

# Meeting Notes



## I-70 Floyd Hill to Veterans Memorial Tunnels

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**Project:** I-70 Floyd Hill to VMT  
**Meeting:** ALIVE Issue Task Force Meeting  
**Date:** April 20, 2018; 10:00 am to 12:00 pm  
**Location:** CDOT Region 1, 425 Corporate Circle, Golden, CO

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**Attendees:**  
See Attached Sign-in Sheet

Summary of Action Items	Responsibility	Status
1. Follow up to see if there are site specific locations that may still be using sand for treatment	Neil Ogden	
2. Look into designs for rockfall netting that minimize entanglement	Julia Kintsch and Stephanie	
4. Check with drone footage used for rock fall to see if it caught any issues with entanglement or animals	Neil Ogden	
5. Provide preliminary crossing design and or schematics to Clear Creek County to facilitate opportunities for partnerships with local development	Neil Ogden	
6. Look into opportunities for conservation easements	Neil Ogden, add to agenda for ROW meeting	
7. Coordinate with Joe Walter on additional wildlife carcass information to add into reporting	Julia Kintsch and Keith Hidalgo	

### SUMMARY OF DISCUSSION

[Note: Action items are in [blue](#).]

#### 1) Welcome / Introductions

Self-introductions were done by the group

#### 2) Project Overview

Vanessa Henderson (CDOT) gave a project overview as shown in the attached presentation.

#### 3) ALIVE MOU and Previous Studies

Julia Kintsch (ECO-Resolutions) provided background on the ALIVE MOU, roles of members of the ALIVE committee, and described the Linkage Interference Zones and mortality data in the Floyd Hill Study Area as shown in the attached presentation. For more information on the ALIVE MOU refer to: [https://www.codot.gov/projects/i-70-old-mountaincorridor/final-peis/final-peis-documents/20\\_App\\_E\\_ALIVE\\_MOU\\_Rev50.pdf](https://www.codot.gov/projects/i-70-old-mountaincorridor/final-peis/final-peis-documents/20_App_E_ALIVE_MOU_Rev50.pdf)

The ALIVE MOU came out of the Context Sensitive Solutions process and was part of the I-70 EcoLogical project that was a Regional Ecosystem Framework for Terrestrial and Aquatic Wildlife along the I-70 Mountain Corridor.

<https://www.codot.gov/projects/i70twintunnels/other-documents/plt-technical-team/issued-task-forces/waterresources/A%20Regional%20Ecosystem%20Framework%20for%20Terrestrial%20and%20Aquatic%20Wildlife%20Along%20the%20I-70%20Mountain%20Corridor.pdf>.

Included the identification of 17 Linkage Interference Zones (2011) that updated the original 13 LIZs (2004). Requested agreement on using 2011 LIZ. ALIVE representatives present agreed to use the 2011 LIZs.

ALIVE Implementation Matrix <https://www.codot.gov/resolveuid/0928f54fb1e94dfa8a57a996edcc7e77> (what questions should be asked at each stage of the project life cycle, currently in project development)

I-70 EcoLogical Guidelines for Enhancing Wildlife Permeability:  
<https://www.codot.gov/resolveuid/34aa4c925fb245f0848e7473e6f9325d>

#### **Clear Creek Junction LIZ from MP 243.0 – 244.9**

Julia Kintsch presented the Wildlife-Vehicle Collision rate, carcass collection numbers and other connectivity issues in this LIZ to the ALIVE committee. Identified improving bridges over Clear Creek and wildlife crossing at 244.9.

*Stephanie Gibson (FHWA): Recommendation on fencing?* Julia Kintsch responded that yes, fencing should always be considered when structures are discussed.

#### **Beaver Brook LIZ from MP 245.5 – 250.2 (project area ends MP 248)**

Julia Kintsch presented the Wildlife-Vehicle Collision rate, carcass collection numbers, Preble's habitat, and other connectivity issues in this LIZ to the ALIVE committee. Identified crossing opportunities at MP's 246.5, 247, 247.5 and 248.2.

#### **Aquatic Connectivity (included to see what the needs are)**

Julia Kintsch presented on aquatic connectivity as identified in the presentation

Julia Kintsch presented the ALIVE Implementation Matrix as shown in the presentation.

*Jo Ann Sorensen (Clear Creek County): Should we also be asking the same questions under project design (phasing in the matrix)?* Yes, we should be asking the questions listed under the first 3 phases, up to project design.

*Alison Michael (USFWS): ALIVE came out of one of the core values from the original CSS process. These are things that the collaborative effort came up with to improve conditions in the corridor.*

**I-70 Traffic and Revenue Study** (<https://www.codot.gov/projects/i-70mountaincorridor/trafficrevenuestudy>) An overview of the study is provided, but a link to download the report isn't available. For further information about the project, contact Benjamin Acimovic, CDOT project manager at Benjamin.Acimovic@state.co.us, phone 720-497-6936.

Julia Kintsch provided an overview of the wildlife connectivity issues discussed during the study.

Neil Ogden (CDOT): Was cost determined for the crossing at 247? Where it was headed, but not finished.

Alison Michael: Where is 247? Located between Hyland and Beaver Brook exits.

#### **4) Wildlife Connectivity Issues and Concerns**

Julia Kintsch presented on the various wildlife issues and concerns identified in previous studies and for the Floyd Hill Study Area, data needed, effects on wildlife, and initial mitigation recommendations. Extended discussion on Bighorn Sheep.

Jo Ann Sorenson: Are there issues related to the maintenance of the highway? Yes, but these issues came from the public meeting last summer.

Doreen Sumerlin (USFS): Did anything come up related to the increase of more sand in the creek due to more pavement lanes? Yes, came up at SWEEP.

Jo Ann Sorenson: Do we have a clear understanding of the maintenance activities? And what is used on the corridor.

Neil Ogden: Areas treated by traction sand recently changed – now being used from Empire Junction to 241 interchange (east Idaho Springs), magnesium chloride is being used from 241 to Denver. **Neil will follow up to see if there are site specific locations that may still be using sand.**

Francesca Tordonato (CDOT): Was there a high number of bears picked up?

Joe Walter (CPW): Not last year, but 4 or 5 the year before. May be due to population and weather. Not a lot of opportunity for hunters on the Front Range. Not on the steep part of Floyd Hill, but typically between Floyd Hill and El Rancho. Bears don't have consistent crossing (like lions). Tend to be more adaptable in crossings.

#### **Wildlife-vehicle collision issue:**

Julia Kintsch provided an overview of wildlife-vehicle collisions and carcass data for the Floyd Hill Project area and which species made up the majority of reporting.

A lot of the data is not reported. Not seeing all of the numbers, but can see patterns. **Joe has more informal data which he can provide on other locations on wildlife carcasses that he has collected in the study area.**

#### **Canada Lynx issues:**

Julia Kintsch provided an overview of lynx and likely habitat for lynx for the Floyd Hill Study Area.

#### **Preble's Meadow Jumping Mouse issues:**

Julia Kintsch provided information on the Preble's habitat located in the Floyd Hill Study Area.

Jo Ann Sorenson: When you're talking about rip-rap, is there an advantage to using rocks that are more difficult to climb on? Tend to use a standard material, rather than something like river rock that may not be able to interlock and stay there and help avoid erosion. For wildlife passage, creating a bench or small pathway through the rip-rap may be helpful. Where it is really steep, there may not be many opportunities. Maybe there are ways to span wider.

Jo Ann Sorenson: Rafting access issues with the steep banks, could we make slopes more accommodating for them too? Need to find opportunities for mutual benefit, although in some places may want to avoid human activity.

### **Connectivity issues for Terrestrial Fauna:**

Julia Kintsch provided information on connectivity issues for elk and mule deer in the Floyd Hill Study Area.

### **Bighorn Sheep issues:**

Julia Kintsch provided information on connectivity issues for bighorn sheep in the Floyd Hill Study Area.

*Doreen Sumerlin: Important to point out lambing areas, project could potentially impact and should be considered from a cumulative effect from previous impacts. There were timing restrictions for blasting on Twin Tunnels. Timing restrictions on blasting to avoid lambing will be similarly imposed here.*

*Doreen Sumerlin: Are the sheep kills on I-70 or on US 6? Mainly on US 6 (not crossing), but cannot tell from the map. Due to curves and sight distance. Sheep are everywhere now that the area is starting to green up. They will cross US 6, rarely will they cross I-70.*

### **Aquatic connectivity issues:**

Julia Kintsch provided information on aquatic connectivity issues in the Floyd Hill Study Area. Only issue is at Beaver Brook.

