if the public sees it as a "safety issue" rather than a (pardon the simplification) "tree hugging issue", they may support it better. I hope to see federal policy trickle down to state policy that stresses the importance of wildlife connectivity (and environment too!).
I am under the opinion that the concept of wildlife crossings could work in a handful of states where wildlife populations and citizens have a greater potential of interaction. However, current economic situations for most states do not offer the type of flexibility needed to pursue such implementation.
I believe __ is on the cutting edge of wildlife connectivity implementation. Our greatest advantage is the support by the people of __ who love our wildlife and see it as a very valuable resource that needs our protection.
I do not see this happening in __. We do hav a problem with White Tail Deer, but their migration and movement patterns constantly change.
I don't believe anyone would see a need for it currently. We are struggling to keep up with repair/replace of existing infrastructure.
I feel unless there is an upper management / political directive that includes wildlife passage as part of the 'main' mission of the DOT (mobility, safety, economic opportunity) then wildlife passages will remain low-priority and without financing or tools for success, such as quality info on animal movement, design, acquisition of easements, partnering with other entities (e.g. railroad), etc. In general, there is a disconnect between the views of what constitutes economic vitality and the role of landscape scale ecological connectivity.
I have doubts as to whether this would be practical in __.

I have never heard a __DOT colleague talking about this topic.
I just heard about a great overpass study in __, I believe from the DOT there. The results were so overwhelmingly positive regarding wildlife use compared to underpasses that this may be something my agency would consider - even though the public would be more likely to criticize it because it is in their face instead of hidden underneath the roadway.
I really hope this will become a more pressing priority for all of DOT __.
I think we would embrace it where possible.
I-80 was widened between __ & __ from two lanes each direction, to six lanes. Whenever possible, the bridges were modified to improve the field of view to the wildlife by limiting the riprap as much as possible under the structure. Long-term maintenance was also considered so interlocking pavement blocks were placed under the drip line of the bridge to prevent water off the bridge from scouring the undercrossing. A 4-mile stretch with four sets of I-80 bridges were tied with deer fence (1 mile woven wire, 3 miles electric) to funnel the deer to the undercrossings. Will have a complete report available march 2013.
If not done correctly, can cause problems for wildlife- US __ __ pass has had some problems.
In __ we have a high deer vehicle collision rate. One problem that I see with this survey discussion is that the collisions that occur in my region are not related to geological features, the deer are everywhere! Generally, deer collisions result in property damage accidents, not serious injury or fatality which is the focus in __.
In my experience, DOTs are most responsive when pressured or mandated by regulatory agencies or FHWA. Implementing policies at those levels may be most effective, but I commend and encourage attemps at changing DOT culture to become more proactive with this important issue.
in the bridge culture i experience, attendance of video conferences is much more popular than off-site conferences .. 8 hours charge as overhead at the work desk available for any "emergencies" is easier then the hastle and bother to budget, schedule, and plan out of state travel
Interesting and wild concept!
It is all a political game. If influential politicians are interested, then this state's DOT will be interested. It is that simple!
It would require a federal mandate to implement.
It's about time the auto-insurance companies help us out with this via some grants. They're profits have to have serious impacts from wildlfie vehicle collisions.
__DOT typically installs wildlife tunnels as part of major reconstructions and widenings; therefore, we may only build one tunnel every couple years. Alternatively, many of our replacement bridges meet state stream crossing standards for providing wildlife passage, and therefore we make most of our connectivity improvements through our bridge replacement projects. * I was unable to answer questions 17 and 18 due to the images not appearing.
Most DOT's have cultures that change slowly and require careful and persistent approaches to affect positive change. Focus on cost effectiveness and safety as these are two areas that get the attention of most DOTs. Be aware of competing needs for funding as resources are very limited, but needs are great.
Must be Federally mandated and funded to garner any real support if DOT's will begin implementing wildlife crosssing infrastructure. In __, the problem is mostly deer crossing the roadways. It seems it would be difficult to provide a crossing infrastructure for deer.
Nationally, the design staff do not have a problem providing any desired solution.
__ has implented a fencing effort to control deer movement along a segment of I-80. At a location along US-__ a fencing effort was implemented to control movement a population of __.
need more data and more money
Needs to be cost effective.
Our entire construction program is dwindling to near nothing and biological staff reductions are underway to match the expected decline in workload. Wildlife crossing infrastructure is likely to be infrequently built in the foreseeable future.
Our State Dept of Fish and Game was a proponent for a deer fence w/ jump-outs project but ultimatly killed the project due to minor unplanned (therefore unmitigated) wetland impacts while the project was under construtcion. They reveied the DED and FED and attended the public hearing but made no indication that we "missed" the

wetland. Would have been good to know about prior to construction. If the resource agencies will not partner with the DOTs to deliver these then we should not do them.
Our state doesn't have the money to maintain our existing infrastructure let alone build wildlife crossings. Any federal money used for this would be effectively reduce funds allocated to the states.
__ has alot of drainage areas. it is my opinion that we provide for wildlife crossings mostly at water crossings because they tend to happen very often. We tend to provide room for movement under the structures. We do have Trail bridges that are used by wildlife and humans to walk under/over roadways.We accomodate when able, where able
Perhaps Wildlife Crossings could be included in __DOT's HES program (Hazard Elimination System).
persistence is important in encouraging change
Presently politicians allege even routine roadway maintenance is an unaffordable luxury. Given economy, it will likely be difficult to convince many to commit to improvements for the benefit of non-human species.
Pretty much the only animals found on our roadways are the occasional __ and stray dogs and cats
provid classes to increase DOT culture about wildlife and enviroment in general
Provide funding and we'll build them. We applied for federal funds (TIGER Grant) multiple times and were denied.
Rural Districts are more sensitive. Urban Districts are more interested in their own paychecks.
Sadly I don't think __DOT is truly interested in protection of wildlife. Probably only be interested if funding is available and if it involves larger wildlife that are causing numerous accidents in the area. Would probably only address issues to protect smaller wildlife if they were required to for a protected species.
seems to be treated as more of an obstacle than a proactive benefit in all but a few parts of the state. Funding is always given as a reason and lack of procedural implementation knowledge is another.
Slowly changing and successful projects have occured
So far, engineers here see it as unnecessary because it uses up money and isn't required. (And here, engineers rule, and other professions including scientists, are not particularly valued.)
State has no policy or method to prioritize, assess and fund crossings. Culture is resistant to warrant crossings based on existing data and for wildlife alone.
__ has approx 4 million deer, 80,000 center line miles of roadway and 52,000 bridges already that we maintain. Nobody likes hurting wildlife but the cost of doing something like you are showing to prevent accidents would be pretty high.
__ is large state and unique in that we have lots of urban area/large population and rural areas. Wildlife crossings would benefit the rural districts. Where I'm located in the __ area, emphasis is on habitat protection. Wildlife crossing would be better on case by case project. Mandating will not be feasible for the entire state.
The biggest obstacles in my oppion are the public. Especially in __, people think that many other things should come before thinking of animals and habitats.
The culture is one where crossing structures appear to have little applicability regarding the primary large mammal (whitetail deer). There is general recognition to consider herptiles (mainly turtles and ambystomid salamanders) at known priority locations for new nad retrofit projects. Other species, like small mammals are usually only considered on EIS projects.
The DOT must balance engineering, environmental and public considerations when it develops projects (NEPA). Wildlife crossings are considered generally on the basis of science, need, engineering, safety and coordination with FHWA and resource agencies.
The __ still views the choice as paying for wildlife crossings (which is not their obligation) or paying for roads and people (which is their obligation).
The main wildlife crossign project being deisgned at __DOT is located at the followign website: __
The mindset of "you cannot control wildlife crossings merely by implementing alternative conduits by which they can travel" , may be the biggest hurdle to overcome. The second will be the economic impact for employee resources to build, maintain, design, etc....
The Northeastern states and Provinces have a Northeastern Transportation and Wildlife Conference every even year

to discuss thiese issues
The other game and resource managers do not seem to be making any effort to help provide the data our agency needs to determine if there is an existing willdlife movement need. There is no planning going on beyond the dot RW to establish and maintain open "corridors" and areas for connectivity.
The safety mission of DOT is focused on the safety of people not wildlife. The protection of wildlife generally comes under the authority of other agencies. There needs to be better partnerships between agencies to allow the safety of people and of wildlife to be a coordinated effort when planning and constructing new infrastructure.
The State of __ is desperately behind all other states with regards to implementing wildife crossing infrastructure. The practice within the agency with regards to implementing wildife crossings has typically only come about through NEPA and other agency/public comments that brought to light the issues. Of the two projects that benefited terresterial widlife in the District in which I work in (both of which I worked on), one was funded by the American Recovery and Reinvestment Act and the other via USFS through a grant awarded by FHWA...they (i.e. projects) would not have been done otherwise. __ really has no established culture or policies when it comes to implementing wildife crossing infrastructure. There is only one crossing that actually works in the State of __ "as intended" and those involved in its success are reluctant to talk about it.
The types of structures presented here are generally not suited to our topography and needs.
The wildlife service agencies need to have solid information on what is needed where and why. Without that you can't even talk about locating any kind of crossing except by documeting the need on a project by prjoect basis as the projects come up. The vast majority of projects are not of a magnitude where we would add a crossing. It takes a reconstruction level of project to add infrastructure and at this point on an established roadway unless there is a widening or a safety problem caused by wildlife this isn't likely.
The wildlife we have crossing highways cross at random locations and creating crossings at select locations would be hard to pin down. Fencing between these crossing would be expensive and impact landowner access. I could see at a larger stream crossing, an extra span could be constructed to allow wildlife crossing. It doesn't seem practical to provide anything like this in the wide open rural areas of __; at least for now.
There are accidents on US __ between __ and __ where individuals have been killed when they hit a deer. We do have some wildlife but very flat terrain.
There are deer crashes all over the state, and the public would likely see deer crossing structures as an excessive amount of spending for minimal benefit.
There is a feeling among some groups that there is an insufficient understanding of wildlife needs, and therefore certain expensive structures being built with political backing are likely poorly designed and may need rework in the future. That is to say, current crossings are often forced for tangential project requirements rather than acting as best practices for the relevant species, the traveling public, and best use of plublic funds.
There is not enough funding even to maintain existing nfrastructurei
There is some cultural division between the environmental department and planning and design although we collaborate often and I would say "work well" together. For wildlife crossings to be used more frequently, upper level supervisors in design and planning have to be convinced.
There would need to be funding at a Federal level as well as FHWA Support and mandate.
They like it when it is there idea. Feds. should make this a mandatory thing on a certain types of large projects or where special funding is available in existing known high animal conflict areas. What each state does and it's cost effectiveness should be shared nationally with all the states to summarize each state's best management practices.
This agency will install these facilities when appropriate, but with the funding issues facing wach state agency, this agency is more likely to not participate in these facilities. This agency will continue to place the funding where it is best utilized on the roadway or pavement.
This has to be a common sense approach. People, goods, services, information and economic development are the most important regarding transportation services
This is an interesting subject that I don't believe we as a Department have thought much about. It might be an issue we want to look in to since __ has so many rural roadways with potential for at-grade wildlife crossings. If you can show these wildlife crossings can be cost-effective solutions to this problem, I guarantee you we'll at least look into it a little more deeply.
This survey forwarded to me by 6 or 8 people who felt they did not have the time, knowlege to complete, but

curiously I never got it directly even though have worked on this stuff for over 20 years. I know you want a lot of different perspectives to reply, but realize most people don't have an extra 30 mins to spend on a survey outside their subject area.
Trying to convice design and project proponents to incorporate wildlife crossing infrastructure into standard design always seems to be a challenge in our agency due to objection to change. We are working to change the perceptions of our designers and project supervisors, but it can be a challenging process.
__DOT is very interested in the natural wildlike in it's state.
Unless they are paid for out of a different pot of money, engineers and planners are very reluctant to consider using limited budgets to incorporate the structures.
Unless wildlife passage becomes a mandate, tight funds will not be used to provide habitat connectivity. We need wildlife passage laws just like we have fish passage laws.
__ is on the cutting edge of wildlife/vehicle accident prevention. We are making huge strides in implementing and constructing wildlife crossing structures with fencing and escape ramps.
We are currently working with Department of Natural Resources on a large animal collison study statewide
We are making slow but steady progress. We recently were awarded __ for two wildlife passage undercrossing structures completed on our US__: __ to __ project located south of __. Furthermore, we are doing preliminary engineering (no construction funding identifed) on another wildlife passage structure (u'xing or o'xing) on US __ in the vicinity of M.P. __.
We are much more focused on the safety of people than animals.
We do not have particulary large wildlife such as would exist in the Northern US and Canada therefore the problem would more than likely not be considered as important as it might be in other states.
We have built wildlife crossing structures in the past. Funding levels are currently insufficient to maintain our system properly, let alone create additional structures.
We have completed one projects and are planning to have a couple more projects to mitigate the wildlife/motorist collisions.
We have done a couple of crossings in the State. __.
We need to educate the engineers about the value/benefit of implementing such infrastructure.
We need to fix the roads first. Building passage structures for species that are not threatened or endangered is not going to be popular when the adjacent roads are in bad shape.
We often include elevated floodplains under our structures to allow for the passage of small mammals. These are located throughout the District.
We really need the support and funding from the Division of Wildlife to have success.
We tried one in our district and although it got through the Environmental and Design phases, it was killed by regulatory agencies during Construction.
We want to be supportive and cooperate with other agencies in regards to providing wildlife crossings, but we do not always have the financial resources to provide the preferred infrastructure, so its usually a compromise. We are dependent on the recommendations of other agencies, when these agencies do not provide the necessary design criteria, standards, or guidelines it makes our implementation of providing the proper wildlife crossings more difficult.
we would have to have this everywhere in __. In many parts of the state, there are deer everywhere. Snakes, racoons, foxes, turtles, etc.
Wildlife crossing infrastructure was installed on the __ project more than 30 years ago. However, even though documentation shows the value of the structures on the __ project there is resistance to funding such structures on the transportation system unless mandated or completely funded by another entity (i.e. fish passage culverts).
Wildlife crossings must have a clear need for specific species at specific crossing locations to be cost effective. They should only be considered only for federally protected species. In __, wildlife crossings would not be economically or ecologically effective for the typical species and situations in __ due to the ubiquitous and widespread distribution of the species that use/cross __DOT ROW. It is been our experience that wildlife crossings have been a failure due to poor placement and because a design was used that would not work due to behavioral characteristics of the target

species.
Wilflife for our state is always bend one of those items at the top of our agenda but with limited funding it is getting harder to justify wildlife crossing's when the roads are falling apart.
__DOT website about wildlife crossing in __ is: __
__DOT has been innovative to protect wildlife since it does generate tourism dollars. It is protecting a valuable resource.
Yes: 1) Your choice of answers, especially to the first dozen questions, are seriously lacking in options. There are many other ways to look at these issues. Your lack of options represents a very narrow minded and one-dimensional picture. 2) The fact is, from a benefit-cost perspective using the value on a human life (not the lives of the animals), even moderately priced mitigation measures can not be justified in most situations. In our state, not that many humans die hitting wild animals, even though we kill thousands wild animals a year.

