APPENDIX A12

BIOLOGICAL ASSESSMENT AND BIOLOGICAL OPINION

Appendix A12

BIOLOGICAL ASSESSMENT

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By Colorado Wildlife Science, LLC

INTRODUCTION AND BACKGROUND

The I-70 West Vail Pass Auxiliary Lanes project is located in Eagle and Summit counties, with the eastern termini just east of the Vail Pass Rest Area and the western termini in the Town of Vail. The project study limits include eastbound (EB) and westbound (WB) I-70 from mile post (MP) 179.5 to MP 191.5. The project location and approximate Study Area are shown in **Figure 1**.

As part of the initial National Environmental Policy Act (NEPA) analysis, a Tier 1 Environmental Impact Statement (EIS) for the I-70 Mountain Corridor (C-470 to Glenwood Springs) was completed in 2011. This EIS, the *I-70 Mountain Corridor Programmatic Final Environmental Impact Statement* (I-70 Final PEIS), recommended the addition of auxiliary lanes EB and WB on the west side of Vail Pass from MP 180-190 as part of the minimum program. A follow-up *Advanced Guideway System (AGS) Feasibility Study* in 2014 analyzed potential alignments and costs for an AGS system and determined there were three feasible alignments for future AGS. Subsequent to this, CDOT identified the Hybrid Alignment as the favored alignment of the three.

A Tier 2 NEPA analysis is the next step required to move highway improvements forward. The project is following the Colorado Department of Transportation (CDOT) and Federal Highway Administration (FHWA) NEPA process to confirm the needs for improvements to West Vail Pass, identify a Proposed Action, investigate the anticipated benefits and impacts of the proposed improvements (through an Environmental Assessment), produce conceptual design plans, and make funding, scheduling, and phasing recommendations.

This Biological Assessment evaluates the effects of the I-70 West Vail Pass Auxiliary Lanes (the Proposed Action) and the No-Action Alternative with respect to federally listed species. United States Forest Service (USFS) sensitive species are addressed in a separate Biological Evaluation. The Study Area used in this assessment encompasses the actual limits of disturbance, including areas that would be impacted as a result of construction activities ("Study Area").

LEGISLATION

This biological assessment has been prepared to address potential project impacts to protected species in accordance with Section 7 of the Endangered Species Act (ESA) of 1973. The ESA is administered by the United States Fish and Wildlife Service (USFWS) and protects federally listed plant and animal species with the goal of ensuring their long-term survival. The law requires federal agencies, in consultation with the USFWS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat.

Related Planning Documents or Recent/Concurrent Plans

Table 1. Related Planning Documents and Plans

Title (Year)	Responsible Agency/Organization	Summary
Summit County Safe Passages: A County-Wide Connectivity Plan for Wildlife (2017)	ECO-resolutions, Wildlife Consulting Resources, Rocky Mountain Wild, USFS	Identifies areas for wildlife movement across Summit County and the need for wildlife to move across highways.
I-70 Mountain Corridor PEIS Biological Resources Technical Report (2011)	CDOT	Described wildlife, vegetation, protected species, and aquatic resources in the I-70 Mountain Corridor, which included the current Study Area.
ALIVE Memorandum of Agreement	CDOT, FHWA, USFWS, USFS, BLM, Colorado DNR Division of Wildlife	Outlines the agency responsibilities and actions for implementing a landscape-based ecosystem approach for consideration of wildlife needs and conservation measures, and the measures to improve wildlife connectivity across the I-70 Mountain Corridor.
A Regional Ecosystem Framework for Terrestrial and Aquatic Wildlife along the I-70 Mountain Corridor in Colorado – An Eco-Logical Field Test (2011)	ECO-resolutions, Rocky Mountain Wild, Western Transportation Institute, Colorado Watershed Assembly	Identifies areas for wildlife movement across I-70 from C-470 through Glenwood Canyon and the need for wildlife to move across highways.
I-70 Eco-Logical Monitoring and I-70 Wildlife Watch Report (2011)	ECO-resolutions, Wildlife Consulting Resources, Rocky Mountain Wild, USFS	Designed to field test the Eco-Logical approach developed by FHWA. Camera monitoring was conducted in 2009 and 2010 to collect baseline information on wildlife activity and use of existing crossing structures along I-70.
I-70 West Vail Pass Habitat Linkage Structure Location, Design Criteria, and Conceptual Design Report (2009)	Felsburg Holt & Ullevig	Purpose was to understand wildlife movement patterns and associated wildlife/vehicle conflicts in order to improve habitat connectivity on West Vail Pass. Preliminary site for a crossing structure was identified at MP187.4 based on a single Canada lynx road kill and favorable engineering characteristics.
West Vail Pass Environmental Assessment Biological Resources Technical Report (2008)	PBS&J	Evaluated the biological resources within the current Study Area (MP180 – MP 190) for the 2008 West Vail Pass Environmental Assessment.
Vail Pass Wildlife Linkage White Paper (2008)	Southern Rockies Ecosystem Project	Discusses the use of wildlife crossing structures as a means of mitigating habitat fragmentation and documents the current ecological and human landscape contexts of Vail Pass.

Public Involvement

Individuals from local jurisdictions, communities, state and federal agencies, and special interest groups were a part Project Leadership Team (PLT) and a Technical Team (TT). The PLT and the TT provided input into the concept development process.

Many suggestions and concerns were identified during the concept development process and the NEPA process, including neighborhood and business considerations. Comments were, for the most part, quite general in nature rather than focusing on single species. Consistent areas of consideration included:

- Maintain and improve wildlife connectivity across I-70 throughout the Study Area; more crossing structures should be added and they should be large enough for elk.
- Wetland conservation and water quality concerns.
- Wildlife exclusion fencing should be constructed between bridges to funnel wildlife through these structures.
- Bike path changes should not affect wildlife habitat, wetlands, or water quality.
- Adopt the recommendations of the 2011 Eco-Logical report (Kintsch et al. 2011) for the Study Area.