Keith Hidalgo (Atkins): Noted in conversations with Paul Winkle (CPW Aquatic Biologist) that the only fish on Beaver Brook is at a stocked reservoir upstream, but no fish in Beaver Brook until much further downstream, closer to Clear Creek. Joe noted that there is no need for aquatic connectivity at this location.

### **Raptor entanglement issues:**

Julia Kintsch presented on concerns that raptors may become entangled in rock fall mitigation netting as shown in the presentation.

*Francesca Tordonato: How does it relate to rockfall mitigation, last recommendation may not work. May be competing interests in design. Follow up with Mark or Jeff Peterson. Having more information may be able to help us balance all of the needs. Need to continue to design rockfall nets with these incidents in mind. Look at design to minimize entanglement. [Julia and Stephanie to follow up.](#)*

*Jo Ann Sorenson: When drones were being used to check rockfall, did they pick up information? [Neil to follow up.](#)*

## **5) Mitigation Considerations**

Julia Kintsch presented on mitigation considerations in the Floyd Hill Study Area.

### **Wildlife Overpass**

Julia Kintsch presented on possible wildlife overpass locations in the Floyd Hill Study Area.

### **Wildlife Underpasses**

Julia Kintsch presented on possible wildlife underpass locations in the Floyd Hill Study Area and discussed it needs to be in conjunction with fencing.

## **6) Map Review**

Maps of the corridor were reviewed by the group. An overview of the discussion for each of the four maps is described below.

### **Study Area Overall**

- Tiered rock walls where rock cuts are so that the walls are not impassible for wildlife, where feasible
- Upsize culverts where possible with natural bottoms?
- Ramps/shelves in pipes, culverts, etc?
- Better roadside visibility of wildlife = good

### **Western Segment**

- Reduce vegetation along roadway to increase visibility of wildlife (bighorn sheep)
- Straightening out w-curves also improves visibility of wildlife, reduces safety risk
- Can Clear Creek move north of the highway?
- Higher walls along  $\frac{3}{4}$  and  $\frac{1}{4}$  with balanced?
- Sheep mortality on east side of VMT
- Gold mine shafts?

### **Central Segment**

- Tunnel good for wildlife (bighorn sheep)
- Tiered potential wildlife impact
- Operations at bridges to span wider for wildlife?
- Locations for underpass?
- Locations for overpasses/crossings?
- Sheep and bear use areas at US 6 Junction
- Deer jumping off bridge?
- Erosion – reduce average grade?

### **Eastern Segment**

- Partnership with Developer for wildlife overpass structure?
- Bridge for connectivity or tubes w/ramps?
- Construction easement possible?
- Two locations for an overpass?
- PMJM trapped here in 2004 downstream on Beaver Brook

### **Map 1 (Veteran Memorial Tunnels area)**

*Anthony Pisano (Atkins):* Options in the west include tunnel or rock cut. Rock cut would involve moving the creek slightly to the south. Does not change the angle of the road going into the tunnels.

Central City Parkway – one or both bridges over Clear Creek are likely to be replaced, depending on how the frontage road ties in.

*Doreen Sumerlin:* Are there issues with the extent of the vertical walls? Look for opportunities for animals to get around. A tiered wall may make more sense than a vertical wall. Would be great for Geotech and ALIVE recommendations to be the same for walls.

*Julia Kintsch:* Straightening the curve east of the tunnels is helpful for bighorn mortality rate. Wildlife fencing would also be a help to mortality. Tunnels added wildlife friendly fencing on west side. Top and bottom are smooth, middle are barbed for wildlife friendly fencing in this area.

### **Map 2 (around US 6 interchange)**

*Anthony Pisano:* Not too many changes in this area. Not sure about property impacts yet. A lot of the alignment changes are within CDOT right of way. Still working out the details of how the greenway comes through. Trying not to impact the interchange. Tiered rock cut to the east of the interchange. Then a tunnel (for westbound) and rock cut for eastbound.

*Doreen Sumerlin:* What does tiered mean? Like Glenwood Canyon? More like stair stepped rock, soil nail walls. Need to consider how the animals can get out or escape the highway. Will have an extra wide ditch for sight distance and catching rocks.

*Alison Michael:* Can a crossing structure be located over the eastbound section where westbound is in a tunnel? May be challenges but could be considered. Would have to cross EB lanes and frontage road.

*Joe Walter:* Don't want sheep crossing the road.

*Doreen Sumerlin:* Tunnel is huge benefit to wildlife over non-tunnel alternatives.

*Julia Kintsch:* Need to consider the crossing at US 6 and the suggested location – these might be better crossing locations than opposite the new WB tunnel.

*Doreen Sumerlin:* How feasible are having larger spans for bridges? Think there are opportunities for that. May depend on the frontage road connection and other things. Rafters have requested some of the walls under the interchange at US 6 remain.

*Neil Ogden:* How would having the greenway underneath conflict with wildlife crossing? Mainly lighting issues, but may not conflict. Would be better for a separate connection. Some examples in Region 1 without lighting. Hasn't been a big issue with leaving it dark, but could be safety issues. One at C 470 and South Platte River.

*Julia Kintsch:* Would be good to have some of the culverts upsized to provide for crossing. (e.g., every ¼ mile). Does not need to be a box culvert, can be pipes.

*Keith Hidalgo:* Pointed out some of the features from SWEEP for the drainage system could be enhanced/upsized for smaller wildlife as well.

*Doreen Sumerlin:* Agreed and liked the idea of shelving for small rodents in new or existing culvert pipes.

*Vanessa Henderson:* Curious about the gulch. Sheep are using for moving, and in the Frei area. Sheep are mostly on US 6.

### **Map 3 (west side of Floyd Hill)**

*Anthony Pisano:* Adding a third lane westbound, may end up with small sections of wall. Most if not all widening to occur on south side and moving the EB lanes over.

*Julia Kintsch:* At 244.9 potential underpass location. Right under the WB pullout, close to 245. How feasible would it be in this location, would still have to cross US 40. A bridge or arch would be good. Shorter lengths are definitely better. Over 120 feet usage drops off. Don't need to add areas for additional light. This may be a preferred location over the crossing in Map 4, and would offer better spacing between crossing opportunities at the bottom of Floyd Hill and top of Floyd Hill, but both locations have challenges.

Overpass option right next to the underpass from the cut slope on the south side to the wide pullout on the north side of I-70. Connection to Clear Creek junction. But will have to consider other needs, such as use of the pullout by law enforcement and maintenance.

#### **Map 4 (Floyd Hill summit)**

*Anthony Pisano:* Adding a third lane westbound, along the slope. Will add a full diamond at one of the interchanges.

*Julia Kintsch:* Overpass at 247, would have to figure out land use in this area. On the south proposing 400-unit development. Maybe an opportunity for partnership with development, and right of way may be needed from the developer. **Adam Springer (Clear Creek County) will follow up when more is known about what is needed. May advance design for crossing in this area.**

Mountain bike and hiking trails going in nearby on open space properties north of 246.5. Also looking for pedestrian access to open space. But need to discourage pedestrian use on a wildlife overpass. Hwy 9 cost was 1.8M (66-foot span). Most comparable structures would be on South I-25, but design and costs are not finalized.

*Doreen Sumerlin:* Are conservation easements possible with the project? **Maybe, Neil will look into it with the right of way group.**

*Neil Ogden:* If an additional off-ramp is added at CR 65 over Beaver Brook, what could the issues and opportunities be? Bridge rather than fill would be a better option in this area.

Consider upsizing Beaver Brook culvert and adding a dry shelf (with vole/mouse tube) for small fauna passage.

#### **7) Next Steps**

Next steps for the project include:

- Conduct field reconnaissance and address data gaps to refine mitigation recommendations
- Create table of mitigation options for evaluation
- Coordinate with design team
- Partnership opportunities
- Next ALIVE meeting – late summer/early fall

#### **8) Project Schedule**

Upcoming dates for future tasks include:

- Existing Conditions/Data Collection
  - Fall 2017 through 2018
- NEPA/30% Design
  - Winter 2017/2018 through Spring 2020
- Final Design followed by Construction (pending funding availability)

- Spring/Summer 2020
- Construction 2021-2024

**9) Questions**

Field visits before the next meeting. No additional questions.