3.3. Discussion

All fifty states were represented in the survey, however, the number of respondents per state ranged from one to 177. Given the qualitative nature of the survey, it was not possible to aggregate responses for one common representation for each state. With the exception of Table 9, which illustrates responses by state for Questions 27-31, responses from all states were aggregated. Therefore, results for all other questions should be interpreted as those given by individual personnel of US DOTs rather than any formal agency representation.

However, the high participation rates for certain states should be noted. At the start of the survey, more than half of the responses (55%) were attributed to only three states (i.e., Texas, Washington and Pennsylvania) (Table 1). By the end of the survey, 53% of responses were attributed to these three states. Texas alone, the state with the highest number of respondents, accounted for 26-27% of responses throughout the survey.

A visual comparison of graphical outputs for Texas-only responses compared to all state responses showed a similar but not exact distribution of responses. In all but two questions, the top choices selected were the same but the relative proportions of all choices selected varied. As an additional check, a visual comparison was made of graphical outputs for all states minus Texas compared to all state responses. The relative proportions of responses were very highly comparable for all questions. This assessment illustrates that perspectives of respondents representing Texas, with its large sample size, closely reflect the perspectives of all DOTs as a whole.

While the term “average person” was used to refer to the general public in interview questions, a change was made to “tax-payer” in the survey because the latter term is more meaningful when discussing topics of political and economic significance.

Some of the responses to state-specific Questions 27-31 varied or contradicted each other, making it difficult to know which response(s) is/are accurate. In retrospect, offering a numeric range for Questions 27 and 28 did not provide the ability to truly compare the current number of wildlife crossings with Bissonette and Cramer (2008). This survey attempted to differentiate between new construction, retrofits, and drainage structures used opportunistically by wildlife. It does not appear that Bissonette and Cramer (2008) made such a differentiation. Multiple respondents to these questions indicated no concrete knowledge or involvement with this type of infrastructure making it difficult to know how accurate these responses are or how much import to put on them. While certain broad interpretations may be made from responses to the state-

specific question set (see 4. Conclusions), the section as a whole did not produce the specificity needed to truly assess the current state of the practice.

Some limited functionality apparently posed a problem for some respondents to Question 16. There were several open-ended comments reporting trouble ranking responses despite the specific instructions to drag and drop selections into the desired order versus trying to number them. This brings up the question of whether Figure 28 is an accurate representation of respondents' opinions. It is interesting to note that for Question 16, "Risk (potential safety hazards [roadside obstacle, earthquake, rain/snow saturation, liability], etc.)" ranked as third for both the most important and the least important types of information wanted or needed before an agency would construct a structural design it was presented with to reduce wildlife vehicle collisions and to allow animals to move safely over a busy highway in its jurisdiction.

4. CONCLUSIONS

4.1. Agency focus

Based on the level of responsiveness to the call for interviews and survey participation, there appears to be great interest in the topic of wildlife crossing infrastructure among US DOT personnel. Despite this overall impression, a fair amount of would-be respondents deferred to their colleagues whom they believed were better informed about the topic. There was a sense that this is a topic best suited for environmental staff, specifically. This cultural belief offers an opportunity for DOT-focused outreach that encourages an interdisciplinary approach for the best chance of success and one that is conducted as a matter of course – cooperatively, agency-wide and ultimately, nationwide. That is, cultivating a standard practice (i.e., pertaining to need and placement assessment, context-sensitive design, construction and maintenance, evaluation, and proactive planning) which results in a more cost-effective way to make highways safer for motorists while providing safe crossing opportunities for wildlife to fulfill their biological needs.

While this topic is apparently primarily viewed by DOT personnel as the purview of environmentally-oriented staff, top suggestions for those staff who should be involved in a continued dialogue on this topic, such as the planned forum for June 2103, include environmental head supervisors, upper level managers (area of expertise unspecified) and chief engineers.

Most survey respondents reported holding managerial roles and most responses indicate a preponderance of agreement that wildlife crossings are needed. This is promising because this level of staff may have influence on others in terms of helping to increase awareness on the subject.

It seems that ARC is in a good position to forge a deeper, more meaningful exchange with DOT personnel because most respondents already agreed on the following cultural markers:

- “There is good interdisciplinary cooperation in my agency.”
- “My agency is committed to minimizing impacts to wildlife and the environment.”
- “My agency welcomes new ideas, new collaborations and/or ways of doing things.”

The majority of respondents agreed that minimizing wildlife vehicle collisions is a priority (~80%) but most of those (~67%) indicated it’s only under certain circumstances – not as a standard practice. The majority of respondents indicated that ensuring wildlife can move across the landscape and across roads is a priority (~80%) but most of those (~52%) indicated while it’s becoming more of a focus with increased awareness, it’s not a standard practice yet. While an overwhelming number indicated that their agency considers building wildlife crossings to improve safety and habitat connectivity for wildlife (~86%), there is great variability in the planning of them - including no protocol at all. This is clearly an area of opportunity for ARC.

If we are to assume accurate representation given the technical difficulties related to Question 16, the top five most important elements for an agency to consider before constructing a new design are:

- “Cost-effectiveness (probability of use by focal species, probability of successful reduction of wildlife-vehicle collisions, estimated savings because of reduction, etc.)”
- “Cost estimates and funding (life cycle cost, vegetation maintenance, availability of construction materials, funding sources, etc.)”

- "Risk (potential safety hazards [roadside obstacle, earthquake, rain/snow saturation, liability], etc.)"
- "Alternatives and prioritization (societal costs of no action, comparison of alternative ways to solve problem, ranking among other priorities, etc.)"
- "Federal assessment (meets guidelines, policies and standards of AASHTO and FHWA)"

Interestingly, risk was in the top five most important *and* the top five least important categories, perhaps eliminating that as an area of focus for ARC outreach.

It appears that most states already engage in some level of best practices pertaining to minimizing wildlife impacts from roads.

4.2. Public focus

Although most survey respondents indicated that the tax-paying public in their state believed minimizing wildlife-vehicle collisions should be a priority (~78%), most of those (~54%) selected the option "Only those who live/work/travel in rural areas with a higher risk of hitting larger animals believe that." Similarly, most survey respondents indicated that the tax-paying public in their state believe it is important to ensure terrestrial wildlife can move across the landscape and across roadways (~87%), most of those (~72%) selected the option "Most have probably never even considered it, only those who are aware of wildlife believe that."

If these perceptions accurately portray the beliefs of the tax-paying public, then clearly the tax-paying public would be a worthy focus group for ARC's education efforts. Therefore, it would be worth exploring the relationship between agency perceptions of the public and what the tax-paying public actually understands and would like to see implemented.

Approximately half of respondents thought taxpayers would agree with the following ARC statements:

- "Just as we plan for pedestrian safety, it makes sense to also ensure safe passages for wildlife to cross roads."
- "We envision a systemic network of wildlife crossings wherever they are needed to make highways safer for people and wildlife and to make habitats more connected for wildlife."

Slightly more than 30% thought taxpayers would disagree with these statements. The remaining roughly 20% chose the option "Not applicable - most tax payers do not understand the practical or economic implications of providing safe passages for wildlife to have an informed opinion." It would be interesting to determine whether 1.) the ARC statements need improvement to ensure broader public support, 2.) this is another indicator that the tax-paying public would be an important focus group for education, or 3.) DOT staff is possibly misinterpreting public perception.

4.3. Barriers to widespread implementation

An overwhelmingly positive response – about 88% – was garnered for the belief that it is possible that all US DOTs could share and work toward ARC's stated vision: "We envision a systemic network of wildlife crossings wherever they are needed to make highways safer for people and wildlife and to make habitats more connected for wildlife."

When asked about the most likely reasons an agency would not be the first to implement a new design or program that promises to be effective and save money, the top three reasons selected from the choices given were "No dedicated funding for building and maintaining the new design or program," "Not enough data to support the claims of cost-effectiveness," and "Not convinced the public would support it."

Three main themes – economics/available funding, proven cost-effectiveness and public support – emerged as the primary barriers to overcome for widespread implementation. Fortunately, these themes are intertwined and provide ARC a clear target for its educational efforts. Showing that wildlife crossing infrastructure (i.e., overpasses or underpasses in combination with fencing and escape routes) can have an economic benefit to society would help garner public support, especially in tough economic times.

Research by Huijser et al. (2008) supports the cost-effectiveness of wildlife crossing infrastructure; however, the authors note that, while the responsibility for the costs of such mitigation measures lies with transportation agencies, the benefits are felt mostly by insurance companies. Still, society stands to benefit financially as a whole. Huijser et al. (2009) provides thresholds for when installing mitigations to prevent collisions with various ungulate species would have a net positive balance to society. For example, if a particular kilometer of road section is the site of more than 3.2 collisions with deer per year, then implementing wildlife crossing infrastructure would likely generate economic benefits. Break-even points were determined to be considerably lower for larger ungulate like elk and moose, 1.2 and .7 collisions per kilometer per year, respectively. Therefore, it can be easy to see that doing nothing on road sections with even with what could be considered low or moderate incidences of wildlife vehicle collisions with animals deer-sized and larger contributes to the overall financial burden to society. Mitigating when break even points are exceeded not only has the great potential to save money, but has the added benefit of providing passages for wildlife to move across roads without the danger of being struck by vehicles.

While the impetus for this interview/survey effort was, in part, to determine the effect of DOT culture on the implementation of wildlife crossing infrastructure, responses pertaining to internal agency culture ranked relatively low. Some respondents did share their sentiments on agency dynamics, and they may be found in the open ended comments to various questions throughout the survey.

Ultimately, the main take home message from this survey effort appears to be that it is the economic situation that dictates how an agency conducts its business of building and maintaining safe roads. Therefore, more effort – in the form of research and education – is needed to mainstream the philosophy that implementing wildlife crossing infrastructure as a matter of course where it is needed makes more economic sense than the "do nothing" alternative.

5. RECOMMENDATIONS

The following recommendations (and rationale) for future actions are made to ARC and its partners. They are based on input garnered from interviewees and survey respondents (collectively referred to here as participants) as well as lessons learned in the course of conducting the interview and survey.

1. Point to and build on the federal Map-21 Law, which grants state, federal, and tribal agencies the authority to reduce wildlife-vehicle collisions and improve habitat connectivity. (Participants indicated that federal leadership would have a positive influence on state implementation of wildlife crossing infrastructure.)
2. Engage and strengthen the roles of nationally-recognized and nationally-focused partners (i.e., FHWA and AASHTO) for the purpose of promoting widespread implementation of wildlife crossing infrastructure. (Participants indicated that federal leadership would have a positive influence on state implementation of wildlife crossing infrastructure.)
3. Encourage state DOTs to view themselves as a network when it comes to wildlife crossing implementation. (Participants identified with the state agency as the single entity that oversees implementation; however, benefits are reported for participation in collectives, such as AASHTO, and regional approaches may have ecological benefits.)
4. Approach environmentally-focused personnel as the entry contacts into agencies on this subject while encouraging an interdisciplinary approach to implementation that includes planners and upper level decision makers. (Environmental head supervisors are viewed as the experts on wildlife crossing infrastructure; however, other personnel may have more of an effect on long-range planning processes, a proactive approach that may enhance cost-effectiveness over the project delivery level approach that currently happens in most cases).
5. Invite environmental head supervisors, upper management and chief engineers to in-person forums. (Participants indicated these were the top three most appropriate types of personnel to continue the dialogue on this topic.)
6. Expand ARC's focus to include public forums, either in conjunction with DOT participation or on their own. (Participants indicated concern about public awareness of the need for and acceptance of wildlife crossing structure implementation.)