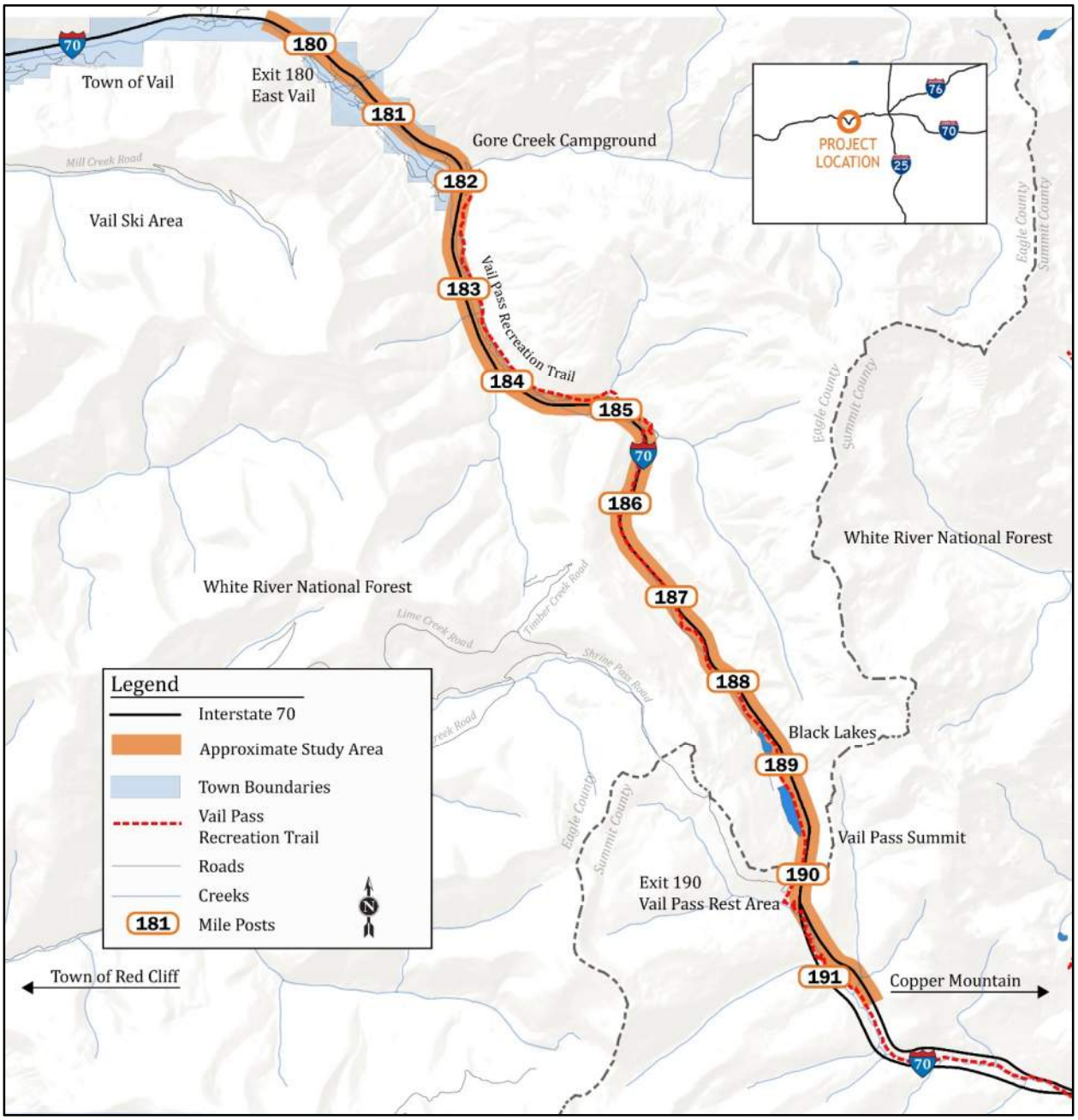
Study Area

The Study Area (**Figure 1**) extends from the Town of Vail (MP 180) east to the top of Vail Pass (MP 191.5) in Eagle County, Colorado. The study area was established early in the planning process and extends approximately 200 feet on both sides of I-70. The project extent was later established to include the potential limits of disturbance resulting from the Proposed Action and was utilized for impact analyses. The Study Area is located, in part, within both the White River National Forest (WRNF) and the Town of Vail. WRNF System Lands exist throughout the Study Area and jurisdiction of adjacent lands alternates within the Study Area between private and public ownership. I-70 traverses National Forest System Lands for approximately 9.8 miles (85%) of the Study Area. The only private land within the Study Area is at the western end of the Study Area at East Vail.

The WRNF lands within the Study Area contain various life zones and habitats (**Table 2)**. Elevation within the Study Area ranges from a low of approximately 8,400 feet at the eastern end of the Study Area to approximately 10,662 feet at the top of Vail Pass. The Study Area lies within the North-Central Highlands and Rocky Mountain Section of the Southern Rocky Mountains Steppe - Open Woodland - Coniferous Forest - Alpine Meadow Physiographic Province (Bailey 1976, Bailey 1995, Bailey et al. 1998) and the Montane and Subalpine life zones. Life zones are defined by changes in climate with elevation increases, which, in turn, are reflected by the broad changes in vegetation communities (Marr 1961, Nelson 1977).

The Western Slope Montane Zone extends from approximately 8,000 to 9,000 feet and is characterized by Douglas-fir (*Pseudotsuga menziesii*), lodgepole pine (*Pinus contorta* var. *latifolia*), and quaking aspen (*Populus tremuloides*) with stands of Gambel oak (*Quercus gambelii*) dominated mixed montane shrublands at lower elevations with southerly to westerly aspects. The Subalpine Zone occurs above 9,000 feet, extends to treeline, and is typified by a co-dominance of Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*). Lodgepole pine and quaking aspen occur within the Subalpine zone as well. Other prominent natural features of the Study Area include

Figure 1. Project Location and Study Area



Source: DEA Project Team

rocky cliff areas, drainages and draws that contain portions of intermittent and perennial streams and their associated riparian zones. Examples include Bighorn Creek, Black Gore Creek, Gore Creek, Miller Creek, Pitkin Creek, and Polk Creek. In addition to the natural features described above, the Study Area and surrounding area contain various human-created features that influence the structure and function of the natural environment.

Table 2. Vegetation Cover Types within the Project Extent

VEGETATION COVER TYPE	ACRES IN PROJECT EXTENT	PERCENT
Montane Grassland	270.6	42.9%
Rock, Barren, or Road	192.2	30.4%
Engelmann Spruce-Subalpine Fir Forest	66.6	10.6%
Water	47.9	7.6%
Lodgepole Pine Forest	36.4	5.8%
Quaking Aspen Forest	8.4	1.3%
Upland Willow Shrubland	4.4	0.7%
Aspen-Mixed Conifer Forest	3.1	0.5%
Mountain Big Sagebrush Shrubland	1.8	0.3%
TOTAL	555.8	100.0%

Highways, roads, towns, single home sites, and recreational development within and adjacent to the Study Area influence which areas are available for wildlife. Current and historic human activities within the Study Area have been instrumental in creating the current distribution of habitats and wildlife species in the Study Area. Important anthropogenic factors include fire regime, agricultural development, livestock grazing, land development, road construction, and recreation development. Secondary or indirect impacts from these activities include non-native plant invasions, degraded water quality, and human intrusion into wildlife habitats. Although logging and grazing historically had the greatest influence, human settlements currently have the greatest indirect effect on the natural systems in the Study Area. Because development tends to be concentrated in the valley bottoms, some of the most notable effects are loss of high-quality riparian, wetland, and floodplain habitats and habitat fragmentation that includes reduced access to these habitats.

The I-70 Draft PEIS identified interference with wildlife movement due to the barrier effects created by I-70 as one of the most serious issues affecting wildlife in the Study Area (Chapter 3, Section 3.2.1).

Through the Study Area, I-70 is typically composed of two travel lanes in each direction with wide shoulders and periodic pull-outs to allow disabled vehicles and vehicles in need of tire chains to safely leave the driving lanes. A pedestrian and bike path closely parallels the interstate over the entire length of the Study Area, crossing underneath the interstate once. In addition, Old Highway 6 also parallels I-70 and crosses under the interstate around MP 181.85. Depending on location, the EB and WB lanes are separated by a vegetated median, by concrete median rail, or in some locations are grade-divided by retaining walls.

Figure 2. Mixed Montane Shrubland, Quaking Aspen, and Douglas Fir in the Western Slope Montane Zone at East Vail

Figure 3. Engelmann Spruce/Subalpine Fir Forest Adjacent to Black Gore Creek in the Subalpine Zone

Figure 4. Polk Creek and Associated Riparian Zone

Figure 5. Abiotic Habitat Features such as These Cliffs Occur Within the Study Area

Existing Highway-Related Impacts

Figure 6. Bridge at MP 185.2 Allows Unimpeded Wildlife Movement Through the Highway Corridor

I-70 on the west side of Vail Pass has two distinct areas in relation to the ability of wildlife to move across the roadway. The lower portion of the pass (approximately from milepost 181.7 through 185) has a series of bridge structures over drainages and rivers (**Figure 6**). This area allows for wildlife movement across the highway without the need for animals to traverse over the roadway. The upper portion of the Study Area (approximately MP 186 through MP 191.5) does not have any structures that allow for unimpeded wildlife movement. For animals to cross the interstate in the upper portion of the Study Area, they must traverse across the travel lanes. Additionally, there are multiple barriers along the roadway that wildlife must negotiate (e.g., guardrails, median barriers, and grade separation of the east and west bound lanes of I-70).

The footprint of the existing highway occupies relatively little habitat, compared to the amount available in the surrounding area. Because I-70 within the Study Area is often located along valley bottoms, however, it affects some of the less common and more valuable habitats in the area of potential effect (APE). In general, valley bottoms contain watercourses that support riparian vegetation and wetlands. These habitat types are important to a wide variety of wildlife in Colorado and can be compromised by disturbance.

Fragmentation of large animal ranges/habitats and movement corridors caused by I-70 is an even more important issue than habitat loss. The ALIVE Committee identified 13 linkage interference zones (LIZs) where the I-70 Mountain Corridor interferes with wildlife migration and wildlife use, including elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), Rocky Mountain bighorn sheep (*Ovis canadensis*), and Canada lynx (*Lynx canadensis*) (J.F. Sato and Associates 2007, Felsburg Holt & Ullevig 2009, CDOT 2011, Kintsch et al. 2011). LIZ identification was used to estimate the degree to which the existing highway disrupts movement corridors and patterns. LIZs were identified based largely on expert opinion and the location of existing barriers to at-grade crossings, including guardrails and fencing. WVC data were also considered. A high rate of WVCs in an area was assumed to indicate that that portion of the highway intersected an important animal movement corridor. Additional information about historic movement patterns of mule deer (*Odocoileus hemionus*) and elk, and, when data were available, other species were also considered.

The 2008 ALIVE MOU identified three LIZs within the Study Area: 6A - Lower West Vail Pass, 6B - Upper West Vail Pass, and 7 - East Vail Pass to Copper Mountain. These LIZs were further investigated and refined into 17 LIZs in 2011 (Kintsch et al. 2011). The ALIVE Committee for this project agreed to use the more accurate 2011 LIZs which again include three within the Study Area (**Table 3**): Vail (East), Gore Creek, and West Vail Pass (**Figure 7**). As discussed above, however, existing permeability across I-70 for wildlife within the Study Area between MP 180 and MP 185.5 is excellent due to the seven bridges under which wildlife can traverse the highway (**Table 4**).