# Sign-In Sheet



## I-70 Floyd Hill to Veterans Memorial Tunnels

**Project:** I-70 Floyd Hill to Veterans Memorial Tunnels EA  
**Meeting:** ALIVE Issues Task Force Meeting  
**Date/Time:** April 20, 2018; 10:00 am to 12:00 pm  
**Location:** CDOT Region 1, 425 Corporate Circle, Golden, CO

Initial	Name	Agency	Address	Phone	E-Mail
SPG	Stephanie Gibson	FHWA	12300 W Dakota Ave Suite 180 Lakewood CO 80328	720-963-3013	Stephanie.Gibson@dot.gov
AMM	Alicia Michael	USFWS		303 236 4758	aliam-michael@fws.gov
AW	Carrie Wallis	Atkins			Carrie.wallis@atkinsglobal.com
JS	JoAnn Sorensen	CCA	PO Box 2000 GT 80444	303.679-2409	jsorensen@co.deer-creek.co.us
DF	Doreen Sumertlin	USFS	POB 10 Granby CO 80446	9702274129	dsumertlin@fs.fed.us
NO	Neil Ogden	CDOT	425A Corp. Circle	720 497 6928	neil.ogden@state.co.us
LB	Lauren Boyle	CDOT	" " "	720 497 6964	Lauren.Boyle@state.co.us
JW	Joe Walter	CPW	6060 Broadway Denver	303-916-1180	joseph.walter@state.co.us
AP	Anthony Pisano	Atkins	7604 technology way Suite 400 Denver, CO 80237	720-475-7013	Anthony.Pisano@Atkinsglobal.com
K	S. Keith Hidalgo	Atkins	7604 Technology Way, Ste 400 Denver, CO 80237	303-214-0825	Keith.Hidalgo@atkinsglobal.com
J	Julia Kintzsch	ECO-resolutions		3/818-1460	julia@eco-resolutions.com
VH	Vanessa Henderson	CDOT		71497-6924	vanessa.henderson@state.co.us
AS	Alan Springer	Deer Creek		3/679-2361	aspringer@co.deer-creek.co.us

# Sign-In Sheet



**I-70 Floyd Hill to Veterans Memorial Tunnels**

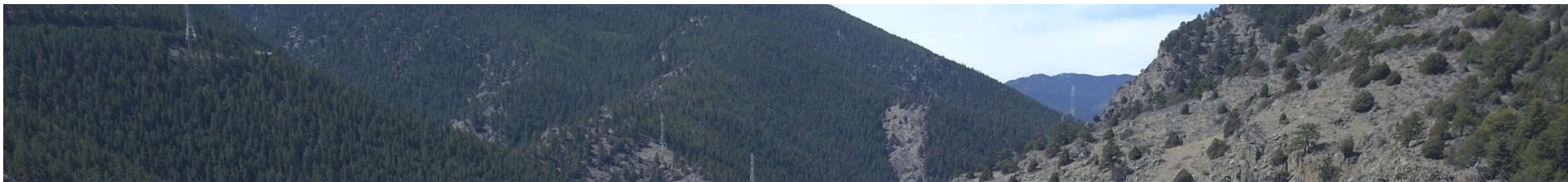
**Project:** I-70 Floyd Hill to Veterans Memorial Tunnels EA

**Meeting:** ALIVE Issues Task Force Meeting

**Date/Time:** April 20, 2018; 10:00 am to 12:00 pm

**Location:** CDOT Region 1, 425 Corporate Circle, Golden, CO

Initial	Name	Agency	Address	Phone	E-Mail
FTT	Francesca Tordonato	CDOT R1	425A Corporate Circle Golden	720-497-6942	Francesca.Tordonato@State.CO.us



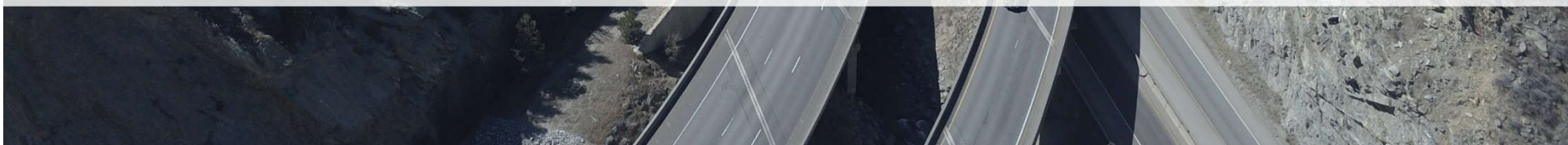
# I-70 Floyd Hill to Veterans Memorial Tunnels

**ATKINS**



**ALIVE Meeting**

April 20, 2018





## I-70 Floyd Hill to Veterans Memorial Tunnels

# Agenda

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- Welcome / Introductions
- Project Overview
- ALIVE MOU and Previous Studies
- Wildlife Connectivity Issues and Concerns
- Mitigation Considerations
- Next Steps
- Project Schedule



# I-70 Floyd Hill to Veterans Memorial Tunnels

## Project Overview and Background



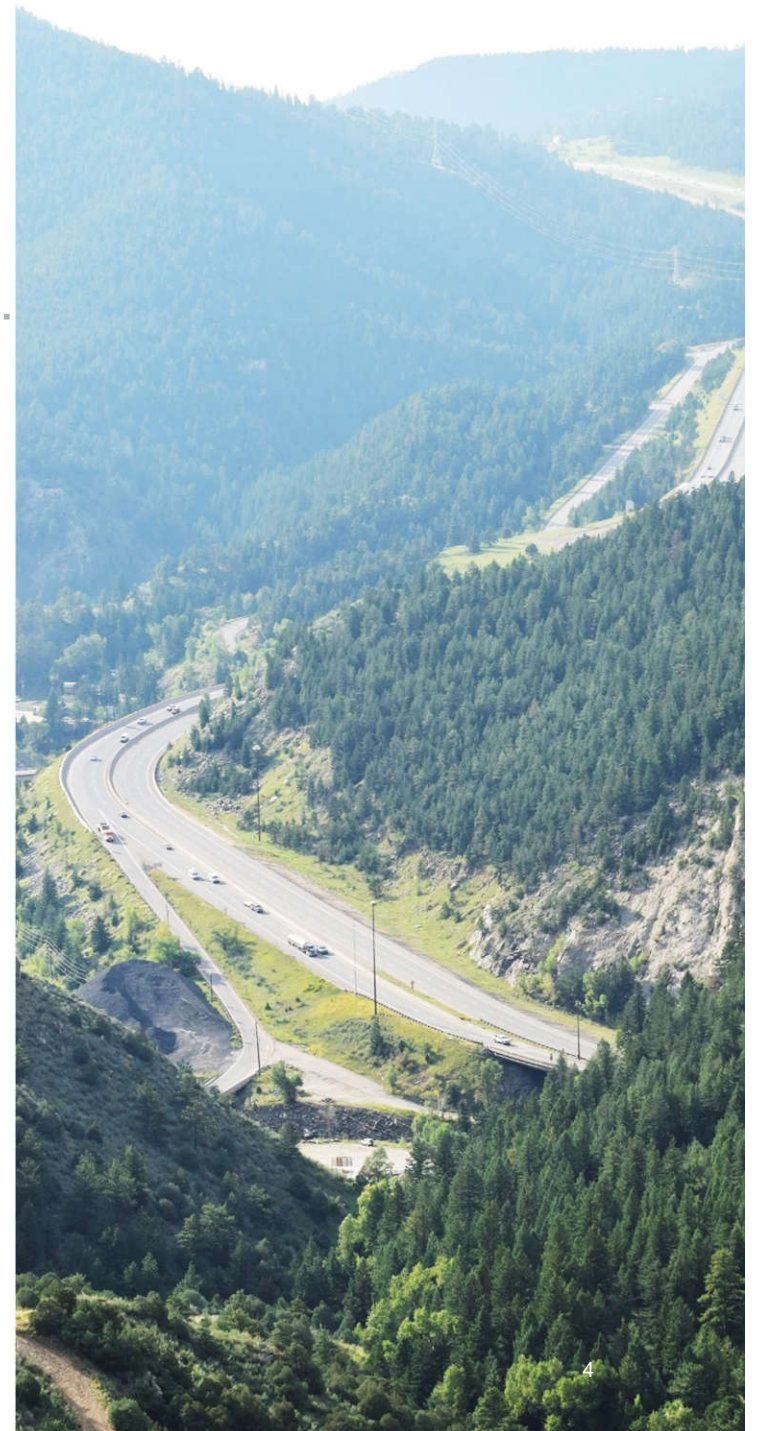


## I-70 Floyd Hill to Veterans Memorial Tunnels

# Purpose

The purposes of the I-70 Floyd Hill to Veterans Memorial Tunnels project are to:

- Improve travel time reliability, safety, and mobility and address the deficient infrastructure on westbound I-70 through the Floyd Hill area of the I-70 Mountain Corridor.
- Improve multimodal connectivity and provide an alternate route parallel to the interstate mainline in case of emergency or severe weather conditions.