6. REFERENCES

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7. APPENDIX

7.1. Raw interview responses

The following are transcribed interview responses typed by the interviewer/author during the interview. Abbreviations for obvious words were used. Obvious typos were corrected at the first opportunity after the interview was complete. Additional edits were made as needed for clarity. Other than for Question 1, any identifying information (e.g., city, state, route names, endangered species found in a single state, etc.) has been removed.

1. What is the name of your agency? (Responses to question #1 have been alphabetized so that responses cannot be matched up with subsequent responses.)

1. AZ DOT
2. AZ DOT
3. CA DOT
4. CA DOT
5. FL DOT
6. MA DOT
7. MA DOT
8. MT DOT
9. MT DOT
10. NJ DOT
11. NJ DOT
12. NV DOT
13. NV DOT
14. NY State DOT
15. OK DOT
16. OK DOT
17. OR DOT
18. SD DOT
19. VA DOT
20. WI DOT
21. WI DOT

2. What is your general role there?

1. Director of Bridge Eng and Infrastructure; several bureaus that work under - bridge eval and bridge management; bridge eng and geotech eng; structural and RR eng svcs; pavement and drainage management (__ bureaus -145 people)
2. Um, I am an ecologist with the department. I work with Endangered species, wetlands and invasives
3. We do NEPA review and documentation for federal aid projects let by __DOT inc. local govt as well as Safe Routes to Schools, rail, transit all that; facilities env compliance
4. Principal design engineer
5. I'm the state bridge engineer so I oversee geotechnical and hydrological section, preservation, bridge, fabrication, loading rating and overloads and dev of bridge design policy and standards
6. Senior wildlife biologist and endangered species coordinator
7. I'm the env svcs bureau chief so in simple terms I'm in charge of env compliance and it also goes beyond that
8. Chief bridge engineer
9. I'm a supervisor in bureau of structures
10. Manage all statewide env programs related to transportation
11. Env Mgr and highway safety supervisor; odd combination
12. Env sci in env svcs division
13. Env Svcs Division in Highway; clear all highway projects for constr advertising program - $2 billion/yr guardrail replace, new interchanges and new highways
14. In one of the env units; env policy, env analyses for projects; assisting in permitting; impact assessment
15. Director of bridge office
16. Roadside resources mgr; veg management program and wildlife prgm and couple of divisions and

kind of programmatic, big picture policies for how activities done at __DOT
17. State bridge engineer
18. Bridge engineer
19. My role is as env specialist
20. I am the section mgr of all env disc and variety of eng disc in the tech svcs branch/HQ function; not project delivery - standards, practices, policy
21. Title is Deputy District Director for Design District __; __ total districts in state

3. What motivated you towards your career?

Well, I have to say the biggest influence was my father because was civil engineer, cement co built and designed cement plants; traveled over world and steered him towards eng.
Oh, uh, mmm, I've been in natural resources field entire life and motivates me to be here
had interest in the env and engineering
uh, oh boy um I don't know I guess I just uh I enjoy structural design, intrigued by bridges and buildings which led in this direction
I guess when I went to school first studied transportation but interest in building and structures -minor; then towards of my undergrad saw trans studies was not what wanted, to the built env/constr more so; grad school MS in struc eng and went to work consulting in 1983; bad economic time - laid off; only people hiring was this agency so hired into bridge section and here ever since - moved up ladder
um, well, I guess uh the focus on env laws and regs and opp to be able to guide decisions in trans related to those laws and regs; passion for the outdoors
oh, interesting, um wow, laugh, y'know I didn't start out env. I'm civil eng and started out as classical infrastructure and certainly where more comfortable but of course over time understanding and awareness of env issues and play large role in infrastr proj so when management position avail good challenge and good job for people of __. not classical drawn by passion for resource although developed that
…I've always been fasc with structures, natural fit to personality
um, let's see, interest in stream crossing, bridges and I like the challenge with designing stream crossings
liking to be outdoors
um, actually, I've been in the env field; env natural resources back in day; env issues always motivator for me
pause...an interest in ecology
env background, was a landscape architect in college; many env classes so when graduated didn't even know there was a env division at __DOT
always interested in wildlife and env and ended up here; grad school for wild bio and this position opened been here ever since
I like bridges
um, sort of fell into it; background in wild bio, field, got involved in veg management and wildlife, NEPA, Section 7 and just developed over time, interest in trans; widlife over time niche for it
dunno, guess liking engineering, want to be engineer
prob my father as civil engineer, exposed to constr projects during his career
ah, well I am a biologist and I have been in state govt working for env agencies in the past and I never would have thought work for DOT as a biologist I was asked if come to work here, realized DOT was more a regulated than regulator so inside of applying my reqs as regulator, I'm now having to make sure we comply with all env reqs; think outside of box to be practical; T&E sp so many in __ that have to have open mind and here able to run own program think of innovative or new ideas esp are of transportation ecology new science; I enjoy it; learn something new every day; always challenging not stuck to one rule; having come with ways ensure project comply with hundred env regs.
um, my tech background is civil eng and registered CE and EE; always had real interest in storm water and then in management roles driven me towards make bigger, better decision in management; more visionary things, tech level but not much control over vision of the agency
probably an interest in math science put it simply

4. Why do you continue to do this work?

pause.. Well, I'll tell you. I think that through career; through ranks in bridge division; many lower titles; got into project management about 18 yrs ago and fortunate enough to be able to manage high profile bridge projects in __ and gave me uh… gave me a lot of pride. Just the job satisfaction in regard to serving citizens in __; something really wrap hands around; lot of enjoyment.
That's a good question (laugh) uh because um… I found myself here looking for some diff opps I came from __ and __ and came here looking for diff opps. That was 10 yrs ago and not sure how long will be here.
um, (repeated question) established in career and I guess its fulfilling work so…

enjoy what I do, enjoying designing and building bridges
because interests me. I like eng challenges and as moved up am voting member of __ dev of bridge design and other codes; tech chair for welding; challenges and solutions; out of the box thinking; like env here at __DOT
um, well, __ has really diverse biology and biodiversity and its also one of the major selling points, we have it all here; exciting part of research and decision making, policy and looking at ways to build trans in more sensitive to way to natural resources; great job that continues to stimulate thought and cooperation; dynamic world to work in
why do I y'know this sounds corny but true I think I can do a good job for taxpayer and make diff
reality is it's fun and we make a difference
mm, um, suppose the challenge still like challenge of designing bridges
laugh, think I can make a difference; making trans and env work together
very good question; some days I don't know - continue because tranportation biz need to have a better product that's more eco friendly instead what we used to get blaze new highway; now mitigate features and impacts; __ reservations so sensitive to cultural awareness; religious signif - exciting
because I like my role as bridge between bio systems and trans systems
challenging, exciting work, we get opp to see what we build and design and permit and very satisfying; once had a chance to work at env agencies but more opp here because many decisions before ever go outside
guess I feel it's rewarding, we try to figure out ways to construct roadways in way to have less impact on env
because still like working on bridges
um, I think it makes huge difference for wildlife; management role feel like make a difference, lots of projects and change culture of agency; wildlife bridges motivates to keep moving
um cause of self-satisfaction and public service
find it rewarding, feel like I can contribute
always learning something new, be creative and think outside box
now really enjoy making visionary changes
um, more from a govt perspective; believing we are making a diff; not just in trans comm but for society in general

5. In general, do you believe average people consider that minimizing wildlife-vehicle collisions is a priority?
Pause. I think by and large people would like that kind of stuff reduced. Try best to keep deer off road if we can. Because no predators, overabundance. Does create safety hazards but…
huh…. Most people do not because they don't hit em; after they do then think might be a priority; people in rural believe, those in more urban do not
um, no
oh, average person probably not
um I think um here in __ where most collisions are with smaller animals, raccoons, skunks - nuisance not much think of it; but northern with moose collision can be potentially injurious to driver or occupants; think more sensitive to trying to avert collisions
I think it depends on where people live in __ esp in very urbanized areas interactions with wildlife don't happen a lot desensitizes; in rural areas people are aware if people who've hit deer and have issues with it; really what people are exposed to and whether threat to daily travel
gotta think about that, … I do think most travelling public consider it priority not all the time but certainly when driving and see a carcass, think about it and what is state doing to try to fix that? Certainly those that hit ungulates crosses mind and certain part of me thinks living in __ but another part says what can we do to make this better; most priority not sure what type of weight. most people want in general safe road and smooth ride and less congestion but alot of public do put some priority on safety and part of that is WVCs
that's a tough question, what does it mean it's a priority, concerned; priority compared to what to war in Afghanistan?
I don't think its high priority, prob low priority
in general, no
yes
laugh, in general, no
average person I don't think so; but certainly get support where aware of lots of collisions; mostly deer and smaller, coyotes; rare moose or black bear so most impacts/collisions do not result in driver being seriously injured but can certainly anytime with accident; some states like Maine people get killed when hit moose; any impact at high speed safety consideration
I think some do but others prob think other priorities; some are passionate about it other think more important things to deal with

no
certainly safety side is priority; when not safety smaller not as important as big stuff; lots of elk related certainly priority for that
uh, sure yes
mm, depends on where they live; in cities I don't think so, in rural prob the case
oh gosh good question, um, I think that may depend on where live; in __ not extremely high priority for avg citizen mainly concerned about bring waste of tax payer money; unique to __ and maybe other __ states, we do a lot of mit measures to conserve T&E sp much as for safety because no huge herds of elk, deer; only 120-150 __ left
well, I would say in rural areas yes because think more prevalent in more rural parts; urban most pop is less of an issue because running over a possum not signif as mule deer
probably not, maybe in certain parts of country yes

6. Is minimizing wildlife-vehicle collisions a priority for your agency?

Don't get involved in that very much; bridge - that's in traffic safety side; can investigate if you like. Off top of head, not really a priority - fencing and that kind of stuff. Highest priority are asset management. Road bridges and traffic safety.
…it's a priority but it's not the top 10
uh, if its related to safety um I would say yes um if related to reg compliance, yes, but if its enhancement to a project, no
um, I wouldn't say it's a real high priority, I mean…
not as a stated policy but I know where env process finds wildlife migration or typical crossing are identified; we will build structures under roadways to help animals along migratory routes without having to cross on roadways but not policy
yes safety is # 1 goal we actually last year as a department had watch out for wildlife week; __ sugg we bring to gov office; unfortunately flooded with proclamations so we as department took upon self to establish that; tried to look at AVC locations and we do proj improvements and have estab some special studies in __ wtih signage and warning and project dev improve with fencing and safer places to cross; safety being our goal it falls under that purview
… yes, um, not sure I could vocalize where it is with respect to other priorities but I know we spend time and money to reduce AVCs and WVCs yeah by very nature of work we do in my bureau yes it's a priority we alloc res for that and demonstrate all you have to look at some projects – US __ poster child; crossing not only safety approach; connectivity as well.
again, what is a priority, a consideration on any project; we do look for clusters but what does a priority mean?
um, I would say prob has medium priority, not a top priority
Reducing them is a priority for our agency
it is very much
yes
yes, we have a chapter in design guide that focuses on wildlife accom; chapter __ on website; award winning design guide developed with slew of stakeholders and two __DOT reps; formed by everyone at table; much more defined and open project dev process in 2006; became a DOT in 2009
wouldn't say top priority; try when we can
yeah we spend considerable effort to find crossing spots, culverts for lizards
yes it is as long as its safety related appears to be priority
yes
has not been yet
yes it is
in certain corridors in eastern __
yes, it is

7. In general, do you believe people consider that ensuring wildlife can move across the landscape and across roadways is important?