Table 3. 2011 Revised LIZs within the Study Area

LIZ NAME	MILEPOSTS	PRIMARY TARGET	SECONDARY TARGET SPECIES RANGE
Vail (East)	176.8 - 180.1	Canada Lynx	Black Bear, Boreal Toad, Elk, Moose, Mountain Lion, Northern Leonard Frog
Gore Creek	180.9 - 182.1	Canada Lynx	Black Bear, Elk, Moose, Mountain Lion, Mule Deer, Northern Leopard Frog, River Otter
West Vail Pass	182.9 - 188.1	Canada Lynx	Elk, Moose, Mountain Lion, Mule Deer, Northern Leopard Frog

Source: Kintsch et al. 2011

Given the existing structures along the lower half of the Study Area and, perhaps, the elevation of the upper half, relatively low WVC rates have been documented along this stretch of highway **(Figures 8 and 9)**. Nonetheless, WVCs occur throughout the Study Area. CDOT maintenance crews reported a total of 112 road kills in the Study Area for the 5-year period 2014 through 2018[1] (Jeff Peterson, CDOT, pers. comm.). These data are considered an incomplete picture of WVCs within the Study Area because only animals large enough to require removal by maintenance crews were reported. In addition, Colorado State Patrol and Vail Police Department reported a total of 47 WVCs in the Study Area for the 2014 to 2018 period (David Bourget, CDOT, pers. comm.). Similarly, only animals large enough to damage a vehicle when struck were included, and only a small number of those WVCs are subsequently reported. The 2014-2016 Safety Assessment (which provides the data on which the traffic and safety recommendations are based) notes that WVCs are 5.4% of the overall crashes within the study area.

Based on interviews with Department of Transportation and wildlife agency personnel nationwide, Romin and Bissonette (1996) estimated only 16 to 50 percent of all WVCs are reported. A study conducted in Nevada compared observed road-killed deer to reported WVCs along a stretch of highway and estimated only 20 percent of WVCs were reported (Messmer et al. 2000). It is important to note that two lynx were killed within a short distance of each other in vehicle collisions on upper west Vail Pass at MP 187.4 in 1999 and MP 188.8 in 2004 (ALIVE MOU 2008).

Forman and Alexander (1998) coined the term "road effect zone" to encompass a wide range of impacts on wildlife, including noise, traffic disturbances, and input of contaminants into habitats from road maintenance and operations. The width of the road effect zone varies with species and terrain (Singleton et al. 2002). Rost and Bailey (1979) indicated effects occurred approximately 600 feet for mule deer and elk in forest habitats but could extend up to 1,200 feet in shrub habitats.

Forman and Deblinger (2000) addressed moose (*Alces americanus*), deer, amphibians, forest birds, and grassland birds and calculated an average road effect zone of almost 2,000 feet for their Massachusetts study. Influences of highway activity and noise may be greater for the more sensitive species such as lynx or wolverine (*Gulo gulo*) and may limit their movements through areas adjacent to the road. Winter maintenance material used to improve traction and/or melt ice from roadways is known to affect downstream (downgradient) habitats. Sand is especially evident at the higher elevations of the Study Area where application is more frequent than at lower elevations.

[1] Note: A larger date range (5 years) was used for this WVC analysis than for the safety analysis (4 years).

Figure 7. Project Extent with 2011 Linkage Interference Zones

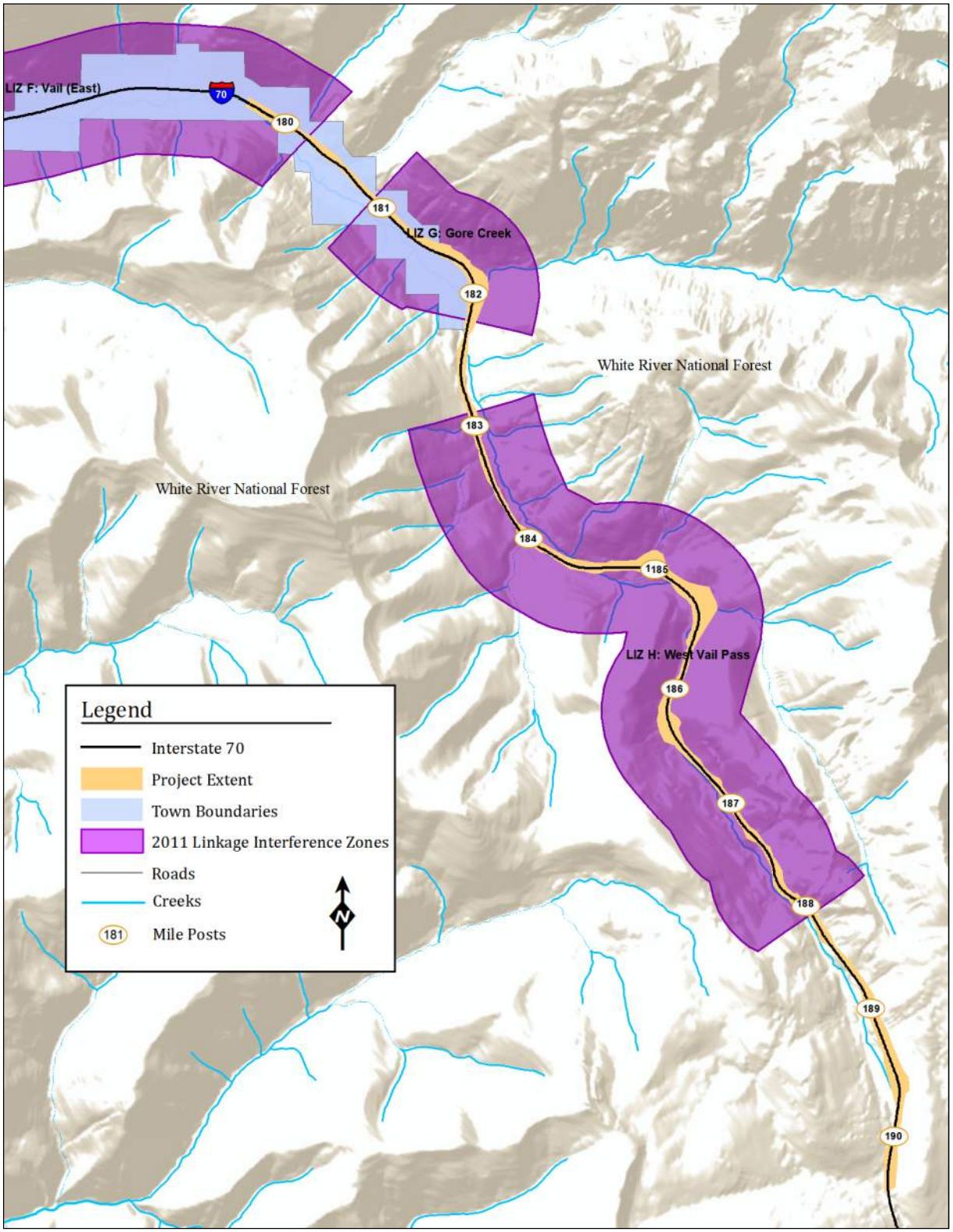
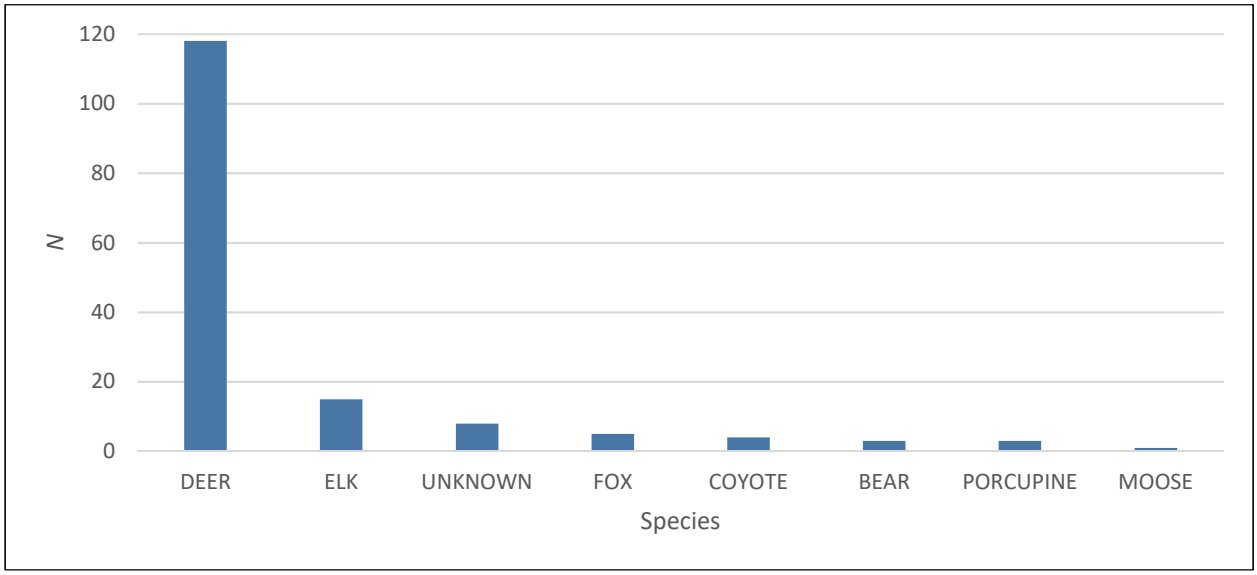