## I-70 Floyd Hill to Veterans Memorial Tunnels

# Proposed Action

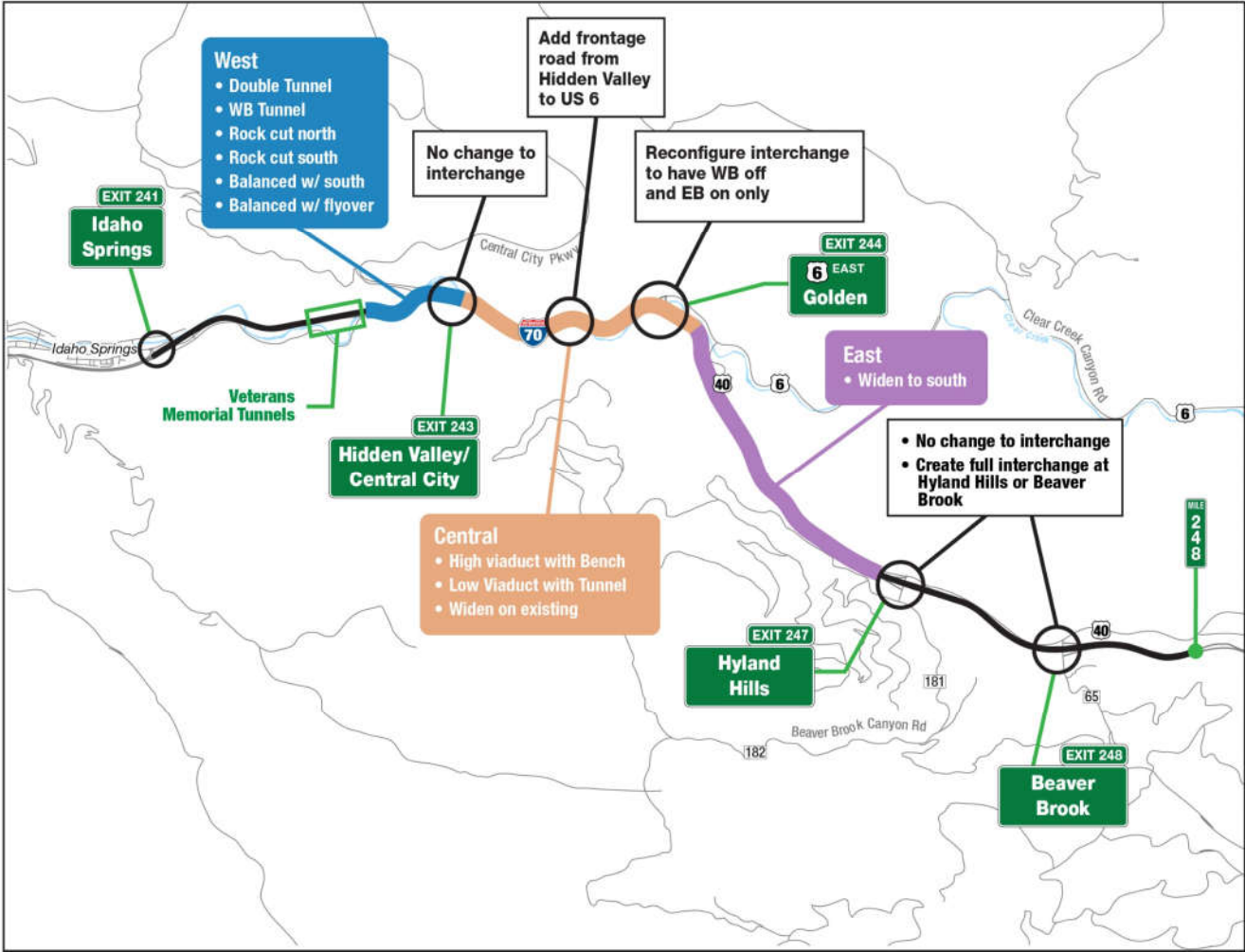
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- Provides a 3<sup>rd</sup> lane from the top of Floyd Hill through the tunnel (2011 ROD)
  - Evaluating options for tunneling, rock cuts, and benches at two locations (bottom of Floyd Hill and just west of Hidden Valley)
  - Evaluating west terminus (dropping 3<sup>rd</sup> lane and tie-in with WB PPSL)
  - Evaluating need for truck climbing/acceleration lane with eastbound on-ramp addition at US 6
  - Evaluating additional intersection and interchange improvement needs throughout
- Addition of trail and frontage road between tunnel and US 6 (2011 ROD)
- Evaluating eastbound curve safety improvements



# I-70 Floyd Hill to Veterans Memorial Tunnels

## Design Options







## I-70 Floyd Hill to Veterans Memorial Tunnels

# ALIVE MOU

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- Background
  - Objective of streamlining coordination and improving connectivity for terrestrial and aquatic wildlife.
  - Signed 2008
- Commitments
  - Ensures agencies' cooperation in early and full implementation of corrective actions to solve permeability problems in identified LIZs.
  - 'Full implementation of a successful ALIVE outcome would require the participation by all Parties and other stakeholders in the commitment of resources beyond those meant for transportation mitigation.'



## I-70 Floyd Hill to Veterans Memorial Tunnels

# I-70 EcoLogical

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- *A Regional Ecosystem Framework for Terrestrial and Aquatic Wildlife along the I-70 Mountain Corridor*
  - Identification of Linkage Interference Zones (2011)
    - Update of original LIZs (2004)
  - ALIVE Implementation Matrix
- *Guidelines for Improving Connectivity for Terrestrial and Aquatic Wildlife in the I-70 Mountain Corridor*



## I-70 Floyd Hill to Veterans Memorial Tunnels

# Clear Creek Junction LIZ

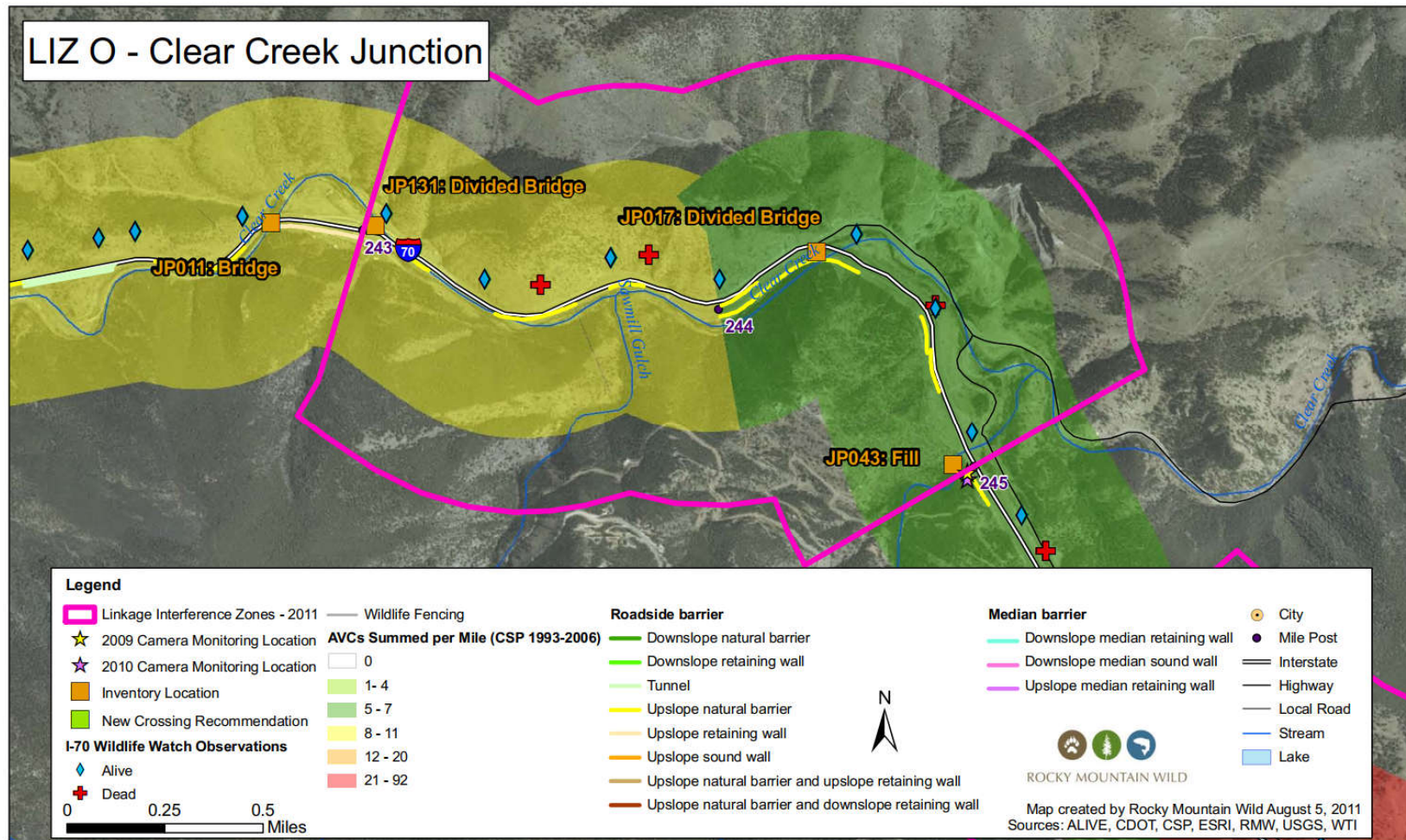
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- MP 243.0 – 244.9
- Elk and mule deer; also bighorn sheep, Canada lynx, mountain lion, Preble's meadow jumping mouse
- WVC rate: Moderate-low
- Land Status: Private both sides of I-70
- Existing bridges provide little opportunity for wildlife passage
- Concrete median barrier throughout LIZ
- EcoLogical mitigation recommendations:
  - Improve passage under existing bridges over Clear Creek at Central City Parkway and bottom of Floyd Hill
  - Install new wildlife crossing ~MP 244.9 (note, wildlife monitoring conducted at this location)