We, uh, in areas where known wildlife movement do incorp things in project to take care of that; have built tunnels for deer and stuff like that; bridges to move wildlife back and forth. Cognizant depending on whether located and - DEP for project permits; wildlife is more than just like deer - turtles something like that other types of wildlife.
no, I don't think it is
uh, yes
um, I would hope they do but I uh in general think they'd have to have a group of people even aware of wildlife

present; in __ towns are few and far between biggest populace in urban; people don't even know wildlife we have in state
uh, I don't think so; I think people um where no large animals they probably view AVCs more as a nuisance than to be motivated to reduce
again it depends on exposure and education to the issue; I know when I tell people what I do for a living tend to have a lot of questions and haven't thought of roads of being such a source of frag for wildlife movement; not always in back of mind, people don't always understand need for dispersal of wild animals; maybe understand ungulate and birds migratory but not necess connectivity on the whole
no, vast majority does not think about it; certain segments minority in tuned; state and fed prompt us to think about it
I think most people have never considered it
um, again, really based on discussion with people I would say um it's not important, no
no
yes
I wish I did
hmm, laugh, I don't think in general but certainly a lot of people do; don't think about it
again some people consider that more of a priority than others
yeah that they can safely, noone to hit bigger animals across, when frogs or lizards less concerns when no risks to prop damage or seriously hurt
I think when understand concept of habitat connectivity and permeability, when understand they do but gen public doesn't so not as widely accepted other than groups that promote
well, I believe so don't know about average people
I think so, we're starting to look at making 6 lanes highways in more rural settings; so far trying to avoid use of median barriers in rural setting trying to preserve grass median without great impediments to animals crossing; another agency turnpike authority has median barrier in rural miles think has been problem for animals trying to cross highway; did you talk to them?
yeah I think so hope so
um, typically not; importance to gen pub is more related to reducing injuries to humans, less so with regards to impacts on sp; family four dies cuz ran into deer want to minimize
think if you asked that ques that would agree but not sure if come up on own as priority or something to expect trans agencies to be tasked with; but common sense to support

8. Is ensuring that wildlife can move across the landscape and across roadways important to your agency?

We, uh, like I said during design we consider it if issue at particular location try to address at best of ability.
no
… I hate to say no, listen to me (laugh); probab not in top priorities; safe, efficient and mobility are the top priority in this agency period
I think so, I think it's starting to come more to the forefront than decades ago; becoming more of a focus
um, like I said it is; we do install animal crossing structures and this is also; I'm on the highway and rail side when they id'd turtle crossings and installed similar structures under tracks so they would be able to crawl under tracks and not caught between tracks or killed by train; we do as part of env process if id'd as something to maintain animal migrations routes
It think it depends on who you talk in the agency. I think um it's not necessarily question of important we like to try to do the right thing in areas where issues. I think the q comes to how to implement something like that in our department? may focus on safety and mobility then secondarily on do we accommodate wildlife movement within the infra; secondary import not primary unless as linked safety concern. Here we look as safety aspect and how various laws/regs address connectivity (SEQUA?) checklist on migration on habitat available so proj basis as far as signif level; wetlands and eco function; end sp; wildlife conn and dispersal from aquatic to upland habitat or where critical habitat areas are and to build into projects. have quite a few examples and trend that's coming. Awareness within department is evolving. As states move in climate change; adaptation may provide us opp to have it be more important. Fish and game has adopted as strategy for climate change. All eval where cross over where we need to cooperate and be part of solution of other agency's strategy. It's evolving.
yes, we can demonstrate on a number of projects; wildlife friendly fencing and pushed to promote permeability; 5-strand and woven wire fencing can force crossing into undesirable places; put up 4 strand

wildlife friendly; __ promoted on all if we can get it; not all but a lot
yes it is
yes
uh, yes
it is
It's becoming more important with awareness
yes
in some instances, again not top priorities but some instances come into play
yeah, they provide larger culverts to dry land for them to cross vs row fencing that tries to funnel wildlife travel patterns
um it is as long as outside funding sources for it
uh, yes it is important
mm, other than the not to put median barriers on 6 lanes, have not seen evidence of being important
yes it is
yes, in fact done some studies to id corridors to look at those issues more closely
yes

9. Does your agency consider building wildlife crossings to improve safety and habitat connectivity for wildlife?

Yes
no
we haven't up to now we have not
I think mostly consider for safety reasons
yes
yes we def consider it um and we are typically considering thru proj delivery, um we also have considered it thru strat planning at state level. Recently funded a proj with fish and game as partner and over 60 agencies where we modeled wildlife connectivity through state and plan to incorp in to state planning; also highlighted as bmp in policy docs - __ trans plan and regional planning guidelines; updating __ trans plan which is statewide policy and habitat connectivity and issue is highlights in current and will be a product with statewide map with new update statewide plan; more sophisticated in GIS (roads, highways, rail, aeronautics) as done statewide data set considered and highlight areas where need to focus improvements. Also outline where to scale down analysis of reg level. Coop with Fish and Game created elev interest state wide; bay area, coastal areas and some work with state parks of __; __ canyon decommissioned interchange and now use for wildlife and land purchase and both sides of freeway in public ownership and working with state parks to maintain. Doing a lot; how culverts being up and where and analysis; so __ lots of culverts for wildlife. policy on down to project delivery.
yes we consider both; I'll be honest as agency the safety tends to dominate but a number of projects where we've looked at wildlife connectivity features coupled with safety
yes we do
yes, we consider to accommodate wildlife passage
on a case by case basis
95% of time no; exception in __ where can make it work; (why?) because __ states no corridors - have whole 77,000 square miles cross roads anywhere; type of wildlife and state we have there is no way to channelize animal movements to locations to safely cross highway except in the hills

yes we do it but because trans oriented agency they're focus is on safety of people more so than safety wildlife
yes we do
we have done in the past
yep and we do on occasion, part if strongly identified area or there is a small identified as being a problem; one example I do know is culvert to convince small lizards to move that way instead of across the road (know name of lizards?) no
um it does we do a lot for safety to aspect, less of priority for spec wildlife; __ willing to be partner but look to outside source for funding; depends on who you talk to some parts of __ diff than others
yes we actually have done that
not aware but same time there are not many public lands in __; most private owned and fenced; not much open range, more diff for animals to move off highways than some places; __ public land, __ does not have much; do build cattle passes but don't think for wildlife - they could use the cattle ones and stream crossing bridges can see the tracks
yes yes
yes
yes

Q10. Raw responses may be found in Chapter 2.2.2 Question Responses.

Q11. Are you familiar with the ARC competition which focused on designing the next generation of wildlife crossing?

Uh, I personally am not but that doesn't mean to that env people aren't. Not familiar, no.
I was familiar with it yes, I don't think anybody else was
uh, no
uh, no
no I'm not familiar with it
yes, we put in a bid for __ to be one of the locations before CO but weren't chosen unfortunately but great contest; exactly what is needed to get issue out in front of engineers. I actually had an opp to utilize the video when I spoke to some high school kids. neat that produced as a teaching tool as much as competition; we want an arc comp in __!
I am.
gonna say specifically no but very strong likelihood that I've seen it; topic I pay attention to
no, I'm not
no
I think seen couple of pictorial things but not familiar in general
yes, actually the models at the last ICOET conference
yes
yes, heard of that
no, I'm not
um I've seen the competition not sure if it's the same
uh, no

I'm not
yes, I am not as familiar as you are; serve on __ committee, steering and abstract review comm., not beyond l__ and notifications and some links to project website, haven't really seen anything in couple months somewhat familiar
personally am not doesn't mean staff is not
no

Q12. Through Q13. Raw responses may be found in Chapter 2.2.2 Question Responses.

Q14. How do you think most people would think or feel about the following statement? "Just like crosswalks for pedestrian safety, it makes sense to also create safe passages for wildlife to cross roads."

I think most people would agree with that. To a certain extent.
Mildly agree to it.
Most people… I think people could agree with that general statement.
I think that seems like a reasonable statement.
Um, I think there's a certain part of population that would agree strongly with that; equally sizable that doesn't think about animals or needs so they would disagree; so the call is sort of split depending on attitude towards animals.
Uh, I don't think they would have this picture in their head; they'd think of a crosswalk. Without a picture wouldn't be able to visualize it or think of juxtaposition of crosswalks for wildlife is something they would see as feasible for how would work.
… Boy that's a tough one, taking myself out, suspect most public would say that doesn't make sense; animals aren't same as people, can get across roads same as we can.
It's one of those great logical statements but implications most people won't understand what's being asked.
Um, I suppose in general would be agreeable to the statement.
I think people would be in general favor that.
I think they'd like that but not many people in state believe it's possible.
I think most people would agree with that; I hope so because I use that perception when I talk to people about wildlife crossings.
Uh, most people I think they would think that was great but not practical.
I think some people in general agreement with that.
It does but I think right now with economy and whatnot not a good time to be spending a lot of money to save lives of squirrels and skunks and keeping employed in other areas.
Um, well, depends who talking to; I think makes a lot of sense but gen public don't think that way but growing number who do though.
Well, makes sense other than comparisons between animals and people; gen public hard time for wildlife to cross at certain points; people - put crosswalk but doesn't cross in crosswalk
Prob depends on economy, in tough times people say wasteful, in good times might not object.
Um, I think people would agree but not majority.
Um, I don't think they'd agree, typically wildlife crosswalk like a coyote downtown, rather keep wildlife separate, not saying it's right; just keep away and everything will be fine.
Um, probably a mixed response - more in favor than not; don't think people think about wildlife as needing to cross or preserving wildlife corridors; percentage opposed - why spending transportation money on animal

crossing; majority in favor.

Q15. How do you think most people would think or feel about the following vision statement? "We envision a systemic network of wildlife crossings wherever they are needed to make highways safer for people and wildlife and to make habitats more connected for wildlife."

I think most people would uh want us to incorporate elements of wildlife into our job where appropriate. I think that's what they would believe.
I think they would slightly agree with tha.t
It's good.
Um, I dunno I think a lot people intrigued by it; still alot of people unless out there and drive a lot; might be an intriguing mission statement are you trying to appeal to the general populace? Sportsmen have seen a lot of instances of animal-vehicular collision; a lot of people not even aware; seems like reasonable statement ideally I'd like to think we trying to achieve connectivity for migrations and eliminate collision; general public need; in a perfect world animals never interrupted by highways at all; obviously need a real global approach; we're doing best we can with limited funding; we have enough data to know where bad parts are; list but not attacking with any regularity; funnel in direction of problem areas; right now no funding for that specificity; public needs background education on this.
Um I think in general people would be supportive of that; in general that would be taken positively.
I think they would um that's a nice thing to seek to accomplish um depending on exposure to nature and wildlife and education assoc with their needs I think that's a higher scale; yeah I can get on board with that; it's more conceptual and when say without definitive link without crosswalk people can theoretically can support when bring to specific crossing location people become more skeptical because can't visualize.
I think most people supportive of statement like that, don't think too much about connectivity but most people say that sounds good.
Sounds like a nice statement, nice goal, lofty goal.
Again, think people would like the thought of having conectivityn and safer for both vehicles and wildlife.
I think most people wouldn't understand it; the statement almost leads people to an answer - safer for people and wildlife but not clear on what impacts would be; easier to support if don't know what impacts are.
Simply not applicable in this state; don't know a way to do it; haven't talked to anyone on how it would work; maybe not negative but prob not doable.
Think most people would agree and concern has to do with cost and need.
I think most people would be happy with that.
I think some people in general agreement with that, also; prob not everyone but yeah think so.
I think it's a y'know, depending on location in __ state we have a diverse pop and geo differences, __ plus rural ends which are sparsely populated and seems like most problems are in between areas where not used to seeing animals cross the road which is most difficult to control migrations. Theoretically it's a nice thought, financially diff for public to commit money to do that without signif discussion of money saved, lives saved and things of that sort; human lives instead of animals to a certain extent.
Most people y'know it's becoming more widely accepted, not sure you can say "most" but groups definitely on board with that; its approp in some cases but have to show stuff works to make a diff; going out and doing this in every location, not there yet and become an example of why not to do this stuff; this whole disc have to be built on successes, have to do this in right places where to make a diff then catch but not ready to do every time and everywhere and funding not there either.
Same, most people would approve and concur with that statement.
I think that's a good statement but prob in __ is mostly with deer and they are everywhere; there so many crossings, no concentration just spread out throughout state.
Sounds good to me, yeah.
I think they would agree sounds like right thing to do and might support it but doesn't understand implications

on what it takes to implement.
Think most people would agree; tie to safety and traveling public most agree.

Q17. How willing is your agency to invest in things that have not been done before?

Um. We have very open minds when it comes to uh harness new technologies and getting this done quicker more efficiently, getting things done to save money, we're very open to all of that stuff. Always looking to be on cutting edge of saving money, more efficiency, saving money for tax payer all onboard with that.
Mmm… depends on what it concerns. If related to safety or asphalt, cement or highway bridges I think they are willing to look at; once you get out of that sphere not very willing to look at it.
Not very
Um, I would say somewhat willing; with anything approach cautiously certainly don't want to go overboard; if talking WCSs in particular we have plans for future ones too; cautiously because monitoring program trying to develop a program, too. Doesn't do any good to be built and not monitored; have to know what's successful and what needs improvement; been able to build more because have data to show working; more momentum; I know for while didn't have info so how do you know it works? If direct more funding want to know its working; absolutely reasonable to ask; no point building a 1000 of them if they don't work.
Right now we are very willing and we're in process in accelerate bridge prgm where trying to do things that haven't been done - rapid bridge constr; also overall sort of policy of the agency as a whole is to look at diff ways of doing things, better ways, thinking out of box; like button red circle and line slash through it - always done it not justification for not trying something new; if shows some promise and serve good benefit, will consider it.
Um, I think they are pretty willing, __ has this expectation to be the leader in various things Senate Bill __ emission reductions, state political will to consider natural resources and integration in trans planning. We have some programs trying to get rolling that get regional planning more sophisticated and looks at natural resources as whole rather than as segments in trying to come up with mitigation and conserv strategy at regional level. Analysis is starting to occur to support emerging issue and on whole we do a lot of research for various trans and like to be cutting edge.
Pretty cautious about it, depends what we're talking about; on small scale trying a new concept for small mammals crossing pretty easy; large scale and high profile/risk develop neg public pressure. It's tough for our agency to do that. Can if insulated, for instance, research funds to try something new or in support from FHWA, bank roller as matter of fact, when share risk easier to step out and try something new. Nearly every proj fed aid backing (80%) or more, need pretty solid to justify because if federal says not meet reqs and does not perform then FHWA non-participating in cost, then state pays whole because normally 4:1. Very cautious with new things and get fed partners on board in advance.
We are quite willing; again has to be a reason; not just because fun, interesting in or cute but if reason and cost effective solution never been done before we will do it.
Mm, um, really depends on the project, there is willingness but agency needs to be convinced for the benefits before we proceed.
We're open to looking at it.
I'd like to say very willing but experience is not very willing to do that.
I would say um they're willing as long as data to back up the decision; on a scale of 1-5 most willing; on 3-4 range but also very important to have an engineering champion.
Laugh, depends if it's a new structure that's difficult but have been doing; built first bridge in a backpack in __ and other locations lined up; esp with bridges; accel bridge program in 2008 (8 yr program) innovative constr techniques; lots of heavy project moving in over weekend; bridges would have to be reviewed and expertise from other states; bridges are all about double redundant systems, perfect so if untested a little bit more intense of review.
Mmm, that's a tough one; right now w fiscal situation want to be sure decent investment it's going to work so has to be done successfully somewhere; might try new things if not cost a lot.
I think fairly open to innovative solutions for sure.