Table 4. Existing Crossing Structures in the Study Area & 2011 Connectivity Recommendations

MP LIZ	DESCRIPTION	2011 CONNECTIVITY RECOMMENDATION
181.0 G Gore Creek	Structure spans natural habitat and offers excellent wildlife passage beneath I-70. Fencing surrounding adjacent neighborhood prevents animals from accessing additional habitat to the south.	Explore opportunities with the neighborhood to develop acceptable measures that would allow wildlife to access habitat on the south side of the neighborhood, completing the north-south connection on either side of I-70. If wildlife passage through or around neighborhood can be accommodated, then install guide fencing to direct wildlife towards the structure.
182.0 G Gore Creek	Large divided span bridge over Gore Creek and SH-6. Bridge connects WRNF though much of LIZ is privately owned.	Concentrate human activity immediately around paved access road at west end of structure and implement measures to minimize human activity beneath the rest of the structure. Restore dirt lot/road with native vegetation cover. Requires coordination with local community and user groups to implement effective control measures and to educate the public on the importance of segregated wildlife/human uses at this location.
183.0 H West Vail Pass	Divided span bridge over small drainage. Creek (JP135) piped under bridge. No fencing at this site but a retaining wall on the southeast side of the roadway and heavy traffic on I-70 act as partial barriers to at-grade crossings.	Remove culvert and restore stream channel through bridge structure. Complement structure with guide fencing to direct animals toward structure and discourage at-grade crossings. If the roadway footprint increases with future highway reconstruction, the span and height of the bridge should also be increased to compensate for the additional length that animals must travel under the bridge.
184.0 H West Vail Pass	Large and high divided span bridge. There is no fencing at this site, but heavy traffic on I-70 acts as partial barrier to at-grade crossings.	Structure is highly functional for target species. Maintain connectivity at site. Complement structure with guide fencing to direct animals toward structure and discourage at-grade crossings.
184.5 H West Vail Pass	Large and high divided span bridge. There is no fencing at this site, but heavy traffic on I-70 acts as partial barrier to at-grade crossings.	Structure is highly functional for target species. Maintain connectivity at site. Complement structure with guide fencing to direct animals toward structure and discourage at-grade crossings.
185.5 H West Vail Pass	Large and high divided span bridge. There is no fencing at this site, but heavy traffic on I-70 acts as partial barrier to at-grade crossings. Bike path crosses under far east section of the span. Sediment pond located under structure.	Structure is highly functional for target species. Maintain connectivity at site. Complement structure with guide fencing to direct animals toward structure and discourage at-grade crossings.

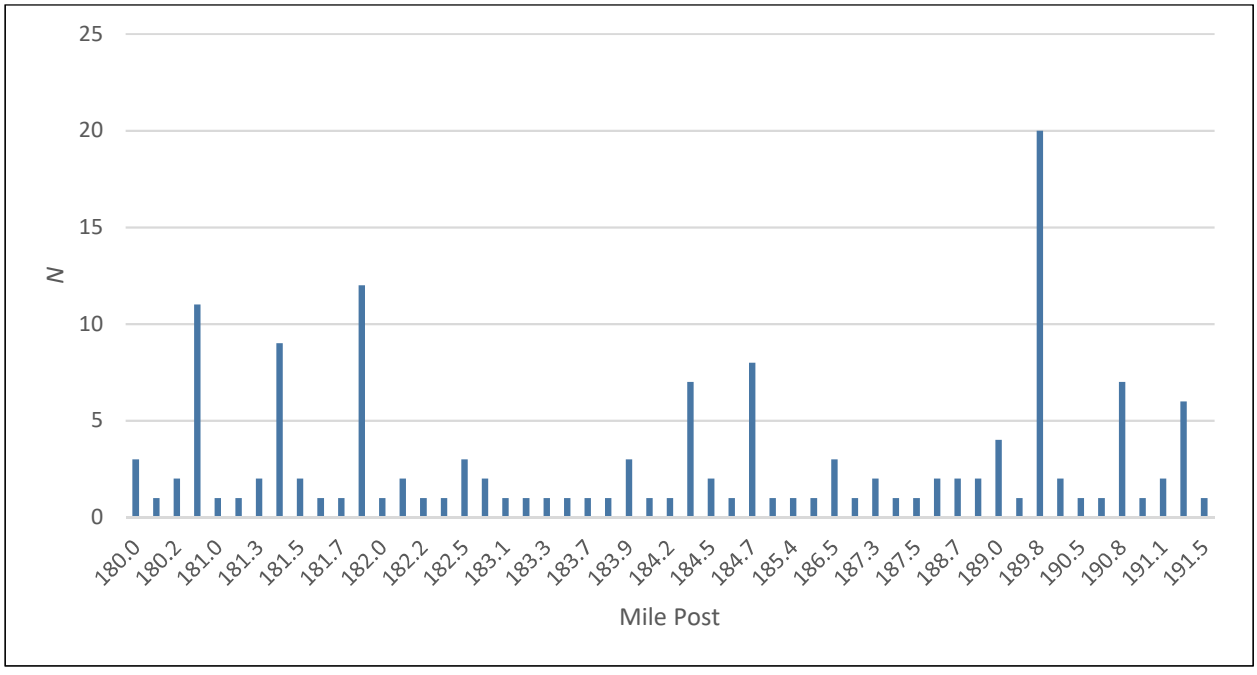
Source: Kintsch et al. 2011

Figure 8. Road Killed Wildlife by Species Reported by CDOT Maintenance, CSP, and VPD (2014 through 2018).



Source: CDOT Traffic and Safety Engineering Branch; CDOT Wildlife Program

Figure 9. Road Killed Wildlife by Mile Post Reported by CDOT Maintenance, CSP, and VPD (2014 through 2018)



Source: CDOT Traffic and Safety Engineering Branch; CDOT Wildlife Program

Purpose and Need

The purpose of the project is to improve safety and operations on EB and WB I-70 on West Vail Pass.

This project is needed to address safety concerns and operational issues due to geometric conditions (steep grades and tight curves) and slow-moving vehicle and passenger vehicle interactions that result in inconsistent and slow travel times along the corridor. The I-70 Mountain Corridor Programmatic Environmental Impact Statement (PEIS) identified safety and mobility issues on West Vail Pass related to speed differentials due to slow-moving vehicles. *(Mobility is defined as the ability to travel along the I-70 Mountain Corridor safely and efficiently in a reasonable amount of time.)*

- Safety Concerns: A high number of crashes occur along the corridor related to speed, tight curves, narrow roadway area, and inclement weather/poor road conditions. Speed differentials between passenger vehicles and slow-moving vehicles cause erratic lane changes and braking maneuvers resulting in crashes and spin outs. Emergency response is hampered by vehicular speeds and lack of roadway width to provide room for emergency vehicles to pass.
- Operational Issues: The steep grades and resulting speed differentials causes slow and unreliable travel times through the corridor. Tight curves also cause drivers to slow down. The corridor is frequently closed by vehicle incidents, due to lack of width to maintain a single lane of traffic adjacent to emergency responders, resulting in substantial traffic backups and delays. During winter months, the travel lanes and shoulders are severely impacted by snow accumulation, impacting the overall capacity of the corridor. (Operations is intended to describe the flow of traffic at desirable speeds given the geometric and prevailing weather conditions.)