# I-70 Floyd Hill to Veterans Memorial Tunnels

## Clear Creek Junction LIZ Map





## I-70 Floyd Hill to Veterans Memorial Tunnels

# Existing bridges in the Clear Creek LIZ

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Clear Creek/Central City Parkway

Clear Creek/ US 6 Interchange





## I-70 Floyd Hill to Veterans Memorial Tunnels

# Beaver Brook LIZ

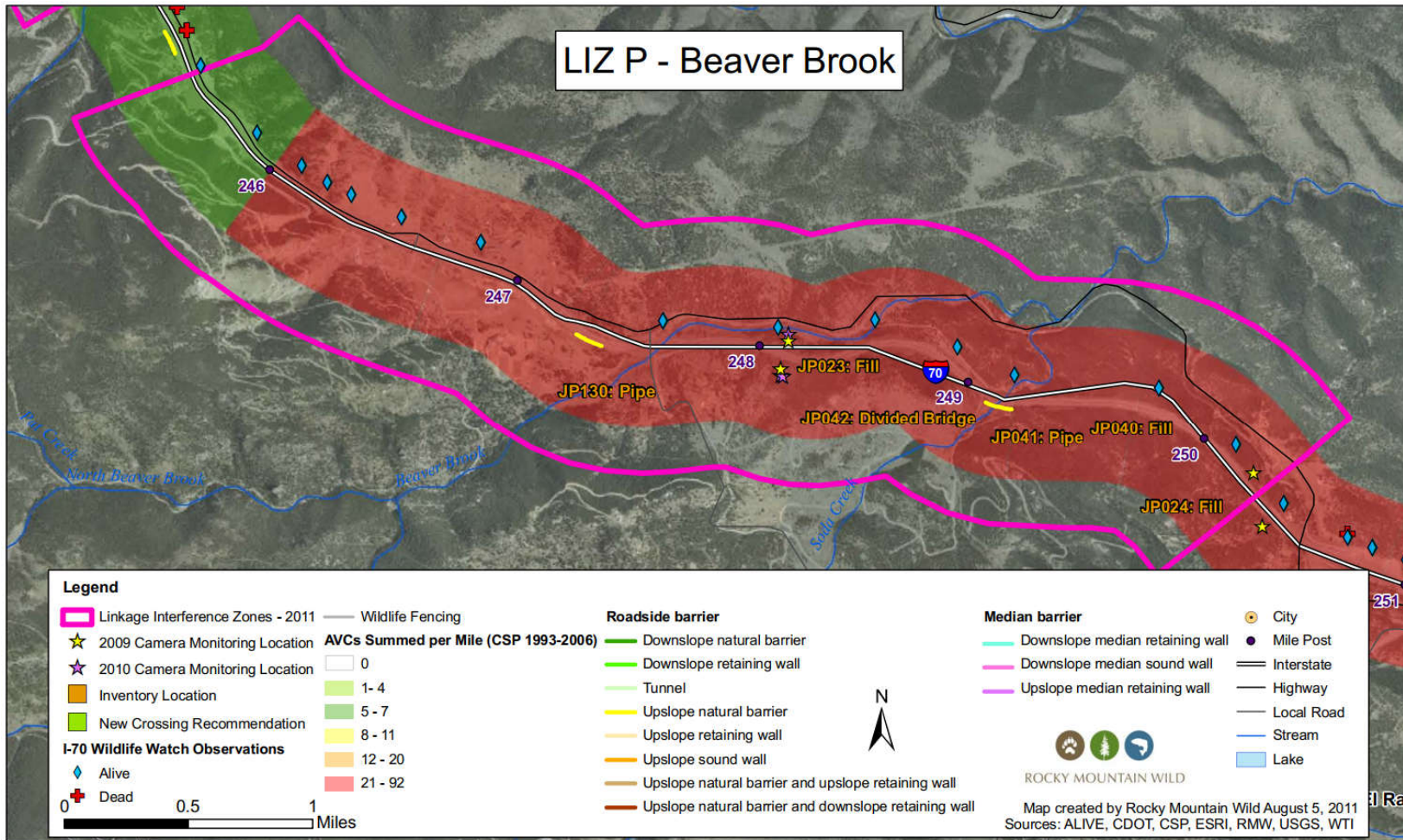
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- MP 245.5 – 250.2 (project area ends MP 248)
- Elk, mule deer; also black bear, Canada lynx, mountain lion, northern leopard frog, Preble's meadow jumping mouse
- WVC rate: Very high
- Land Status: Private both sides of I-70
- Concrete median barrier MP 245.5 – 246.6
- EcoLogical mitigation recommendations:
  - Investigate opportunities to install new wildlife crossings, e.g., MP 246.5; MP 247; MP 247.5 (Preble's occupied habitat along Beaver Brook); MP 248.2 (monitoring location)



# I-70 Floyd Hill to Veterans Memorial Tunnels

## Beaver Brook LIZ Map





## I-70 Floyd Hill to Veterans Memorial Tunnels

# Aquatic Connectivity

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- MP 243 – Bridge over Clear Creek, Hidden Valley interchange
  - Currently good aquatic connectivity; maintain
- MP 244.2 – Clear Creek, US 6 interchange
  - Currently good aquatic connectivity; maintain
- Beaver Brook
  - CMP provides drainage only





## I-70 Floyd Hill to Veterans Memorial Tunnels

# ALIVE Implementation Matrix

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- Developed for I-70 EcoLogical project
- Considerations during project development:
  - Target species movement needs; barriers to movement; opportunities?
  - Changes or potential changes to wildlife habitat or movements?
  - Permeability concerns outside of LIZs?
  - Potentially conflicting mitigation actions?



## I-70 Floyd Hill to Veterans Memorial Tunnels

# I-70 Traffic and Revenue Study

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- Initiated in 2013 to explore solutions to congestions on I-70 Mountain Corridor
- Study terminated in 2014
- ALIVE Committee revisited mitigation recommendations from EcoLogical
  - Highlighted wildlife overpass at MP 247 as a feasible location
  - Confirmed value of connectivity at Clear Creek/US6



## I-70 Floyd Hill to Veterans Memorial Tunnels

# Wildlife Issues Discussion

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- Identify:
  - Initial list of issues and concerns
  - Information and data needs
  - Initial mitigation recommendations





## I-70 Floyd Hill to Veterans Memorial Tunnels

# Project's Effects on Wildlife

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- Habitat loss due to expanded highway footprint
  - Highway widening, new alignment, rock cuts
- Increase in barrier effect:
  - Increased number of traffic lanes
  - Increasing traffic volumes
  - Retaining walls, median and shoulder barriers
  - Lighting at interchanges and signs
- Potential increase in wildlife-vehicle collisions



## I-70 Floyd Hill to Veterans Memorial Tunnels

# Initial Stakeholder Concerns

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- Threatened and Endangered Species
  - Canada lynx
  - Preble's meadow jumping mouse
- Bighorn sheep winter range and mortality
- Connectivity for terrestrial wildlife
- Reduce wildlife-vehicle collisions
- Clear Creek is a high value fishery
  - Improve fish passage and reduce channelization