Um, not very willing usually tough, wanna know it's gonna work; want example its worked in past or evidence; got beyond that with wildlife structure not sure it would work and we've shown that it has; easier on some projects now; not unwilling open to discuss but not a given add to projects without knowing it will work.
Do you have an example? (general question) Can't answer for my agency think though large investments using public funding reluctant to implement something on large scale that hasn't been done before; gut feeling.
Fairly unwilling.
Um, I think pretty willing.
Very willing if safe for traveling public.
Um, yeah think initially a lot of resistance, if good yesterday why not good day, never did before, ultimately, unless someone has a hammer or someone is forcing it on us there is a lot of resistance.

Q18. Is your agency more likely to implement designs and programs that have been proven elsewhere even if they are expensive –or– is it more likely to be the first to implement new designs and programs that promise to be effective and save money?

We generally speaking we, uh, we work with FHWA and huh I would say we wouldn't be first to try but try to get on board as early as can if something has merit.
I think our department is willing to be some of the first people if save money.
Mmm... I'm gonna cop and out say it depends, most focusing on maintenance of current infrastructure 75 yr. old bridge, maintaining existing, not new roads/construction) so not innovating new things.
I think historically we tended to build program based on what others have done; not copying if extremely expensive but at least basis for own decision; if expensive but successful and might be worth it; can improve on; built on what others have done; WCS successful with limited info and pushing forward.
Um, we've right now we're the latter types, tried several bridge types experimental in nature and decided to try them out; build them to get experience to see how they work; people that decided to use them had vision that these new innovative structures can be potentially good and serve a need esp. for rapid construction; the old tried and true ways don't necessarily solve.
Little bit of both, depends on risk. Imagine that would factor in terms of safety and seismic that drives struc eng. I think the building industry is constantly working for strategies to do things faster and cheaper and better and so a lot of innovation comes from way we structure our building contracts and incentives associated with those and innovations can come from that structure. A lot of design-build options and ends up farming our eng side of the proj delivery which typically done in house. May see new innovations through that. Also looking at public private partnerships. See some privatization of trans may influence. Cost and seeing what people have done is influential doesn't mean do exactly same way. I think, um, this type out of box thinking will take some innovative engineers and so have the examples will help our eng cost and scope out and seeing Banff bridges is powerful the fact that those - I don't think they were built for wildlife movement orig or some weren't so don't know if costs realized on grounds is more powerful. Hesitation not with 2-4 lane highways because culverts have works; it's really with 20-lane highways what would be feasible? Implements somewhere may be the leaning to first choice for larger structures.
…Can't answer that one, can't speak to agency this one goes beyond env issues; with regard to env issues I think we're more likely to try new things that we think are going to be effective and strike out on own, not huge cost, but provide a lot of value - bat boxes, small crossings; thought effective and used again and were effective; wetland more progressive; we strike out on own fairly frequently.
Laugh… I love those kinds of questions, we are going to try to balance risk on that; either answer under a given circumstance; in general leaned to what has worked; balance risk and reward tough scenario.
Um, the latter.
Don't think I can answer that.
Latter really looking for effectiveness mostly; know sounds contradictory to what said before but if can show effectiveness willing to do - but not willing to do something if no basis, follow pack than lead.
I don't think it's either/or it's really project dependent; __ in situation of both; general easier to get known design through system and harder to implement innovative even though cost effective because of nature of

system but both can happen.
The more effective and save money that's what we look for; fast 14 project, replaced 14 superstructures in 10 weekends definitely cost more but the user costs were incredible savings so think of traffic impacts of replacing 14 bridges over 2-3 const cycle done in one summer; willing to spend more for innovative with hope less esp. for future projects; big selling point is saving time.
Hmmm... I don't know, really don't know, interesting question.
B.
Um, dunno 50/50; done both; if can show elsewhere helps but have gone forward just based on extrapolating on similar projects; first to build __ bridges that I'm aware but good to have experience of what's been done elsewhere.
Now getting into tough question; choose #2 actually.
First of those two; if ask __ opposite answer but __ is a whole other country.
We do want to save money these days more than ever, tricky two-part question - yes to both but __ rather unique, very flat state, don't have the topo relief so not cost prohibitive to just build overpass, so not a lot of those in __. Pretty much most are under road. If underpass works just as effectively – need much more fill, etc.
The latter.
Um, I think combo more so latter; our agency spec history of not going along with other state DOTs; eg. nationwide testing for guardrail but our department does not accept 49 other states test data; must do our testing; combo of two but historically have to prove to selves its warranted or working; forefront of developing own processes.

Q19 – Q20. Raw responses may be found in Chapter 2.2.2 Question Responses.

Q21. If you were invited to a face-to-face meeting to continue this dialogue with other DOTs and transportation and natural resource professionals, would you be interested in attending?

Uh, they have to pay my way because we have funding problem, but if not me we would have an appropriate delegate. We'd consider it. No guarantees though.
Depends on where it is; thing is I wouldn't get any permission to travel out of state – anymore.
Um, probably me or my biologist, one staff biologist, if possible to travel since state budgets up and down; sometime possible sometimes not.
Sure.
Um, potentially one of the key problems we have now is lack of travel, we can travel if someone else pays for that, even __ meeting has stipend; we rely on that to get; no travel funds for the state; potentially interested if outside source was funding a face to face.
Definitely, took part in __ on that policy developed for trans few years ago, we found that in two days we spent face to face, helpful and outlines barriers and constraints to policy; coming back together would be advantageous.
Oh, absolutely would love that opportunity.
Yes, I would, this is an important topic yes I would.
Uh, not personally, I feel there are other individuals in this agency better suited to attend and learn.
Yes but I have probably have a better person, researcher best person.
I'd be interested; currently out of state funding restrictions.
Absolutely that's why I went to __ last August.
Likely send staff; manager so don't get to go anymore; __ all DOTs get together and talk about wildlife

passage; __ has it too; latest and greatest - crossings, etc.; couple of staff who would love to go; sure if smaller group.
I would, depending on where, might not have permission; travel cut way down; web conference might be more likely to do it.
No, not really, I think there are other people who could offer a lot more to the conversation than I could.
Um yeah.
Tough question, (no response).
Probably not, __ better rep for agency than me.
I would be interested if fund my travel.
Certainly only if can bring people who really know stuff.
Um, yeah, interesting topic but that said, for our DOT, traveling out of state is often a barrier; may want to go but not as easy that.

Q22. Is it likely that your agency would provide financial support to do so?

At this point I don't know. They approve that stuff on case by case, funding tight.
No, already tried that with other similar conferences.
Totally depends on the budget situation; there is sometimes nobody travels anywhere; right now discretionary so if interest and if something big going on may be able to attend
Perhaps, depends on where it's at.
Um no.
If it's in __; issues with out of state travel; webinar would be able to; depends on when come out of recession if more loose from travel restrictions; FHWA has offered financial support for __ employees.
.. Uh, I think so, couple years ago would say no but we've been sending people out of state more often now and pretty good chance we'd go; easier if someone financed but might be too much to ask for.
It is possible, don't know if would or not, depends on conf and likely benefit of it.
Um ,it's possible, difficult but possible.
No; let go but no funding.
Unlikely.
Yes.
No, if not fully funded every dime don't get to go; very active in __, steering comm for __, go to conf and research panels and my travel is paid for or paying out of pocket; most states if not paid for completely doesn't pass desk; at__ we presented two papers had to have __ liaison present projects; funded position could go but I couldn't send own people; willing to send because these are very valuable conf; being involved in __ send email and response in 5 mins.
Probably not.
No, highly unlikely.
Depends on circumstances potentially; ICOET sort of thing would have to show that it's providing info back to the agency - not worthy group for sure for out of state travel.
Y'know they may because one of their priorities, maybe, could, not a no.
Yeah think possible, she has very good rapport with boss so usually do anything wants to do.
Honest not these last 3-4 years, haven't been able to travel at all; travel budget cut significant; new secretary approving more travel now; can always submit and see what happens, 5 years ago encouraged to travel because __ still viewed as leaders.

Caveat severe out of state travel restriction; no way in heck; politically even if another agency were to pay still can't go - more to do with public perception than avail funding.
Yeah if could get thru approval process; yes, do participate in national forums; select group that attends on a regular basis.

7.2. Raw survey responses

Q3. In general, which of the following do you deal with most?. [Range of choices included "project delivery," "policies and standards," and "other."]

"Other" responses (unedited)	
1	Construction of projects
2	construction
3	As the Environmental Services Bureau Chief, I deal with both environmental policies and standards, as well as project delivery, with a slight edge to project delivery.
4	Ensuring compliance with ecological resources policies and standards in delivery of projects
5	construction
6	Roadway Maintenance
7	Construction
8	Equally
9	Maintenance of the roadways
10	Professional service contracts for various disciplines
11	construction
12	maintenance of roadways
13	complaints
14	Contract administration and project management
15	Traffic Management
16	environmental
17	Construction
18	maintaining existing facilities
19	Both the same.
20	Construction & Maintenance
21	threatened/endangered species, general wildlife
22	Construction Management
23	construction
24	Traffic, Safety, and Operations
25	Information
26	Quality Control
27	Pavement Related Issues
28	a little of both; I deal with environmental policies and regulations to get projects through project delivery
29	Design of structures
30	Operation and Mobility
31	Aquatic Resources and T/E Species
32	Engineering Decisions

33	Pre-Construction Review and Issues during Construction
34	Both policies and project delivery
35	Work for Environment Service Noise & Air Quality Statewide
36	Both
37	Bridge inspection
38	Highway Design
39	Project Construction
40	Regional Coordination & Study Development
41	Highway Safety - Grants Administration/Program Development
42	field investigations and agency coordination
43	Both
44	Planning
45	Highway maintenance, vegetation management
46	Bridge Maintenance and Operations
47	Training
48	Regulation compliance
49	Manage project delivery policies and standards
50	Environmental construction compliance
51	Highway operatoins - maintenance & construction
52	maintenance
53	Delivering projects to best comply with policy and standards
54	Access to/from State Highways
55	long range planning studies
56	Developer
57	Customer Services
58	vegetation monitoring
59	Protect and Preserve System
60	system maintenance
61	Highway Safety - Data Analysis
62	Maintenance operations
63	design documentation
64	Environmental Research and Implementation of Research Findings
65	maintenance
66	both equally
67	Bridge Inspection and Load Ratings
68	both
69	Planning & Corridor Studies
70	Designing Interstate projects

71	Support of field maintenance stff
72	Bridge Inspection
73	Maintenance
74	road maintenance
75	Project design and construction.
76	Both - too close to separate.
77	construction
78	Maintenance
79	both- follow policies and standards to get projects out
80	Project Delivery/Environmental Clearance
81	We do environmental clearances for project delivery and develop policy and standars
82	Bridge Management
83	Maintenance and Operations of transportation facilities
84	Planning
85	operations and project delivery
86	Operations/Maintenance
87	Both above equally
88	Operations
89	construction management for HDOT Highways
90	GIS support for environmental services
91	Inspections
92	Advanced mitigation
93	Safety
94	All the above including research
95	Planning and Benefit to Cost Analysis
96	planning
97	Maintenance
98	Project Development
99	Maintenance and Construction
100	Maintenance of infrastructure
101	Environmental permits
102	NPDES permit compliance
103	environmental monitoring
104	Bridge Maintenance/Replacement
105	Section 404 permits and mitigation
106	maintenance and construction of the highway system
107	I deal with both project delivery and policies/standards
108	project design

109	INSPECTION
110	Comnplaint resolution.
111	Bridge Inspection
112	Preservation
113	Structure design
114	Obtaining environmental permits for projects
115	maintenance
116	Planning: project selection and programming; public involvement
117	Highway Maintenance
118	pre-construction environmental clearance
119	Envrironmental scoping, documentation, and permitting
120	Construction
121	Both - Policies and Standards as well as Project Delivery. I am a statewide Project Development Trainer. Training topics that I am responsible for = Design Documentation, Roadway Geometrics, Intersection Design, Interchange Design, Roadside Safety, and Pedestrian Accommodation (ADA)
122	I am dedicated to wildlife-friendly infrastructure, both from the standpoint of policy (establishing investment priorities) and standards (what elements do we include in project and how are they designed).
123	Maintenance
124	managing existing bridges
125	Project delivery that abides by all relevant environmental policies and standards.
126	Environmental Clearance
127	Maintenance
128	Construction Manager
129	All of the Above
130	Regional Engineering Management
131	Planning & Programming

Q7. Why do you continue to do this work? (Choose your top three reasons.)
Complete language for choices offered.
Opportunity for upward mobility in my agency
Already have an established career
It's good for the time being
Like the work environment my agency provides
Enjoyment/excitement in my work
Satisfaction of being able to design/permit/build a structure and see it completed
Opportunity to be creative/visionary
Pride/job satisfaction in serving people/tax payers of my state
Desire to build transportation infrastructure that is more sensitive to natural and/or cultural resources