No Action Alternative

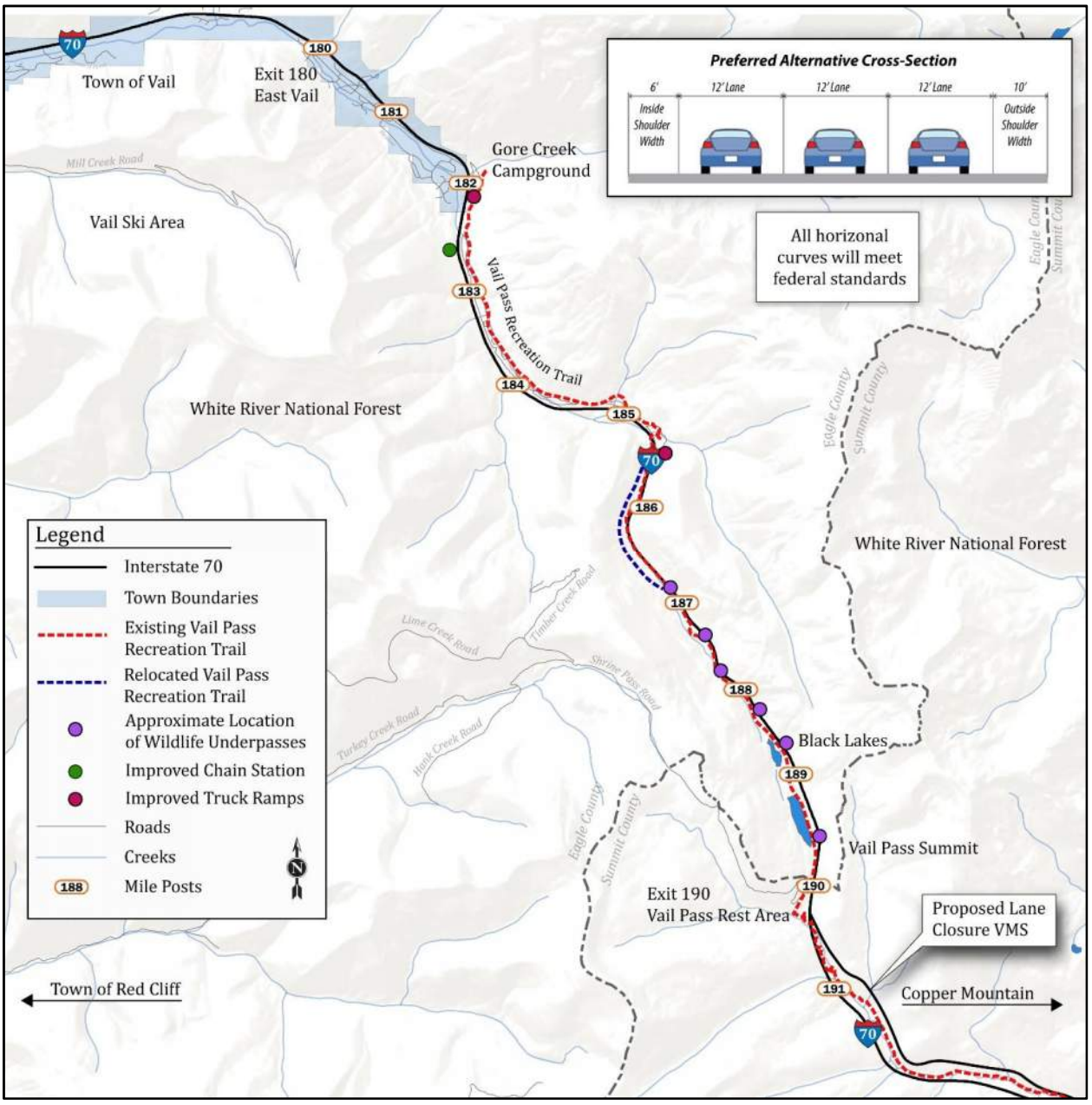
The No Action Alternative is included as a baseline for comparison to the action alternative. Under the No Action Alternative, only programmed projects that are planned and funded by CDOT or other entities would be completed. Currently, there are no large-scale transportation projects to add safety improvements, operational improvements, vehicular capacity, and multimodal facilities along I-70 within the project area. The No Action Alternative would leave West Vail Pass as it currently is configured and would not provide substantial improvements beyond typical current maintenance (e.g. resurfacing and plowing) activities. The roadway would remain the same, with 2 EB and 2 WB lanes (each 12 feet in width), an inside shoulder typically 4 feet in width, and an outside shoulder typically 10 feet in width.

Proposed Action Alternative

The Proposed Action Alternative (**Figure 10**) will add a 12-foot auxiliary lane, both EB and WB, for 10 miles from approximately the EB I-70 on-ramp in East Vail (MP 180) to the WB off-ramp at the Vail Pass Rest Area exit (MP 190). Existing lanes will be maintained at 12 feet and the shoulders would be widened to a minimum of 6 feet for inside shoulders and be maintained at 10 feet for outside shoulders. All existing curves will be modified as needed to meet current federal design standards.

Intelligent Transportation System (ITS) equipment will also be installed along the I-70 project corridor, consistent with recent study recommendations. Additional variable message signs (VMSs)

Figure 10. I-70 West Vail Pass Auxiliary Lanes Proposed Action Alternative



Source: DEA Project Team

will be installed at key locations to warn drivers of upcoming curves, grades, and incidents. Additional variable speed limit signs will be installed to manage driver speeds to conditions. Automated lane closure signage will be installed approaching the East Vail exit on EB I-70 and approaching the WB I-70 Vail Pass Rest Area exit to quickly and efficiently close lanes when needed.

Additional elements of the Proposed Action include:

- The Vail Pass Recreation Trail will be directly impacted by the addition of the I-70 auxiliary lane and therefore relocated for approximately two miles from MP 185 to MP 187.

- Existing emergency truck ramps, located at approximately MP 182.2 and 185.5, will be upgraded to current design standards.
- Six wildlife underpasses and wildlife fencing will be constructed throughout the corridor.
- Additional capacity will be added to the existing commercial truck parking area at the top of Vail Pass.
- Widened shoulders (minimum of eight feet of additional width beyond the 10' shoulder) at multiple locations to accommodate emergency pull-offs, emergency truck parking, and staging for tow trucks.
- Improved median emergency turnaround locations to accommodate emergency and maintenance turnaround maneuvers.
- Improved chain station located at approximately MP 182.5 with additional parking, signage, lighting, and separation from the I-70 mainline.
- Avalanche protection located at approximately MP 186.

Purpose of the Biological Assessment

The ESA of 1973 (16 U.S.C. 153 et seq.), as amended, requires federal agency decisions and actions to conserve and recover listed species and use their authorities to further the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species (50 Code of Federal Regulations [CFR] §402). Under the ESA, the effects analysis report is called a Biological Assessment (BA) and must be prepared for federal actions that are "major construction activities" to evaluate the potential effects of the proposal on listed or proposed species and critical habitats. ESA directs all federal agencies to consult (referred to as Section 7 consultation) with the U.S. Fish and Wildlife Service (USFWS) when their activities "may affect" a listed species or designated critical habitat. The ESA also mandates that federal agencies contribute to the conservation of federally listed species by using their authorities to conserve (recover) federally listed species so that listing is no longer necessary. This BA has been prepared in compliance with Section 7 of the Endangered Species Act of 1973, as amended. The purpose of this biological assessment is to review the Proposed Action Alternative to determine its likely effects on species listed as threatened, endangered, proposed, or candidate species under the ESA that potentially occur in the Study Area.

Methods

Field reconnaissance of the Study Area and taxon specific surveys were conducted by project team biologists between July 2017 and June 2018 (**Table 5**).

Table 5. Field surveys conducted for the Biological Assessment

Survey Type	Survey Date	Primary Taxa	Secondary Taxa
Broadcast Survey	June 15-16, 2017	Northern Goshawk	Other Accipiters & Raptors
Avian Survey	July 5-6, 2017	Migratory Birds	Raptors, Songbirds
Winter Track Survey	December 20, 2017	Canada Lynx	American Marten, Bobcat, Coyote, Elk, Mountain Lion, Mule Deer

Table 5 continued. Field surveys conducted for the Biological Assessment

Survey Type	Survey Date	Primary Taxa	Secondary Taxa
Winter Track Survey	January 9, 2018	Canada Lynx	American Marten, Bobcat, Coyote, Elk, Mountain Lion, Mule Deer
Winter Track Survey	January 25, 2018	Canada Lynx	American Marten, Bobcat, Coyote, Elk, Mountain Lion, Mule Deer
Winter Track Survey	February 8, 2018	Canada Lynx	American Marten, Bobcat, Coyote, Elk, Mountain Lion, Mule Deer
Winter Track Survey	February 23, 2018	Canada Lynx	American Marten, Bobcat, Coyote, Elk, Mountain Lion, Mule Deer
Winter Track Survey	March 8, 2018	Canada Lynx	American Marten, Bobcat, Coyote, Elk, Mountain Lion, Mule Deer
Owl Survey	March 22-23, 2018	Boreal Owl	Other Nocturnal Birds
Winter Track Survey	March 27, 2018	Canada Lynx	American Marten, Bobcat, Coyote, Elk, Mountain Lion, Mule Deer
Winter Track Survey	April 6, 2018	Canada Lynx	American Marten, Bobcat, Coyote, Elk, Mountain Lion, Mule Deer
Pollinator Survey	June 19, 2018	Western Bumble Bee	Other Bees

In addition to the taxon specific surveys, general reconnaissance of the Study Area was conducted on July 19 and July 21, 2017. The entire corridor was walked or driven, while noting plant communities, direct wildlife observation, wildlife habitat, and basic stream and riparian attributes. Formal habitat mapping and wildlife surveys were not conducted at this time. During the reconnaissance, various highway attributes such as bridges, culverts, sediment retention basins, median rails, etc., and existing impacts to local wildlife populations were noted. All road-killed wildlife encountered during the reconnaissance, including location and species, were recorded. Numerous photos in the corridor were taken at the time of the reconnaissance.