## I-70 Floyd Hill to Veterans Memorial Tunnels

# Issue: Wildlife-Vehicle Collisions

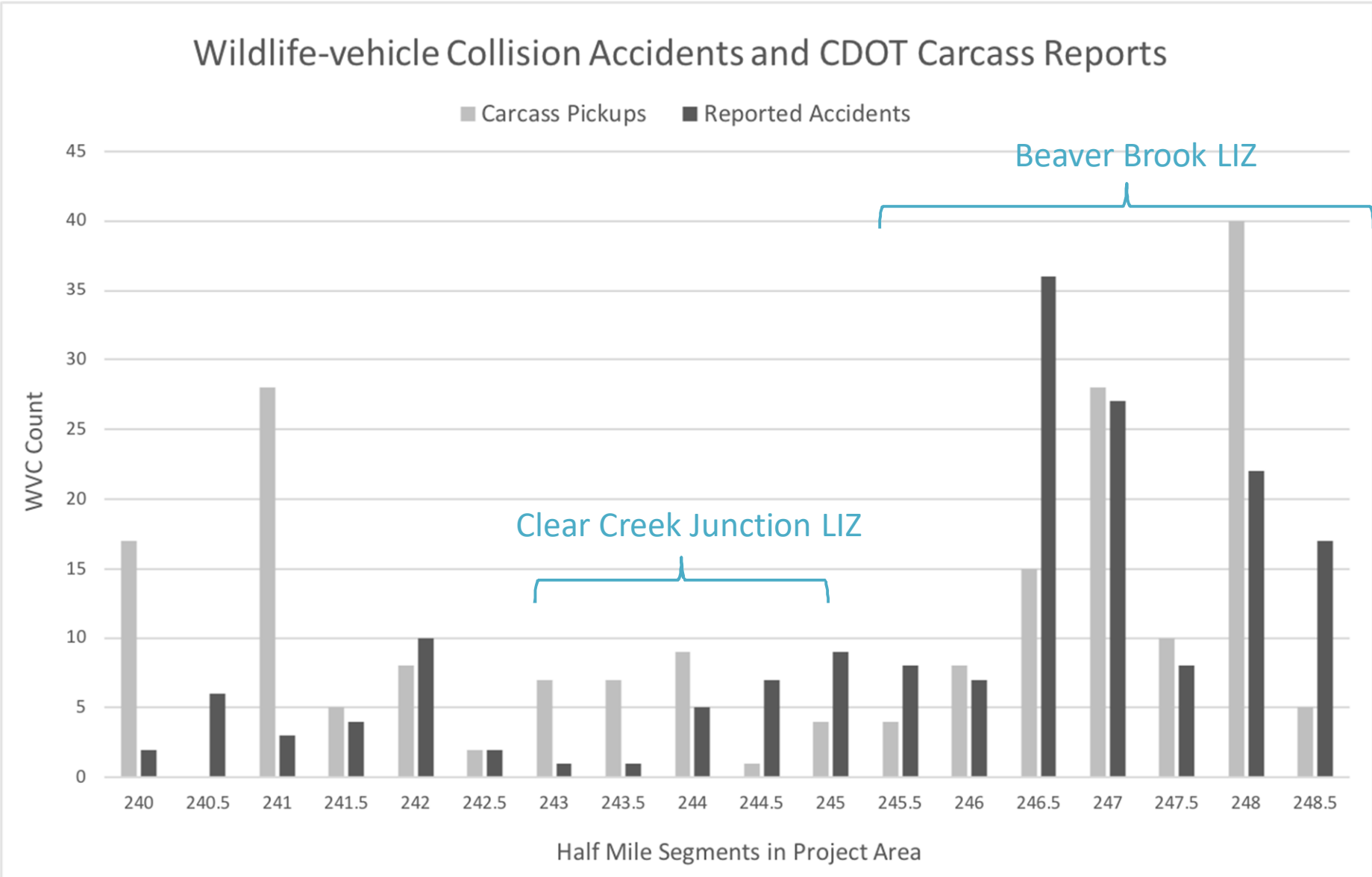
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- 2.5 WVC/mile/year (carcass pickups recorded by CDOT Maintenance, 2007-2016)
- 175 reported accidents (10 years, MP 240-248)
- Primarily mule deer (46%) and elk (26%); also black bear, bighorn sheep, mountain lion, other medium sized fauna