Desire to build transportation infrastructure that better serves public mobility/economy/safety
Other (please specify)

Q7. Why do you continue to do this work? (Choose your top three reasons.)	
"Other" responses (unedited)	
1	It's a good fit for me
2	Great supervisor and coworkers
3	job benefits
4	Good job for the present.
5	good benefits
6	Retirement pension
7	Money
8	no
9	thought working with wildlife would be fun, desired to have work that was continuous and DOT's provided that, the work WAS relatively easy
10	Money
11	Job Stability
12	Eligible to retire, and am looking for something elsa at this time.
13	Opportunities for training in various fields (GIS, wetlands, etc.)
14	Opportunity to implement change
15	it pays the bills
16	Desire to build transportation infrastructure that better serves public mobility/economy/safety and minimize impacts. Being creative to meet the goal of accomplishing a project built to satisfy thes goals.
17	job market is bad, want to make 10 year mark for insurance sake
18	benefits
19	Making time to retire. There is no opportunities for upward mobility.
20	Pays better than other jobs
21	it's a living (sort of)
22	No other choice
23	Job to get paid and pay bills, etc.
24	love bridges
25	Enjoy managing natural resources
26	only way to deal with structures and the outdoors
27	job hours/flexibility are great for a family
28	Keeping employees working safely and doing their work tasks well
29	N/A
30	Opportunity to share knowledge
31	Opportunity to effect change

32	Close to retirement
33	Money - it's hard to live without it.
34	personal
35	The money. There are very few Environmental jobs in this area.
36	benefits
37	opportunity to live in a great location
38	DOT takes environmental aspects of projects seriously
39	no sense to move when close to retirement
40	opportunity to save lives
41	job security and benefits
42	High Wages (Engineering Field) & Health Benefits
43	Close to retirement
44	Provides health and retirement benefits
45	Slow economy
46	Pays the bills
47	I can make a difference
48	Security
49	Desire to serve the public, love my coworkers, pride
50	Desire to learn to do my job well
51	Need a job
52	security, salary, benefits
53	Set myself up for a comfortable retirement.
54	Jobs in transportation and dealing with environmental/safety/mobility issues are far and few between!
55	I need the paycheck, otherwise I would leave.
56	Satisfaction of seeing a project through that has minimized it's environmental footprint.
57	I love the positive impact transportation improvements have on our lives. i also love linking economic development to transportation.
58	Allows for flexible schedule
59	the injury and life saving opportunities
60	Wildlife habitat development. (Wetlands)
61	work is limited to an 8 county region-I no longer have to travel or stay out of town to "follow the work"
62	Promote safety - save lives

Q17. Please list any other necessary information not included in the list above. (This refers to the list associated with Q.16; see Section 3.1.2 Survey results)	
Other suggestions for necessary types of information (unedited; __ indicates identifying information removed)	
1	Safety data, Wildlife population data, AADT
2	some answers may not accurately reflect my DOT's position as I am not involved too much with the scope of this survey.

3	There are not any large migratory wildlife in __. The wildlife we have could cross anywhere and everywhere. Not sure about the practicallity of something like this in __. __DOT has in the past built tunnels under the road near __ for endangered __. Obviously, we had to do this becasue the __ were endangered.
4	Field Data to support the probability of the effective choice and use of a crossing selection and follow up data to support the choices made.
5	Drop down box is not working correctly. Will not keep the order that I put in.
6	Can't think of any at this time.
7	__ currently uses some below grade cattle crossings effectively .. do to the high concentration of rural sheep and cattle most areas have barbed wire along roadways except for government lands .. major issues end up being deer who get through barbed wire and small animals
8	It is difficult to separate out the above listed items since many of them are related. For example, an alternatives analysis would include several of the other categories (e.g., engineering, land owner impacts, costs and cost effectiveness, and commuter impacts).
9	Many of these items occur concurrently. Partner assessment would include coordination with FHWA.
10	your ranking button thing doesnt work and seems time consuming any way, so I'm skipping it
11	Political acceptability; urgency of competing projects of all types
12	Right of Way, Utilities, Permitting, Interagency Agreements, Prioritizaztion based on Benefit/Cost analysis of all projects being considered for wildlife crossings, Incorporation of assessment of wildlife crossings into agency design standards and approvals, coordination with Local Agency, Utility & developer Projects, availability of Grants on Local State and Federal levels, quantifying amount of habitat area and species affected by the project, assessment of all Planned and Programmed projects in the area to minimize throw away work.
13	Not applicable to __
14	The intent of question 16 was not very clear.
15	just a suggestion...too long a list
16	Can't speak for the whole agency on this, given that only 1 crossing structure since I've been employed here has been constructed. My responses are assumptions only.
17	#16 really doesn't fit the process by which my agency would build these structures. You mix and match design, and planning, funding and engineering and a few other things. Other questions didn't really grasp the process. There are multiple times and ways we could do these projects, or we could plan them, or the need can come up. You all need to partner more to understand the opporunities you do have.
18	question 15 the drop downs do not work properly.
19	Can some good Public Relations be obtained by doing the right thing at the particular location with known accident and crash history issues. I believe that the state needs to target the most effective areas where low development is expected and State Game Lands may exist. Constructing wetland banks in strategic areas away from the our highways may be more effective and can be used as mitigation for environmental impacts on projects.
20	The greatest concern would be futurer maintenance and operations costs. All other issues would be subordinate to that criteria.
21	State permit requirements
22	Sometimes these are required by Endangered Species Consultation like __ has for the __. There is also public perception to consider - not everyone thinks their taxpayer dollars should be spent on a special bridge for wildlife so there needs to be public input durning the environmental review.
23	na
24	Public Input...
25	What is the question?

26	Cost is a really big factor right now
27	Agency mandate
28	Regulatory requirements and approvals/permits
29	Future widening of the roadway at this location.
30	Mitigation requirements for project impacts
31	Pedestrian safety concern when wildlife is directed to the same structure. If moving deer, elk or other smaller animals to a pinch point you are also directing the predator animals to the same location which could put pedestrians at risk which is an agency liablity.
32	Your list above exceeds what we do for a minor project
33	na
34	Summarized guidelines about the focal species to inform the engineering process.
35	Please note that #16 drop downs did not work. Any selection caused the entire list to automatically fill in sequentially.
36	The radial button on this survey for question 16 is not working properly. It will not allow you to arrange your priority, it will only allow the choices to be listed 1-12 as seen above.
37	Need to know the migration habits of the animals that will use this crossing. We have long winters so snow accumulation on the structure and the roadway is vital to success of the crossing and safety for motorists.
38	Topography and actual migration path locations
39	Political acceptance of using public funds to construct an expensive crossing.
40	Money!!!!!!!!!
41	construction funding that is not diverted from other projects
42	If the assumptions (i.e. data, property ownership, topography and constructability) are already known then partner, internal and federal assessments play a role but not as large or valuable a role as if the assumtpions are unknown (i.e. because there is an established informational/data baseline to use). Our state has yet to get a grasp on what data and information is really considered valid data in relation to WVCs and or migratory/big game movement patterns and habitat needs (both reliable and accurate). As-built drawings are very helpful...but in the one case where __DOT (in conjunction with a collaborative partnership) did build one structure the site specific field conditions were to unique and as such any documentation from other places were utilized as examples of guidance .
43	none
44	I deal with all aspects of construction processes (at tail end of the construction) as Inspector Inc Charge (IIC) please note: 1. You need to consider the Educational process (change of culture) for department personal involved and contractors' attitude (maybe an incentive which maybe worked into the contract) 2. To give authorities to (competent? IIC) to implement the new changes at the end product.
45	Long-term planning prioirities that keep project on priority list over multiple funding cycles until approval can be obtained for design & construction

Note: Critiques about functionality of the tool indicate respondents who did not read the instructions to drag and drop choices to arrange in order of importance.

Q.26 If applicable, please share one practice employed by your agency that benefits wildlife.	
Open-ended responses (unedited); *italics* indicate not applicable responses.	
1	deer crossing signs
2	We have "no mow" zones in certain ditches.
3	wildlife crossing for endanagered felid, when Section 7 consultation demands it
4	*none*

5	I know of one Bridge built for a Deer crossing.
6	Interagency collaboration, research, planning, and project implementation with the state wildlife department.
7	Some wildlife crossings have been constructed under a couple of roads.
8	non mow areas in the ROW
9	wetland mitigation
10	We have been placing more emphasis on and increasing the use of wildlife friendly fencing.
11	Fencing constructed to direct wildlife to bridge crossings.
12	tunnel for endangered frog & turtle fence for high kill zone
13	Several projects I have been involved with required special structures or construction procedures to address endangered species.
14	Stock-passes on various roadways.
15	Various design concepts are introduced and presented through resource agency coordination for wildlife constraints.
16	The Environmental document process we use for each one of our construction projects identifies wildlife in the vicinity and examines the potential impacts.
17	research into night vision affected by glare of signing background--drivers can't see wildlife due to perception blindness similar to lifeguards not seeing the drowning person due to sameness of water.
18	Various wildlife crossing signing
19	Tunnels for endangered frogs.
20	we install deer crossing signs
21	Avoiding Wetlands.
22	mitigation for impacts to wildlife
23	Mowing program
24	In addition to avoiding nad minimizing impacts - Deer crossing culverts with directional fencing, Turtle crossing culverts with drift fencing, small mammal crossing culverts with drift berms, avian nesting structures, bat houses, mowing strategies, plantings
25	erosion control
26	Strict environmental policies and regulations to preserve natural environment
27	Not disturbing wetlands.
28	We try to look out for wildlife.
29	minimize construction site contamination to watersheds via runoff protocols (SW3P).
30	endangered toad tunnels
31	We have enviromental division
32	Crossing signs
33	Red cockaded woodpecker season: no construction during months where there could be eggs in the nest.
34	Wildlife warning signs for vehicles
35	Environmental Assisments
36	As mentioned before, we built toad tunnels near Bastrop.
37	This agency will place or build wildlife crossings at known locations of endangered species.
38	*N/a*

39	warning signs
40	Nesting Bird protection - limit tree removal - Federal reguirement, etc...
41	Crossings for ocelots
42	bridges that provide nesting areas for bats
43	Signage
44	SW3P
45	Have used larger culverts than hydraulically needed to allow for comfortable passage of wildlife.
46	Rural Districts create birding trails alond the Coast. I work in Houston, and they are highly urbanized and insensitive towards nature.
47	firm adherance to the MBTA
48	established bat habitat(s) in Austin District
49	No buidling during nesting seasons.
50	staging construction as to not disturb hatching season
51	*n/a*
52	Conservation easments
53	have trouble getting sidewalks built due to $$$$, wildlife crossings should be next to impossible for the same reason.
54	Stockpasses for livestock is also utilized by wildlife in the more rural areas of our state.
55	*no comment*
56	*Convice a politician to lead the effort, and any thing can be done in this state ... even if it does not make sense.*
57	cattle crossings
58	Wildlife crossing warning signage
59	cat tunnels (ocelot, jaguarandi)
60	spanning larger area of the floodplain when replacing bridges so wildlife has the ability to cross under the bridge
61	The inclusion of Stock Passes, for sheep, cattle or horses, under roadways that connect same-owner property, that could be used by wildlife.
62	avoids disturbing endangered species
63	Deer Crossing Signs - Turtle bridge
64	Halting construction during breeding season for burrowing owls and endangered frogs.
65	Cross culverts with raised platform for animals to cross under the roadway.
66	Builds longer bridges.
67	environmental report investigates wildlife in area
68	Crossings for endangered amphibians
69	We allow migratory nesting birds to continue their nesting till hatching (prior to bridge demolition).
70	*?*
71	Houston Toad Crossing
72	Bat Bridges
73	non-breeding season demolition of obsolete bridges

74	Houston toad crossings
75	We have built wildlife crossing structures
76	Protection of wildlife habitats.
77	mussel sweeps
78	East Tennessee Bear Crossing treatmments.
79	Wetland mitigation
80	Fish passage policy
81	We have constructed structure such as the ones shown in this survey on I-90.
82	Constant coordination with wildlife agencies and the public to identify and address wildlife issues.
83	Our structures (bridge openings and larger culverts) over water tend to be large enough to provide ample room for both human inspection and wildlife passage. Such structures tend to have signs of use by wildlife.
84	Wide Clear zones to be able to separate Vehicles and Wildlife
85	We recently put in some wildlife crossings in a corridor that had a high rate of deer/car collisions.
86	passage design for animals
87	shielded highway lighting
88	Installation of lots of fencing.
89	wildlife crossing structures and culvert replacements.
90	*Don't know.*
91	small animal barrier fencing
92	Conducting PNDI searches when projects are outside paved areas.
93	wetland banks
94	Wildlife Fence Project along I25 between MP 122 and MP 128
95	Fish baffles in paved streambeds.
96	environmental mitigation
97	build a lot of wildlife crossings
98	deer reflector installations
99	*n/a*
100	protecting endangered species
101	Putting Baffles under structures with concrete bottoms so fish can migrate up or down stream.
102	mud sill cribbing to promote fish habitat
103	Several projects have been built, usually because of the need for mitigation for some type of adverse impact.
104	Seasonal limits on construction activity for breeding or nesting.
105	game fence with "deer guards" and designated crossings on US 550
106	wildlife crossings
107	Wildlife fencing and escape ramps
108	I4/IL Program to remove barriers to fish passage
109	WY has provided many crossings for antelope, elk, deer ect.
110	removing fish passage barriers