The project team biologists surveyed culverts and bridges for terrestrial mammal tracks or signs. An assessment of wildlife habitat and wildlife movement areas was conducted based on available datasets and reports from CDOT, CPW, and other organizations (See **Table 1**). WVC data (reported crashes and carcass locations from CDOT maintenance patrols, CSP, and VPD) were analyzed to identify areas with high WVC rates by species. Existing barriers to movement, as well as features that may facilitate wildlife movement, were also documented.

Consultation History

CDOT has initiated coordination with federal and state agencies, local stakeholders, and working groups, and will continue that commitment throughout the project. The agency and public scoping process includes working with the ALIVE Committee to fulfill the commitments set forth in the 2008 "A Landscape Level Inventory of Valued Ecosystem Components" (ALIVE) Memorandum of Understanding (MOU), which focuses on WVCs and habitat connectivity. The ALIVE Committee was developed during the NEPA process that was completed for the I-70 Mountain Corridor Final PEIS.

The MOU, signed in April 2008, details the responsibilities of each agency in addressing a project.

An initial project scoping meeting was held on June 12, 2017 with CDOT environmental specialists to give a project overview and identify concerns and documentation requirements. In order to fulfill responsibilities set forth in the ALIVE MOU, the ALIVE Committee scheduled two meetings to identify and discuss wildlife concerns, potential impacts and mitigation strategies. The ALIVE meetings were held on April 8, 2018 and December 14, 2018. The ALIVE meetings were attended by representatives from, CDOT, Colorado Wild, CPW, ECO-resolutions (first meeting only), FHWA (first meeting only), Town of Vail, U.S. Forest Service (USFS), and USFWS. In addition, two Stream and Wetland Ecological Enhancement Program (SWEEP) Committee meetings were held on May 16, 2018 and February 11, 2019, respectively, to integrate concerns about wetlands, sedimentation, Total Maximum Daily Loads (TMDL), and other Clean Water Act Section 303(d) related issues.

During the initial ALIVE meeting, Alison Michael, USFWS, identified Canada lynx as the only federally listed species with potential to occur in the Study Area and Bill Andree, CPW, noted that there had been two lynx mortalities on I-70 within the Study Area, one in 1999 and another in 2004. CPW personnel expressed concern regarding the potential impacts to elk, mule deer and other wildlife in the Study Area and the increased barrier effect of additional lanes. The recommendations of the various I-70 habitat linkage and crossing structure studies were discussed as mitigation to increase permeability for wildlife. Each of the three LIZs within the Study Area were discussed. CDOT presented a number of mitigation strategies at the subsequent ALIVE meeting. The primary focus was the design and location of underpasses to increase permeability in the upper portion of the Study Area since existing and planned bridges will provide sufficient wildlife crossing opportunities in the lower portion. There was general agreement that many small to large underpasses would provide more effective mitigation than a single overpass as had been recommended in past studies. CDOT has also expressed safety concerns over the potential shading and icing hazards that could result from a wildlife overpass constructed in an area that is in the top 10 highest crash rates per volume of vehicles on all of I-70 (CDOT Statewide Crash Data 2016) and includes steep grades (which exceed the standard of 5%) and numerous curves. This factor was a primary consideration when selecting an underpass versus an overpass for this location.

Consultation and coordination efforts conducted to date related to biological resources for this project are listed in **Table 6**. Meeting minutes are included in **Appendix B**. In addition, two public stakeholder meetings were held on February 22, 2018 and December 13, 2018.

Table 6. Coordination and Consultation Summary

Agency or Committee	Meeting Date	Purpose of Meeting
Environmental Scoping Meeting	June 12, 2017	To present information and solicit input from environmental specialists and resource leads to incorporate into scoping information.
USFS Scoping Meeting	July 19, 2017	As a cooperating agency, USFS was consulted regarding botanical and wildlife field surveys, existing data, etc.
ALIVE	April 8, 2018	Provide overview of project and project effects on wildlife with a focus on LIZs within the Study Area.
SWEEP	May 16, 2018	Provide overview of project and discuss issues relating to water quality, wetlands, and aquatic resources.

Table 6 continued. Coordination and Consultation Summary

Agency or Committee	Meeting Date	Purpose of Meeting
CPW	July 20, 2018	Discuss wildlife movement patterns, habitat use, crossing structures, and interaction with I-70 in Study Area.
CPW/USFS	November 26, 2018	Collaboration on wildlife connectivity & crossing structures – design and location.
ALIVE	December 14, 2018	Discuss feasibility of a variety of mitigation solutions with specific focus on crossing structures to mitigate the effects of the project on and improve conditions for wildlife.
SWEEP	February 11, 2019	Refine sediment mitigation solutions and integrate concerns about sediment ponds acting as wildlife attractants into the siting and design of sediment ponds.
USFS Check-in Meeting	April 11, 2019	Provide an update on the Proposed Action and design option status. Gather feedback on trail realignment options and approach to other environmental resources.

Species Considered and Evaluated

This section provides the review of the species considered for evaluation. A list of species with status under the federal ESA for the Study Area was initially developed based on programmatic consultation with USFWS, USFS, the ALIVE Committee, and knowledge of the area. A list of federally listed and proposed species and designated/proposed critical habitat in the Study Area was then obtained from the USFWS IPaC website on May 28, 2019 (**Appendix A**). Using this list, we determined which of those species/critical habitat had a potential to occur within the Study Area (shown in **Table 7**). Species not known or with no potential of occurring in the Study Area are documented with brief rationale in **Table 6** and will not be discussed further in this document. Excluded species have been dropped from further analysis by meeting one or more of the following conditions:

- Species does not occur, nor is expected to occur in the action area during the time activities would occur;
- Occurs in habitats that are not present; and/or
- Is outside of the geographic or elevation range of the species.

Based on the review of habitat present within the Study Area, the only federally listed species with potential habitat in the Study Area is Canada lynx. No critical habitat for any federally listed species occurs in the Study Area. As described above, USFWS concurred with this conclusion. There is no proposed or designated critical habitat for any federally listed species addressed in this assessment within the action area; therefore, there will be/no direct, indirect, or cumulative effects. Critical habitat will/not be addressed further in this assessment.

Table 7. Federally Listed Species and their Potential to Occur in the Study Area. Bold text indicates a species that will be carried forward for analysis.

SPECIES	STATUS[1]	HABITAT REQUIREMENTS	POTENTIAL FOR OCCURRENCE IN THE STUDY AREA
MAMMALS			
Canada Lynx (*Lynx canadensis*)	**FT**	**Found primarily within the subalpine and upper montane forests zones typically from 8,000 to 12,000 feet in elevation. Early successional spruce/fir and lodgepole pine forests used for foraging, mature and old growth spruce/fir and lodgepole pine containing large downed woody debris used for denning. Riparian areas, mixed aspen/conifer, mature spruce/fir, and shrublands to forested lynx habitat also used for foraging.**	**Known to occur within the Study Area (Ivan 2011, Squires et al. 2011, Baigas et al. 2015, Olson et al. 2018). Suitable habitat exists adjacent to the Study Area.**
BIRDS			
Mexican Spotted Owl (*Strix occidentalis lucida*)	FT, ST	Occurs at elevations below 9,100 feet in large steep canyons with exposed cliffs and dense old growth mixed coniferous forests.	Unlikely to occur. There is no habitat for Mexican spotted owl within the Study Area. The only Mexican Spotted Owl habitat on WRNF potentially suitable for Mexican spotted owl is located within Glenwood Canyon (USDA Forest Service 2002).
Greenback cutthroat trout (*Oncorhynchus clarki stomias*)	FT, ST	Cold, clear, gravelly headwater streams and mountain lakes which provide an abundant food supply of insects.	Unlikely to occur. Suitable habitat occurs within Study Area but unoccupied by this species. Colorado River cutthroat trout (*O. c. pleuriticus*) - blue lineage occur in Pitkin, Polk, and Miller Creeks (K. Bakich, CPW, pers. comm. 2018). The *O. c. pleuriticus* - green lineage that the USFS and FWS are treating as threatened under the provisions of the ESA, however, do not occur within the Study Area. Therefore, the proposed action will have NO EFFECT on the greenback cutthroat trout (or green lineage Colorado River cutthroat trout).

Table 7 continued. Federally Listed Species and their Potential to Occur in the Study Area. Bold text indicates a species that will be carried forward for analysis.