# I-70 Floyd Hill to Veterans Memorial Tunnels

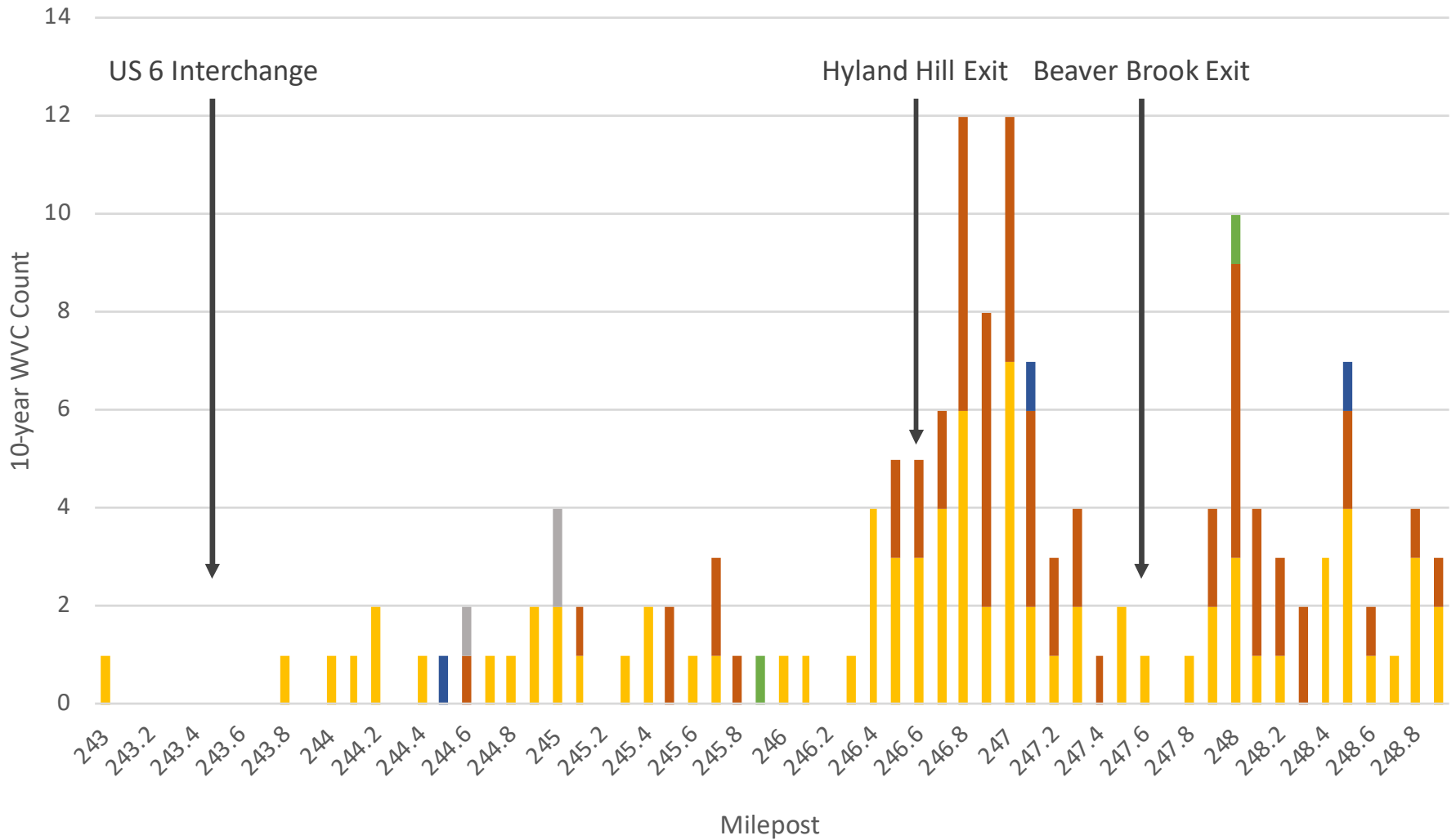




# I-70 Floyd Hill to Veterans Memorial Tunnels

WVC Reported Accidents 2007-2016

DEER ELK BEAR LION UNKNOWN



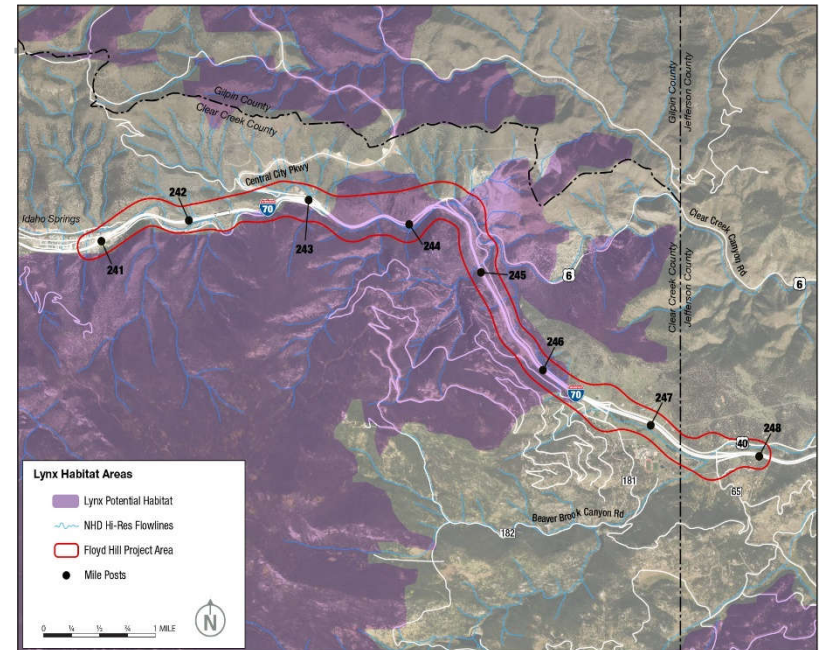




## I-70 Floyd Hill to Veterans Memorial Tunnels

# Issue: Canada Lynx

- Suitable lynx habitat
  - Mostly low probability of lynx highway crossing; high probability around Hidden Valley and middle of Floyd Hill (Baigas et al. 2017)
- Barriers to movement:
  - Highway footprint and traffic volume
  - Retaining walls, median & shoulder barriers
  - Lighting (primarily at interchanges) & lighted signs
- Cumulative effects

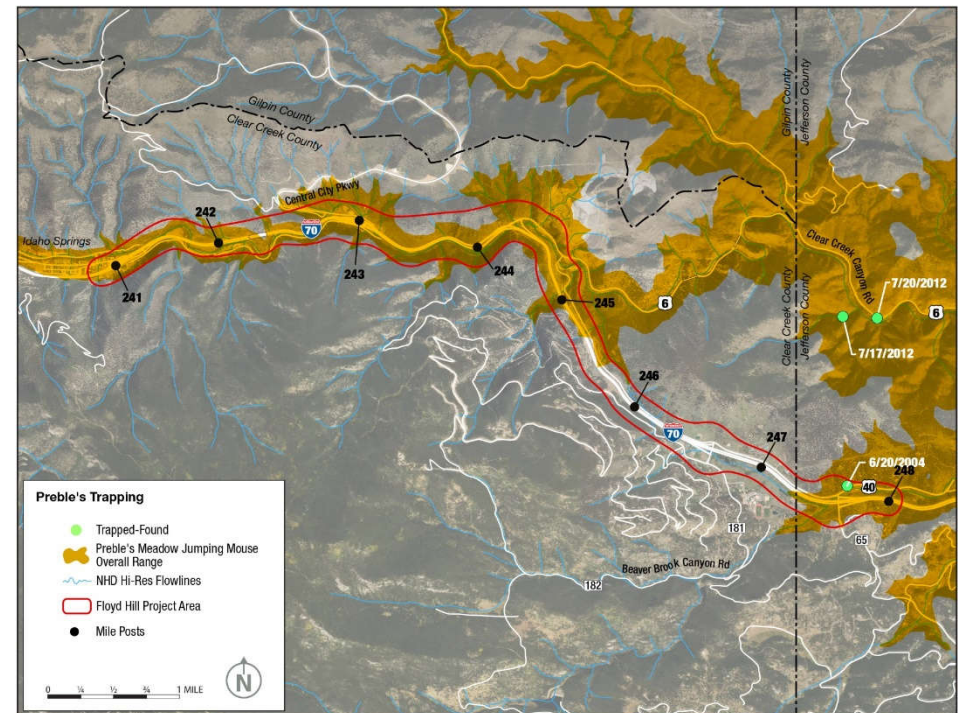




## I-70 Floyd Hill to Veterans Memorial Tunnels

# Issue: Preble's Meadow Jumping Mouse

- Overall range
  - Occupied habitat in Beaver Brook watershed (upstream of I-70); no riparian connectivity under I-70
  - No suitable habitat along Clear Creek
  - No critical habitat

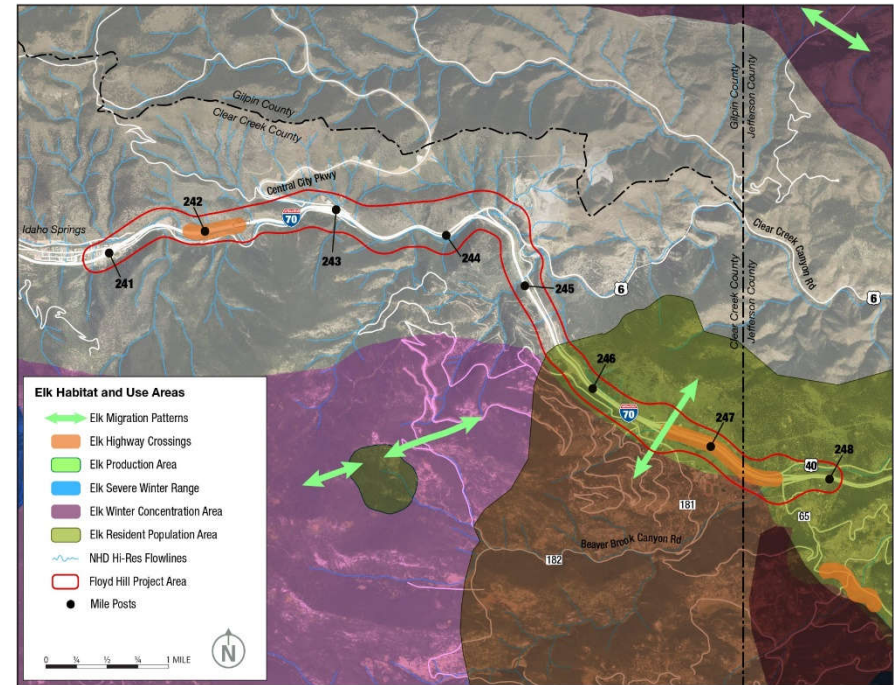
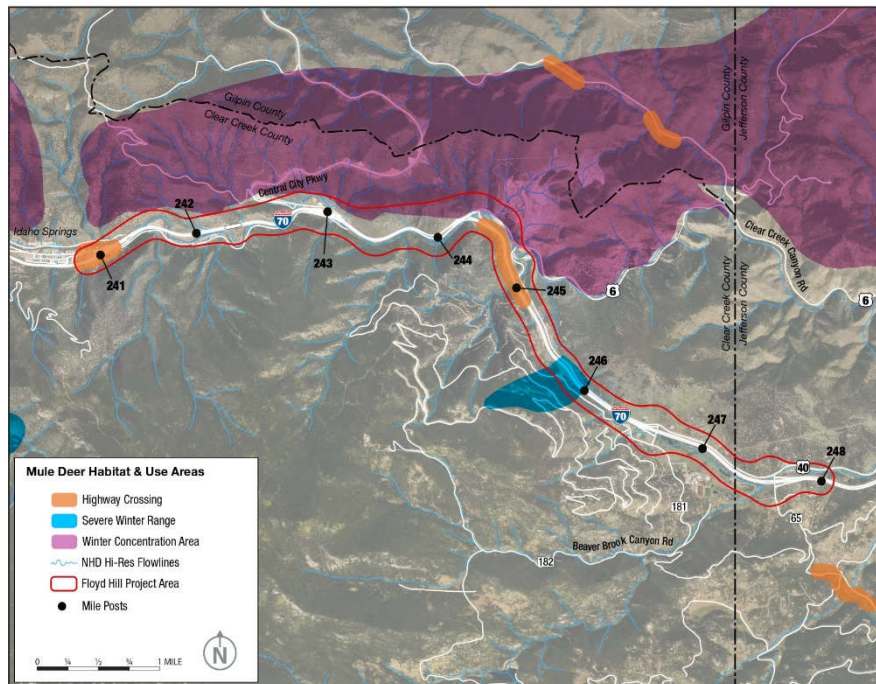




## I-70 Floyd Hill to Veterans Memorial Tunnels

# Issue: Connectivity for Terrestrial Fauna

Elk migration top of Floyd Hill; resident population  
 – WVC hotspot east side of Floyd Hill