111	Follow curent environmental regulations.
112	wildlife detection systems
113	I-90 Snoqualmie Pass East Project.
114	We look to modify roadsides to make wildlife easier for drivers to see
115	There are inexpensive practices we can employ now that no one will because helping wildlife is not seen as a benefit.
116	We install wildlife crossings but have few opportunities as usually done on reconstruction/construction rather than maintenance. As far as safety the main animal are deer and crossings would be needed everywhere to show any actual safety benefit.
117	Making bridges longer for animal crossing reasons
118	We have built a wildlife undercrossing!
119	We do build wildlife fencing on many projects.
120	Each porject is reviewed by many disciplines to make sure that wildlife will not be disturbed if possible.
121	wetland mitigation
122	xing structures
123	cutoff light fixtures
124	Incorporated several research projects under the "Stimulus Program" that are benefiting wildlife.
125	constructs crossings
126	Wildlife fencing in high migration areas to help move wildlife to protected crossing locations.
127	speciall guideposts
128	Past and current research on wildlife-vehicle collisions and mitigation.
129	we do have areas on I76 Morgan County, Colorado that we are using portable message boards to warn motoriest of crossing animals because of farming harvest causing wild life to look for food in other areas and because of wild fires causing more animals from the mountains to follow the South Platte river down to the plains to look for food
130	We talk to wildlife resource agencies on projects and solicit their opinions. If we are replacing a culvert for example it's no big deal to replace it with a fish friendly one.
131	we have one major wildlife crossing that employs an array of fencing and use of existing culvert crossings and several less complex crossing areas
132	WYDOT has constructed numerous underpasses throughout Wyoming. Two - 150 foot wide overpasses are currently being built in the western part of the state. Wyoming has received 3 exemplary awards from FHWA for this.
133	Using hazard trees to enhance fish habitat
134	Reconstruction of stream crosssings from culverts to bridges for fish passage and riparian habitat connectivity
135	A funded program for environmental retrofit of infrastructure that may impede fish passage and repair of areas that chronically degrade habitat especially along streams.
136	wildlife paths on bridge approaches
137	Construct wildlife crossings. Deploys wildlife warning signs and systems.
138	Interagency review and partnerships are key to modifying highway project designs to incorporate habitat improvements.
139	PENNDOT Enginnering District 9 built 6 wetland banks in it's six major watersheds. We started by building them near the roads but that attracted animals toward the raod where they eventually got his so we began to build them away from the roads in State Game Lands and other lands not susceptable to development

	where wildlife can thrive. We use the 10 acre sites to write off wetland impacts from our projects until there is no more acreage to use up and then we will build another 10 acre wetland bank. We also allow our Districts to pay into a statewide Wetland Fund to construct wetlands where needed most for mitigation.
140	buried culverts for aquadic passage
141	Bluebird and kestrel boxes at intersections
142	Fish passage crossings, but only typically willing to do the minimum required (i.e., select culverts over bridges due to future maintenance and operations costs, even if bridges would better meet the need).
143	Trees removed within the project area are mulched and used as erosion checks in the ditch instead of 3-foot tall silt fence that can limit wildlife movement.
144	permanent water quality treatment
145	We are installing 8' wildlife fencing to prevent collisions, however, we don't have the funding to create separated grade crossings.
146	maintenance is generally scheduled to avoid seasonal wildlife conflicts
147	construction of wildlife underpasses
148	Offsite compensatory mitigation. We do it regularly and at significant mitigation ratios.
149	Avoid tree removal during nesting season.
150	We have installed crossings due to high numbers of collisions.
151	Data collection of animal/vehicle collisions on State Highways and Interstate System in Colorado.
152	We have wildlife crossing on Interstate 99 in Centre County, PA
153	We have one new passage in our region, more planned in adjacetent regions on Snoqualamie Pass.
154	retrofitting of bridge structures, constructing wildlife fencing, constructing wildlife escape ramps.
155	considers upgrading sizes of culverts to allow aquatic/riparian animal passage if possible.
156	When warranted, we include wildlife connectivity in our design process.
157	Providing Fish Passage Cuveerts
158	Doing what outside agencies force us to do in order to get our projects permitted even if it is not in the best interest of the tax payers.
159	Wetland banking
160	We assess for wildlife movements and at least preserve habitats important to them - and sometimes, we do wildlife fencing and some underpasses. We have not done any overpasses for them but this looks interesting.
161	Wildlife fences
162	culverts as small mammal crossings
163	Integrating wildlife benches into stream crossings
164	*no thanks*
165	Moose Crossing flashing lights at high incident locations.
166	Compliance with NEPA.
167	wetland bank sites provide wildlife habitat, wildlife culverts in Shawnee Natl. Forest, roadside habitat inventory conducted, deer-collision data used to plan and design highways
168	deer fences...where we already have a natural crossing structure such as a bridge
169	Increased use of cable barrier.
170	additional bridge length to provide paths under bridges

171	*N/A*
172	control of tree triming/ removal, and time of roadside mowing
173	The MOU's we have with organizations like the Forest Service, BLM, DOW …
174	wetland restoration
175	compliance with existing environmental laws
176	Habitat protection for endangered species.
177	We have constructed or plan to construct several different types of wildlife crossings
178	Wildlife crossing installed
179	*Sorry, I do not know.*
180	culvert retrofit for fish and wildlife
181	wildlife crossings
182	New bridges with understructure benches for wildlife passage
183	contructs fish ladders
184	building wider clear span bridges.
185	Placing breaks in guardrail runs are in alignment. Critter crossing box culvert under roadway
186	Has supported efforts to document wildlife corridors and implement "grassroots" wildlife projects in the state
187	escape berms
188	We have designs for breaks in barrier systems or changes in barrier type to facilitate animal passage.
189	wildlife crossing incorporated into the design of a concrete median barrier
190	ENVIROMENTAL STEWARDSHIP IS PART OF OUR MISSION
191	Only do work during applicable work windows
192	Fish Barrier Removal Program
193	warning signs of wildlife crossing
194	Wildlife crossing program
195	Signage at hot spots
196	Bog Turtle crossings.
197	Retrofitting culverts to make more fish passage friendly (only because the tribal lawsuit)
198	We build wildlife crossings.
199	Seasonal night time posted speed reductions for wildlife areas.
200	Signing known specific crossings and closing road(detour) for a specific migraition in State owned propety / forest / natue preserve, etc.
201	fish passage projects that accommodate other wildlife and extreme weather events
202	We build wildlife crossings and would build more if funding allowed. We cannot maintain our existing infrastructure under current funding so justifying additional infrastructure is difficult.
203	Interagency communicaton to determine impacts outside the roadway prism
204	We havae a few tunnels for wildlife to cross under highways.
205	Stormwater treatment where feasible

206	Larger box culverts under fill and pipes placed in large fills so animals can go through instead of up and over.
207	Identifying culverts that are aren't fish-passable and prioritizing their replacement in order to fix them asap.
208	Wildlife fencing?
209	wildlife fencing
210	wild life x-ings on new highway construction
211	wetland mitigation
212	fencing
213	Track all road kill location including species to determine problem areas.
214	We have implemented Wildlife Crossings, on previous projects.
215	Fish Weirs and Small critter crossings where appropriate
216	wetland preservation
217	Installing drainage structures that may be opportunistically used by wildlife. This is a great solution.
218	fencing to prevent wildlife crossings of the interstate
219	Green Infrastructure planning
220	depressed culverts for fish passage
221	During a design we specifically designed an area where wildlife had better access to their own habitat
222	Wildlife crossings under roadway (Box Culverts specifically for animals, not drainage)
223	consideration of aquatic lifeform passage when designing drainage culverts > 24"
224	Fence along limited access roads to prevent wildlife access to the road.
225	Natural bottom required in all new box culverts.
226	restrictions on construction during certain wildlife seasons.
227	no net loss wetland program
228	Water Run off midigation to help ensure or lessen the silt impact to streams and waterways.
229	install animal crossing warning signs
230	As we change out our light pole and luminaires, we are replacing convex lenses with flat lenses so that shearwater gulls do not mistake them for the moon and end up by the highway.
231	We actively build and monitor wildlife crossings and study wildlife movement and collisions as an indicator of where new crossings/fencing are needed.
232	We have built animal crossing and track animal collision data.
233	WYDOT has installed and will install more under ground game crossings. We will do so as a roadway project is constructed. Without TIGER funds WYDOT will not construct game crossing without improving the 10 mile section of roadway.
234	We are building fish passable culverts using "stream simulation" design and we have noticed (with remote willdlife cameras) that we are getting a bonus of wildlife passage (deer particularly)
235	Wildlife crossing, wildlife fencing and electronic detection system
236	Maintenance tracks deer mortality
237	Fish passage barrier removal & wildlife crossings
238	MBTA specification
239	Signing and flashing lights on migratory areas where we have the most fatality.

240	We install cattle and ungulate fencing to protect the animals and the motorists.
241	When justified through cost benefit, stand alone wildlife connectivity projects have been developed and implemented.
242	WSDOT is working with the Department of Fish and Wildlife and other stakeholders on a statewide habitat connectivity assessment that will identify areas where wildlife require movement across the highway. In addition to this planning work, WSDOT is incorporating wildlife protection measures in its projects. One example is a new project that is just beginning construction, the Interstate 90, Hyak to Easton project, which has a number of wildlife crossing structures and wildlife fencing. There are other examples, such as the recently completed wildlife crossing underpass on SR 240 that provides access to habitat in the vicinity of McNary National Wildlife Refuge, the bridge at Casey Ponds, on U.S. 12, which was built with an increased span to accommodate wildlife crossings along the water's edge, and the wildlife fence on US 97A. http://www.wsdot.wa.gov/Environment/Biology/FAQwildlifeCollisions.htm#protect
243	We do wildlife mitigation. it is a problem and we are addressing it as money permits
244	Limiting new barrier, building fencing and crossings.
245	E & S plan to safe guard water ways
246	NMFS requirements and state fish passage laws, some of which require bridges 2x channel width or more.
247	Accepted interdisciplinary approach to most projects
248	Using stream simulation sizing during replacement of most fish barrier replacements, allowing dry stream banks to be present under most conditions.
249	Flood lights on the bottom of temporary structure to avoid shadow barrier for fish. First state to use fish muffler when driving piles in water.
250	installatin of electronic moose mats
251	*I don't know of anything conducted by our agency that is really applicable as a practice (do be a practice it has to be replicated and recurring).*
252	We have developed a wildlife roadkill application to track animal types, location date, etc.
253	Signing
254	Advisory signing for wildlife crossing areas
255	Wildlife fence along a high crossing area along Interstate 80.
256	Always considered in the design process.
257	Modified fence design
258	In the NEPA stage of the environmental process we have implemented an Interdisiplinary Team and a Mitigation Development Team to work with Federal/ state Agencies and other enviromental groups to promote the I-90 Snoqualmie Pass East project with great success. The process is slow but is makign inroads to balance transportation and connectivity needs.
259	*N/A*
260	Snoqualmie Pass Wildlife Crossing
261	Federally mandated stream crossing rules
262	We have built crossings.
263	We consider wildlife crossing in every rural project we plan throughout the state.
264	electronic elk/deer crossing warning message signs placed during winter at main crossing zones
265	animal crossing signs
266	Cooperative fencing programs.
267	open bottom and sunken culverts or structures for crossings

268	wildlife crossings
269	Wetland Mitigation
270	Building in strategic exit points for deer along high volume deer crossing areas of the Interstate System
271	wildlife crossings, fencing
272	Bog Turtle investigations, species of concern study prior to project implementation
273	Wetland Banks
274	wetland mitigation
275	use a conventional bridge over a creeck not boxculvert because of fish/trout
276	Our DOT is a statewide agency that consists of several multi county districts. I work in a urban /suburban 8 county district located in the south central to south eastern part of the state. We employ a multitude of practices that benefit wildlife, however we have not idetified any locations that would benefit from a wildlife crossing.
277	Constructing under-road passages when practicable.
278	Stream crossing rules that are extream
279	There are several practices used in Minnesota. Some bridges allow for wildlife crossing areas underneath the roadway. We also have a mowing policy that allows nesting birds to complete their breeding and nesting season before mowing can be completed.
280	We tend to avoid wetlands as much as possible. And mitigate where T and E species are involved.
281	wetland mitigation
282	Dedicated large under roadway culverts.
283	We have built many wildlife under-crossings and we have one overpass in the state.

Q32. If someone from your agency were invited to a face-to-face meeting to continue this dialogue with other DOTs and transportation and natural resource professionals, what two staff role(s) would be the most appropriate to invite?	
Other suggestions for staff roles to invite (unedited; __ indicates identifying information removed)	
1	Chief Design Engineer
2	maintenance supervisor, construction supervisor
3	the people that actually work on the road
4	Traffic Engineer
5	environmental scientist
6	the executive director is the dictator!
7	Transportation Commission Chairman
8	Commission member
9	__ Wildlife Biologist HQ
10	District environmental head supervisor, because closer to all pertinent information, including natural resource agencies, design, construction, and maintenance.
11	Director of Assistant Director
12	Hwy Safety Engineer
13	Environmental Researcher
14	the man who know the habit of the animals best.