SPECIES	STATUS[1]	HABITAT REQUIREMENTS	POTENTIAL FOR OCCURRENCE IN THE STUDY AREA
Colorado pikeminnow (*Ptychocheilus lucius*)	FE, ST	Medium to large rivers with small quiet backwaters within the Colorado River system.	Does not occur in the project area. Project will not deplete water sources that are part of the Colorado River system.
Razorback sucker (*Xyrauchen texanus*)	FE, SE	Often associated with sand, mud, and rock substrate in areas with sparse aquatic vegetation, where temperatures are moderate to warm within the Colorado River system.	Does not occur in the project area. Project will not deplete water sources that are part of the Colorado River system.
Humpback chub (*Gila cypha*)	FE, ST	Not found in areas of swift current, but prefer slower eddies and pools within the Colorado Rivers system.	Does not occur in the project area. Project will not deplete water sources that are part of the Colorado River system.
Bonytail chub (*Gila elegans*)	FE, SE	Prefers eddies and pools, not swift currents within the Colorado River system.	Does not occur in the project area. Project will not deplete water sources that are part of the Colorado River system.
PLANTS			
Ute Ladies'-tresses (*Spiranthes diluvialis*)	FE	Occurs in seasonally moist soils and wet meadows of drainages below 7,000 feet elevation.	Study area is above the elevation range of species. Water depletions not of sufficient magnitude or proximity to occupied habitat.
Western Yellow-billed Cuckoo (*Coccyzus americanus*)	FT, SC	Reservoirs, lakes and rivers with bare, sandy shorelines with pebbles for nesting and foraging.	Unlikely to occur. No suitable habitat is present in the Study Area. Study area is outside of elevation range. Nearest known occurrence is Gunnison and Delta counties (Wickersham 2007).

[1]Status Codes: PT = Proposed Threatened; FE = Federally Endangered; FT = Federally Threatened; SE = State Endangered; ST= State Threatened, SC = State Special Concern.

CANADA LYNX (LYNX CANADENSIS)

The information cited herein represents the best available science relative to Canada lynx life history, status, habitat affinity, seasonal use, movements, and important landscape linkages.

SOUTHERN ROCKIES LYNX AMENDMENT

This document discloses information specific to analyzing projects under the Southern Rockies Lynx Amendment (SRLA; USDA Forest Service 2008a), which amended the Land and Resource Management Plans on eight Region 2 National Forests. The SRLA adds consistent management direction to promote conservation of the Canada lynx on National Forest Service (NFS) land in the

Southern Rocky Mountains. The aim is to help ensure that the appropriate information is used in the effects analysis and provided to the USFWS, thus streamlining consultations on SRLA projects.

The management direction is designed to strike a reasonable balance in providing for the conservation of lynx habitat while also allowing appropriate levels of human uses to occur. The decision adds one goal, 13 objectives, 7 standards, and 34 guidelines related to all activities (ALL), vegetation management (VEG), grazing management (GRAZ), human uses (HU), and linkage areas (LINK). Goals are general descriptions of desired results; objectives are descriptions of desired resource conditions; standards are management requirements designed to meet the objectives; and guidelines are recommended management actions that will normally be taken to meet the objectives, but are not required.

Under this decision, standards are applied only to vegetation management activities that have the potential to directly affect snowshoe hare (*Lepus americanus*) prey and thus may impact lynx at the population level. Other activities that may have possible adverse effects on individual lynx are subject to guidelines. Any deviations from guidelines would be considered only after analysis of site-specific conditions, and in compliance with ESA Section 7 consultation requirements.

LIFE HISTORY

Lynx are temperate forest dwelling carnivores. In Colorado they are mostly dependent upon snowshoe hare for prey; red squirrels (*Tamiasciurus hudsonicus*) are probably secondary in importance (Shenk and Kahn 2010, Ivan and Shenk 2016). They also have been documented preying upon other mammals, grouse, and ptarmigan during the summer months. Hares not only determine where lynx are found, but also influence how many lynx may occupy an area. In the northern portions of their geographic range they undergo dramatic fluctuations in populations based on the ten-year cycle of hare abundance. In the southern portions of their range (Colorado), these population fluctuations are not as evident and lynx populations appear similar to those occurring during the hare population lows in the northern portions of their ranges (Dolbeer and Clark 1975, Wolff 1980, Koehler and Brittell 1990).

In the southern Rocky Mountains, lynx are predominately found above 8,000 feet in Engelmann spruce, subalpine fir, and lodgepole pine forests. They typically use areas during winter where low topographic relief creates continuous forest communities of varying stand ages and provides moist forest floor conditions to support hares. Typically, lynx require a mosaic of forested habitats in which to den, forage, rest, and travel. Riparian and wetland shrub communities found in valleys, drainages, wet meadows, and moist timberline locations may support important prey resources (Ruediger et al. 2000).

The status of Canada lynx, along with life history information (e.g., general ecology, prey relationships, characteristics of foraging denning, and security habitat, landscape connectivity, movement patterns, and the effects of recreational activities on lynx) may be found in Koehler and Aubry (1994), Ruggiero et. al (2000), Interagency Lynx Biology Team (2013), Shenk (2009), and (Squires et al. (2011). This analysis tiers to these documents and to the SRLA EIS (USDA Forest Service 2008a), ROD (USDA Forest Service 2008b), Supplemental Biological Assessment (2008c), and Implementation Guide (USDA Forest Service 2009). The SRLA provides Objectives, Standards, and Guidelines at the Forest level to provide for the habitat needs of Canada lynx. The lynx baseline data contained in these documents represents the best and most current scientific information available.

STATUS OF CANADA LYNX IN COLORADO

In an effort to restore a viable population of Canada lynx to the southern portion of their former range, the Colorado Division of Wildlife (now CPW) reintroduced 218 individuals into Colorado from 1999-2006. In 2010, CPW determined that the reintroduction effort had met all the benchmarks of success, and that a viable, self-sustaining population of Canada lynx had been established (Ivan 2012). Several of these animals have been either confirmed or reported in Eagle County.

Within areas of high use in southwestern Colorado, mature Engelmann spruce-subalpine fir forest stands with 42-65% canopy cover and 15-20% conifer understory cover has been the most commonly used forest community in southwestern Colorado (Shenk 2009). Little difference in aspect, slope, or elevation were detected for long beds, travel, and kill sites. Den sites, however, were located at higher elevations on steeper and more commonly north-facing slopes with a dense understory of coarse woody debris.

Monitoring by the CPW suggests two primary areas of use by reintroduced and monitored lynx. The first is the core research area and a secondary core area centered in the Collegiate Peaks Wilderness. High use is also documented for the area east of Dillon, both north and south of 1-70, and the area north of State Highway 50 centered around Gunnison and then north to Crested Butte. These last two high use areas are smaller in extent than the two core areas.

HABITAT USE BY LYNX

Shenk (2009) reported the results of radio/satellite telemetry investigation into landscape-scale habitat use by Colorado lynx. Her results were based on 10,935 aerial locations collected from 1999 - 2008. Throughout the year, Engelmann spruce / subalpine fir was the dominant cover used by lynx. A mix of Engelmann spruce, subalpine fir and aspen was the second most common cover type used throughout the year. Various riparian and riparian-mix areas were the third most common cover type where lynx were found during the daytime flights. Use of Engelmann spruce-subalpine fir forests and Engelmann spruce- subalpine fir-aspen forests was similar throughout the year. There was a trend in increased use of riparian areas beginning in July, peaking in November, and dropping off December through June.

Site-scale habitat data collected from CPW snow-tracking efforts confirms that, at the level of individual sites used by lynx for daily activities, Engelmann spruce and subalpine fir are the most common forest stands used by lynx during the winter in southwestern Colorado (Shenk 2009). Comparisons were made among sites used for long beds[1], dens, travel and where they made kills. Little difference in aspect, slope, or elevation were detected for long beds, travel and kill sites. At these three types of sites, lynx typically used gentler slopes at a mean elevation of 10,410' MSL, and varying aspects with a slight preference for north facing slopes. Mean percent total overstory was higher for long bed and kill sites than travel or den sites.

Engelmann spruce provided a mean of 36%± overstory for kills and long beds, with travel sites averaging 28% and den sites having the lowest mean percent overstory of 23%. Willow overstory was highly variable and no dens were located there. In contrast, the most common understory species were Engelmann spruce, subalpine fir, willow and aspen. Various other species such as ponderosa pine, lodgepole pine, cottonwood, birch, and others were also found in less than 5% of the habitat plots. If present, willow provided the greatest percent cover within a plot followed by Engelmann

[1] Long beds are sites where a lynx lays in the snow for an extended period, characterized by having an iced surface.

spruce, subalpine fir, aspen and coarse woody debris for long beds, kills and travel sites.