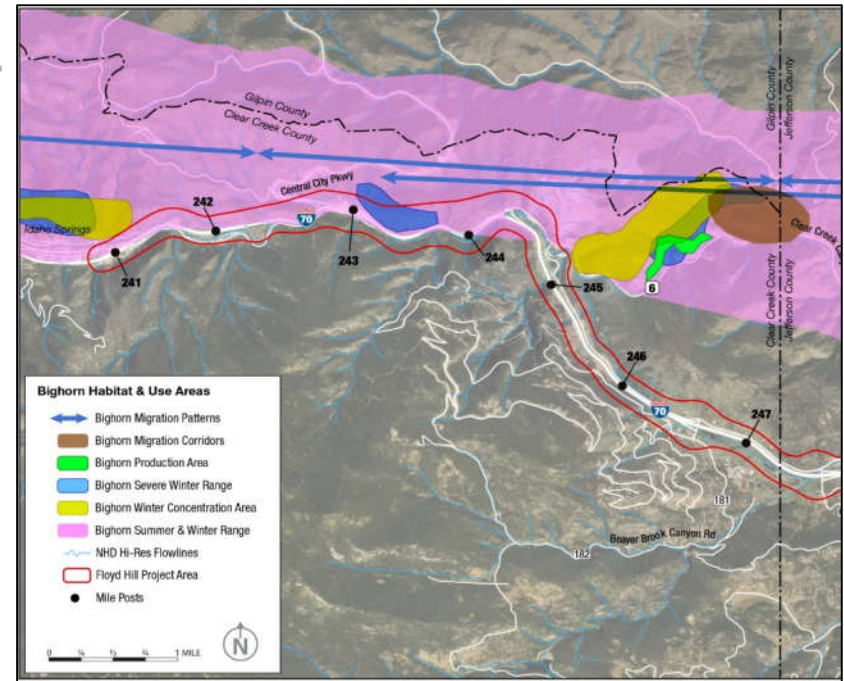
Mule deer winter concentration, severe winter range and highway crossing zones



## I-70 Floyd Hill to Veterans Memorial Tunnels

# Issue: Bighorn Sheep

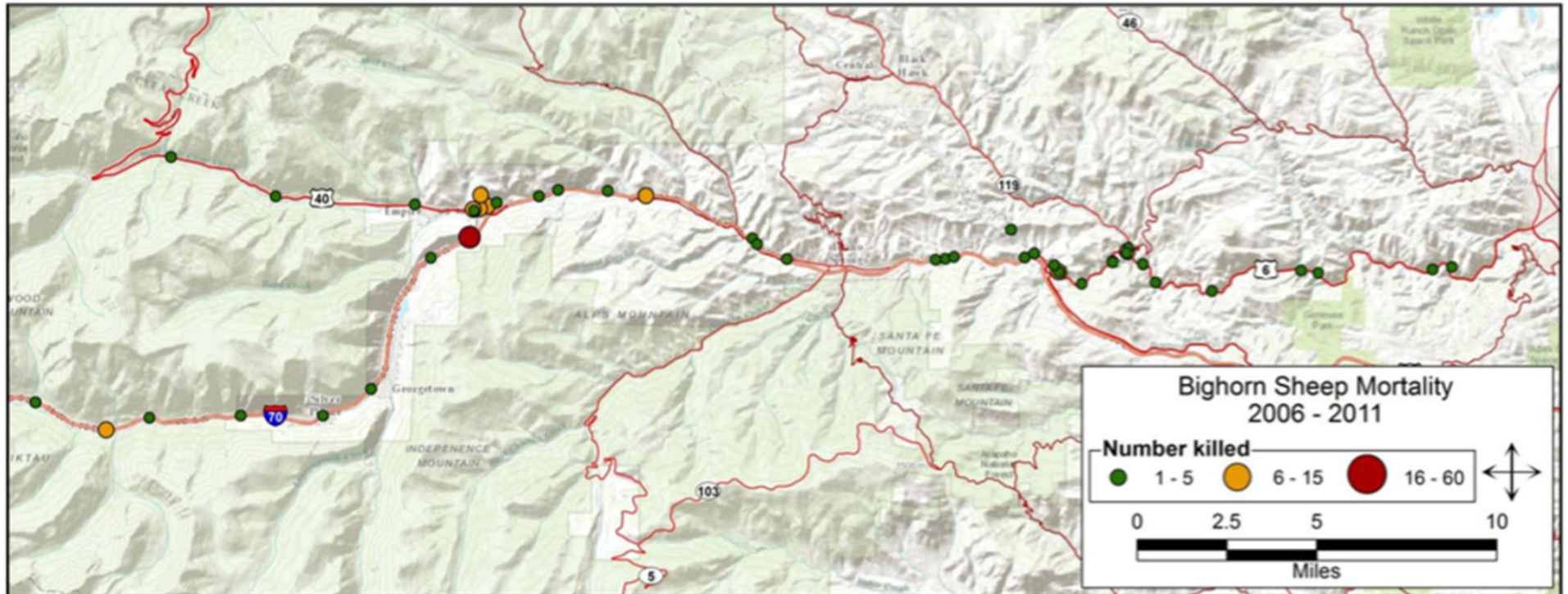
- Bighorn sheep overall and winter range north of I-70
- Mortality due to WVC
  - Primary source of mortality for Georgetown herd
  - Hotspots:
    - East side of VM Tunnels
    - I-70/US 6 junction
  - De-icing minerals and spring green-up act as attractants to road shoulders
- Previous mitigation:
  - Decreased upland trees adjacent to road (Twin Tunnels project)
  - Replaced barbed-wire with wildlife-friendly fence west of tunnels (EBPPSL)





## I-70 Floyd Hill to Veterans Memorial Tunnels

# Issue: Bighorn Sheep



Bighorn sheep WVC 2006-2011, Huwer 2015



## I-70 Floyd Hill to Veterans Memorial Tunnels

# Issue: Aquatic Connectivity

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- Fish passage
  - Clear Creek is stocked.  
No connectivity or dewatering issues for native fish species





## I-70 Floyd Hill to Veterans Memorial Tunnels

# Issue: Raptor Entanglement

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- Concern that raptors may become entangled in rock fall mitigation netting.
  - Two incidents previously reported (Steamboat Springs & Durango)
  - Further research needed to determine scope of this problem across the state.
  - Recommend, when feasible, pin down the top of the mesh to be flush with or close to the rock wall to avoid large openings.



## I-70 Floyd Hill to Veterans Memorial Tunnels

# Potential Wildlife Mitigation Summary

MILEPOST	RECOMMENDATION	CHALLENGES
243	Improve passage for wildlife under existing bridges, including CDOT access road	Limited feasibility to improve passage for large fauna without replacing bridges
244.2	Integrate wildlife movement into new interchange/bridges	Extensive infrastructure including interchange & trail
244.9	Wildlife underpass at fill slope under I-70	Outside of LIZs; Challenging terrain
246.5	Wildlife overpass	Challenging terrain, land ownership
247	Wildlife overpass	Potential development on north side
247.5	Riparian crossing	Limited feasibility; Extensive restoration required





## I-70 Floyd Hill to Veterans Memorial Tunnels

# Mitigation Considerations

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- Wildlife Overpass
  - Given highway footprint & US 40, overpass will be most effective structure type for elk
  - Greatest need for elk crossing structure around the top of Floyd Hill
- Wildlife Underpasses
  - Improve wildlife passage at Clear Creek/US 6 interchange
  - May consider large culverts for deer, bear, mountain lion and other fauna
- Install wildlife-exclusion fencing in conjunction with crossing structures



## I-70 Floyd Hill to Veterans Memorial Tunnels

# Mitigation Considerations

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- Bighorn activity mostly north of I-70; Need to reduce roadside attractants & improve driver visibility
  - West side of Veterans Memorial Tunnels
- Partner & Stakeholder Roles
  - Explore need and opportunities for additional complementary mitigation funding, conservation easements, landowner coordination



## I-70 Floyd Hill to Veterans Memorial Tunnels

# MAP REVIEW

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- Considerations for Central Section
- Considerations for West Section



## I-70 Floyd Hill to Veterans Memorial Tunnels

# Next Steps

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- Conduct field reconnaissance and address data gaps to refine mitigation recommendations
- Create table of mitigation options for evaluation
- Coordinate with design team
- Partnership opportunities
- Next ALIVE meeting – late summer/early fall



## I-70 Floyd Hill to Veterans Memorial Tunnels

# Schedule

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- **Existing Conditions/Data Collection**
  - Fall 2017 through 2018
- **NEPA/30% Design**
  - Winter 2017/2018 through Spring 2020
- **Final Design followed by Construction\***
  - Spring/Summer 2020
  - Construction 2021-2024



*\*Pending funding availability*



## I-70 Floyd Hill to Veterans Memorial Tunnels

# Questions

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