15	depends on type of meeting
16	State Design Engineer
17	Field opperations engineer.
18	Secretary of Transportation
19	Environmental Manager
20	Commissioner Level
21	Sorry can't stick to just 2: It would be important to have upper-level management that included a biologist and maybe applicable to have staff biologist responsible for implementing projects at the ground level.
22	Washington State Secretary of Transportation
23	District Engineer
24	District Engineer
25	Director
26	area foreman
27	Chief Bean Counter (Director Capital Program Development & Management)
28	Safety Managers
29	District Maintenance Manager
30	Some one that cares at a managerial/excutive level to finding "real" solutions. Someone that knows how to work collabortively between natural resource, land-use and transportation agencies and understands the "larger picture" of "collective values" and "mission needs".
31	don't know who, but know it will be way more than two
32	Field level personnel with experience in constructing wildlife structures
33	Structures engineer

7.3. Survey tool

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***1. Please select your state.**

***2. Please select the option that most closely describes your main area of focus in your DOT.**

- ◯ Promoting human mobility
- ◯ Protecting natural resources/wildlife
- ◯ Equally-focused on promoting human mobility and protecting natural resources/wildlife

***3. In general, which of the following do you deal with most?**

- ◯ Project delivery
- ◯ Policies and standards
- ◯ Other (please specify)

***4. Do you supervise/manage the work of other staff?**

- ◯ Yes
- ◯ No

***5. If yes, are you in upper, middle or lower management?**

- ◯ Upper (director, administrator...)
- ◯ Middle (bureau chief, section supervisor...)
- ◯ Lower (front line supervisor, unit supervisor...)

*6. Which best describes the main force that motivated you toward your current career?

- ◯ Role model(s) while growing up
- ◯ Specific interest in particular subject(s) in school
- ◯ Passion for outdoors/natural resources
- ◯ Fascination with built structures such as bridges
- ◯ Just "fell into it"

*7. Why do you continue to do this work? (Choose your top three reasons.)

- ☐ Opportunity for upward mobility in my agency
- ☐ Already have an established career
- ☐ It's good for the time being
- ☐ Like the work environment my agency provides
- ☐ Enjoyment/excitement in my work
- ☐ Satisfaction of being able to design/permit/build a structure and see it completed
- ☐ Opportunity to be creative/visionary
- ☐ Pride/job satisfaction in serving people/tax payers of my state
- ☐ Desire to build transportation infrastructure that is more sensitive to natural and/or cultural resources
- ☐ Desire to build transportation infrastructure that better serves public mobility/economy/safety
- ☐ Other (please specify)

*8. Please select your level of agreement with the following statements.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There is good interdisciplinary cooperation in my agency.	◯	◯	◯	◯	◯
My agency is committed to minimizing impacts to wildlife and the environment.	◯	◯	◯	◯	◯
My agency welcomes new ideas, new collaborations and/or ways of doing things.	◯	◯	◯	◯	◯

***9.**

Would you say that most tax payers in your state believe that minimizing wildlife-vehicle collisions should be a priority?

- ◯ Yes, most believe that
- ◯ Only those who live/work/travel in rural areas with a higher risk of hitting larger animals believe that
- ◯ No, most do not believe that

***10. Is minimizing wildlife-vehicle collisions a priority for your agency? (Choose best fit.)**

- ◯ Yes, it's one of our top priorities across the state
- ◯ It's a priority only under certain circumstances
- ◯ No, it's not a priority at all because we have more important things to focus on
- ◯ Not applicable because our state does not have any wildlife large enough to cause a collision

***11. Would you say that most tax payers in your state believe it is important to ensure that terrestrial wildlife can move across the landscape and across roadways?**

- ◯ Yes, most believe that
- ◯ Most have probably never even considered it, only those who are aware of wildlife believe that
- ◯ No, most do not believe that

***12. Is ensuring that terrestrial wildlife can move across the landscape and across roadways important to your agency? (Choose best fit.)**

- ◯ Yes, it's important; it's a standard part of our environmental review process and addressed, if needed
- ◯ It's becoming more of a focus with increased awareness but it's not a standard practice yet
- ◯ We'll ensure it only if some other entity pays for it
- ◯ No, it's not important

***13. Does your agency consider building wildlife crossings to improve safety and habitat connectivity for wildlife? (Choose best fit.)**

- ◯ Yes, definitely, we follow it as a best management practice from policy level down to project delivery
- ◯ Yes, in theory, but we are very limited by topography, habitat and/or land ownership
- ◯ Yes, in theory, but funding is the limiting factor.
- ◯ Yes, on a case by case basis and only if human safety is the real issue
- ◯ No, up until now we have not

***14. If yes, during what planning stage is the decision made that a crossing will be built? (Choose best fit.)**

- ◯ Long-range, statewide planning process predicts it
- ◯ Project delivery: preliminary design stage (feasibility/concepts/interdisciplinary collaboration)
- ◯ Project delivery: environmental review process
- ◯ Project delivery: final design stage (construction plans/permitting)
- ◯ No clear protocol: just depends if funding is available
- ◯ No clear protocol: just depends on whether there is an apparent safety issue
- ◯ No clear protocol: decision is made whenever there are both a justified need and available funding

***15. Prior to this survey were you familiar with the ARC competition which focused on designing the next generation of wildlife crossing? (For future reference, visit http://arc-solutions.org/what-is-arc/.)**

- ◯ Yes (Saw a presentation, read an article, saw the model exhibition, perused the website, saw the video and/or even tried to participate)
- ◯ I'm not sure, sounds familiar
- ◯ No

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***16. If your agency was presented with a structural design to reduce wildlife vehicle collisions and to allow animals to move safely over a busy highway in its jurisdiction, it would likely want and need various types of information before constructing it.**

Assume that:

1. There is a scientifically-documented need for mitigation in a particular location based on accident reports, roadkill surveys and wildlife movement data for at least one focal species.

2. Land ownership is such that habitat connectivity on both sides of the highway will be maintained into the future.

3. The topography and substructure are conducive to supporting a built structure.

4. Wildlife fencing would be installed to prevent at-grade crossing and to funnel animals towards the structure.

Drag and drop choices to re-arrange them into your order of importance; 1 being the most important.

☐	Aesthetics and land owner impacts (visual appearance, potential effects to adjacent property owners, etc.)
☐	Alternatives and prioritization (societal costs of no action, comparison of alternative ways to solve problem, ranking among other priorities, etc.)
☐	As-built drawings that have worked in other places
☐	Commuter impacts (time and space required for construction, potential delays or detours, etc.)
☐	Cost estimates and funding (life cycle cost, vegetation maintenance, availability of construction materials, funding sources, etc.)
☐	Cost-effectiveness (probability of use by focal species, probabillity of successful reduction of wildlife-vehicle collisions, estimated savings because of reduction, etc.)
☐	Engineering (design details, dimensions, ratios, calculations and rationale, etc.)
☐	Environmental (materials used, effect on geological, hydrological and biological patterns and processes, etc.)
☐	Federal assessment (meets guidelines, policies and standards of AASHTO and FHWA)
☐	Internal assessment (in-house expert approval; meets guidelines, policies and/or standards of your agency, etc.)
☐	Partner assessment (interdisciplinary expert approval; peer agency acceptance, etc.)
☐	Risk (potential safety hazards [roadside obstacle, earthquake, rain/snow saturation, liability], etc.)

17. Please list any other necessary information not included in the list above.

***18. Please indicate the level of agreement you think most tax payers would have about the following statements.**

	Most would strongly disagree	Most would generally disagree	Most would generally agree	Most would strongly agree	Not applicable - most tax payers do not understand the practical or economic implications of providing safe passages for wildlife to have an informed opinion
"Just as we plan for pedestrian safety, it makes sense to also ensure safe passages for wildlife to cross roads."	◯	◯	◯	◯	◯
"We envision a systemic network of wildlife crossings wherever they are needed to make highways safer for people and wildlife and to make habitats more connected for wildlife."	◯	◯	◯	◯	◯

***19. Do you believe it is possible that all US DOTs could share and work toward this vision, "We envision a systemic network of wildlife crossings wherever they are needed to make highways safer for people and wildlife and to make habitats more connected for wildlife." ? (Choose best fit.)**

◯ Yes, it is undoubtedly possible, especially if AASHTO and FHWA are involved

◯ Yes, it is possible but cost and how-to are limiting factors

◯ No, I don't believe it is possible

Implementing Wildlife Crossing Infrastructure: Understanding DOT Culture

***20. In one word, how do you respond to the idea of having a nationwide systemic network of wildlife crossings wherever they are needed to make highways safer for people and wildlife and to make habitats more connected for wildlife? (for example, "reasonable", "unrealistic", "hopeful", etc...)**

***21. If there were obstacles or barriers to nationwide systemic deployment of terrestrial wildlife crossing structures, to what single reason would they most likely be related?**

- ◯ Personal belief that it is not possible to balance human mobility with habitat connectivity for wildlife
- ◯ DOT-level policy and/or culture
- ◯ Economy and available funding
- ◯ No perceived problem by the motoring public
- ◯ No perceived priority by the motoring public
- ◯ Federal policy
- ◯ Technology and know-how
- ◯ Other (please specify)
- ◯ Not applicable; there are no obstacles or barriers

***22. How willing is your agency to invest in things that have not been done before? (Choose best fit.)**

- ◯ My agency is very willing because it's always looking to be on the cutting edge to be more efficient and save money
- ◯ My agency is willing to consider such investments but we're more likely to follow another agency's lead to have proof that it worked
- ◯ My agency is willing only if there are partners to distribute the risk if it doesn't work
- ◯ My agency is resistant to consider such investments

***23. Which of the following best describes your agency? (Choose best fit.)**

- ◯ More likely to implement designs and programs that have been proven elsewhere even if they are expensive
- ◯ More likely to be the first to implement new designs and programs that promise to be effective and save money
- ◯ We tend not to be one way or the other, it depends on risk-reward scenario of the project or program being addressed

***24. Which are the most likely reasons your agency would not be the first to implement a new design or program that promises to be effective and save money? (Select top three.)**

- [ ] A state or tribal statute against it
- [ ] My agency's bureacracy makes it slow to accept new ideas
- [ ] No dedicated funding for building and maintaining the new design or program
- [ ] No pressure from external entities to do so
- [ ] Not convinced the public would support it
- [ ] Not enough data to show that it is safe
- [ ] Not enough data to support the claims of cost-effectiveness
- [ ] Not rewarded for taking risks, only reprimanded if something does not go as planned
- [ ] Too busy with regular work for anyone to be a champion of something new
- [ ] Not applicable - there is no underlying reason we wouldn't do it if there is a reasonable promise of success

***25. In terms of how your agency conducts business of building and maintaining safe roads, on which of the following are its choices MOST dependent?**

- ◯ The economic situation
- ◯ Demands for environmental compliance
- ◯ Federal mandates
- ◯ Its own culture/way of thinking and behaving

26. If applicable, please share one practice employed by your agency that benefits wildlife.

***27. What was the number of crossing structures designed and built specifically for terrestrial wildlife in your state... (Please count overpasses and underpasses but do NOT count retrofits or drainage structures opportunistically used by wildlife.)**

	0	1-10	11-50	>50	Don't know
As of 10 years ago?	◯	◯	◯	◯	◯
As of 2012?	◯	◯	◯	◯	◯

***28. What is the number of retrofits done specifically to benefit terrestrial wildlife in your state...**

	0	1-10	11-50	>50	Don't know
As of 10 years ago?	◯	◯	◯	◯	◯
As of 2012?	◯	◯	◯	◯	◯

***29. Please answer the following as they pertain to your agency and its wildlife crossing structures.**

	Yes	No	Don't know	Not applicable
Do the structures have associated elements to prevent animals from crossing at-grade (e.g., fencing)?	◯	◯	◯	◯
Does your agency provide escape routes (e.g., jump outs) if animals did find themselves on a fenced roadway?	◯	◯	◯	◯
Does your agency maintain structures to ensure they are passable by terrestrial wildlife?	◯	◯	◯	◯

***30. Does your agency monitor terrestrial animal use of your crossing structures as a matter of course?**

- ◯ Yes
- ◯ No
- ◯ Don't know
- ◯ Not applicable

***31. If yes, does it share/publish results from its monitoring efforts?**

- ◯ Yes
- ◯ No
- ◯ Don't know

***32. If someone from your agency were invited to a face-to-face meeting to continue this dialogue with other DOTs and transportation and natural resource professionals, what two staff role(s) would be the most appropriate to invite?**

- [ ] Staff biologist
- [ ] Chief biologist
- [ ] Environmental head supervisor
- [ ] Staff engineer
- [ ] Chief engineer
- [ ] Engineering head supervisor
- [ ] Staff planner
- [ ] Chief planner
- [ ] Planning head supervisor
- [ ] Upper-level management
- [ ] Other (please specify)

***33. Would your agency allow out-of-state travel if the meeting coincided with a major international conference on ecology and transportation in late June 2013?**

- ◯ Likely Yes
- ◯ Likely No

***34. Is it likely that your agency would provide financial support to attend?**

- ◯ Yes
- ◯ Somewhat, funding is tight but they approve on a case by case basis
- ◯ No but it would accept funding if another entity paid for it
- ◯ No and it would not allow out-of-state travel even if another entity paid for it

***35. Please provide one or two names and contact info for the most appropriate agency staff to attend such a meeting. (Alternatively, have those individuals contact Angela Kociolek angela.kociolek@coe.montana.edu to express their interest.)**

36. Is there anything you would like share with regard to DOT culture when it comes to implementing wildlife crossing infrastructure?

Thank you for completing our survey!