Den sites had significantly higher percent understory cover, in comparison with long-beds, travel, and kill sites (Shenk 2009). Understory at den sites was primarily made up of coarse woody debris. The most common tree species was Engelmann spruce. Subalpine fir and aspen were also present in >35% of the plots. Most habitat plots were vegetated with trees of DBH < 6". As DBH increased, percent occurrence decreased within the plot. Although decreasing in abundance as size increased, most lynx-use sites had trees in each of the DBH categories, indicating mature forest stands except for dens.

Habitat used by lynx varies seasonally, most likely due to the greater diversity of prey species available in summer versus winter (Ivan and Shenk 2016). During winter, lynx select for mature multi-story stands dominated by large Engelmann spruce and subalpine fir with dense horizontal cover (Squires et al. 2010). During summer, lynx broaden their resource use to select younger forests with high horizontal cover, abundant total shrubs, abundant small-diameter trees, and dense saplings, especially spruce-fir saplings.

Mortality

Reported causes of lynx mortality vary between studies. The most commonly reported causes include starvation of kittens (Quinn and Parker 1987, Koehler 1990) and human-caused mortality, mostly fur trapping (Norman and Thompson 1987, Ward and Krebs 2011). Of the total 218 adult lynx released, there have been 115 known mortalities as of May 25, 2009. Starvation was a significant cause of mortality in the first year of releases only. Mortalities occurred throughout the areas through which lynx moved. The primary known causes of death included 30.4 percent human-induced deaths, which were confirmed or probably caused by collisions with vehicles or gunshot. Malnutrition and disease/illness accounted for 18.3 percent of the deaths. Other mortality factors included predation or probable predation by mountain lions (*Puma concolor*), bobcat (*Lynx rufus*), and lynx, as well as other trauma-caused deaths. An additional 37.4 percent of known mortalities were from unknown causes (Shenk 2009).

Lynx Home Range & Movement

Canada lynx home range size varies by the animal's gender, abundance of prey, season, and density of lynx populations (Koehler and Aubry 1994, Poole 1994, Slough and Mowat 1996, Ruediger et al. 2000, Steury and Murray 2004). Lynx maintain large home ranges, averaging 8 to 800 km^2 (Koehler and Aubry 1994, Ruediger et al. 2000, Squires and Laurion 2000). The size of their home range varies depending on abundance of prey, gender, age, season, and the density of lynx populations. When densities of prey decline, lynx enlarge their home ranges to obtain sufficient amounts of food to survive and reproduce. Males tend to have larger home ranges than females.

Three types of lynx movements are relevant with respect to habitat connectivity, all of which must be maintained at the project level for an action to be considered consistent with the ALL S1 Standard of the SRLA (USFS 2008). During their daily movements, lynx select continuous forest and frequently use ridges, saddles, and riparian areas. They typically avoid large openings in the forest canopy (greater than 100 meters) and normally use coniferous or deciduous vegetation greater than 6 feet in height with a closed canopy for traveling (Koehler and Aubry 1994). Daily movements range from a low of 1.2 miles for female lynx with kittens, to a high of 3.3 miles during periods of low hare abundance (Interagency Lynx Biology Team 2013). One study observed a female lynx to have daily movements of up to 6.2 miles per day during the summer and 5.3 miles per day during the winter.

Lynx landscape-level movements include exploratory movements[2] and dispersal movements[3]. Exploratory movements have been documented to range from 9 up to 452 miles (Interagency Lynx Biology Team 2013). Dispersal distances have been detected up to 620 miles. Despite the large distances covered during landscape-level movement, the distance traveled each day are similar to normal daily movements within the lynx's home range. Dispersal and movements of transients can occur year-round, while male, breeding season movements generally occur from January into April, peaking in February and March.

There is some evidence that lynx inhabiting the more fragmented Southern Rockies may cross larger openings somewhat more freely than their northern counterparts. For example, Thompson and Halfpenny (1989) reported that they backtracked a lynx that crossed a 4,400 foot wide subalpine grassland within the Vail Ski Area. Another of the lynx released in Colorado by the CPW traveled as far as Nebraska prior to being shot. Poole and Mowat (cited with no date in Ruediger et al 2000) reported observing lynx crossing several hundred meter wide openings, frozen lakes and rivers greater than 1 km wide during their investigations in the Northwest Territories. However, these movements, at the present time, are considered atypical and/or movements associated with dispersal.

Permeability of transportation corridors to lynx movements is central to their persistence in Colorado given the large spatial extent of transportation networks and the high mobility of lynx. Baigas et al. (2015) investigated the degree to which highways were permeable to movements of resident Canada lynx in the Southern Rocky Mountains based on highway crossings (n = 593) documented with GPS telemetry. All lynx crossed highways when present in home ranges at an average rate of 0.6 crossings per day. Lynx mostly crossed highways during the night and early dawn when traffic volumes were low. Five of 13 lynx crossed highways less frequently than expected when compared to random expectation, but even these individuals crossed highways frequently in parts of their home range. At the fine scale, lynx selected crossings with low distances to vegetative cover and higher tree basal area; they found no support that topography or road infrastructure affected lynx crossing. At the landscape scale, lynx crossed highways in areas with high forest canopy cover in drainages on primarily north-facing aspects. The predicted crossing probabilities generated from their landscape-scale RSF model across western Colorado, USA, were successful in identifying known lynx crossing sites as documented with independent snow-tracking and road-mortality data. Connectivity of lynx habitat has been identified as an important consideration for the southern Rockies, because of the extreme topographic relief juxtaposed with human developments such as highways and residential communities. In the Remanded Rule (Federal Register Vol. 68, p. 400786), the FWS concluded that the population-level threat to lynx attributable to high traffic volume on roads that bisect suitable lynx habitat and associated suburban developments is low. The FWS, however, recognized that a higher risk exists in Colorado than elsewhere in the range of the lynx (Interagency Lynx Biology Team 2013).

In the SRLA (USDA-FS 2008b), 38 linkage areas were identified in Colorado and southern Wyoming. Management direction for these areas is to maintain connectivity of habitat and facilitate lynx movements. Some of these linkage areas, however, may be located in proximity to existing human

[2] Exploratory movements are long-distance movements beyond identified home range boundaries, in which the animal returned to its original home range.

[3] Dispersal is the permanent movement of an animal to a new home range.

developments or may not currently contain the conditions or structures needed to provide habitat connectivity.

Ski resort development, a growing and affluent population, and telecommuting capabilities have converged to spur rapid growth in some mountain valleys. Transportation corridors continue to be modified and expanded to handle increasing volumes of traffic and speeds, altering historical movement patterns of wide-ranging species and creating barriers to movement. These and other factors, both historical and current, have eliminated or degraded some landscape linkages, which increases the importance of remaining linkage areas.

LANDSCAPE LINKAGES

As a result of the patchy, discontinuous nature of lynx habitat in Colorado, the maintenance of habitat connectivity is thought to be critical to the maintenance of a viable population. Linkage areas occur both within and between geographic areas where blocks of lynx habitat are separated by intervening areas of non-lynx habitat such as basins, valleys, agricultural lands, or where lynx habitat naturally narrows between blocks (USDA Forest Service 2008b). Connectivity provided by linkage areas can be degraded or severed by human infrastructure such as high-use highways, subdivisions or other developments.

Any continuous forested corridor between and/or across mountain ranges that provide lynx habitat may provide such connectivity. Narrow forested mountain ridges or shrub-steppe plateaus may provide a linkage between more extensive areas of lynx habitat. Wooded riparian communities may provide travel cover across otherwise open valley floors between mountain ranges, or lower elevation ponderosa pine or pinyon-juniper woodlands may link high elevation spruce-fir forests (Ruediger et al. 2000).

The Vail Pass lynx linkage area identified in the SRLA Environmental Impact Statement (USDA Forest Service 2008a) encompasses the Study Area south of MP 182.1.

STUDY AREA - LYNX HABITAT BASELINE

Habitat for Canada lynx, as described above and within the tiered documents, occurs within the Study Area and throughout the Vail Pass area. The distribution of lynx habitat (i.e., vegetation) on the WRNF is presented in the Forest-wide GIS lynx mapping coverage developed in collaboration with USFWS. The Study Area includes lynx winter forage, denning, other habitat, and linkage areas. For the purposes of this analysis, the Canada lynx analysis area is the 114,613 acre Cache Lynx Analysis Unit[4] (LAU), the 82, 870 acre Camp Hale LAU, and the 36,995 acre Ten Mile LAU, as defined and assigned by the Forest Service (**Figure 11**).

Preferred habitat for lynx is classic boreal forest and subalpine forest. Of greater importance is the presence of snowshoe hares, their main food source. Lynx can be found in spruce-fir, lodgepole, Douglas fir, and aspen forests especially when snowshoe hares are present. **Table 2** lists vegetation types and proportional representation that occur throughout the Study Area.

[4] Lynx Analysis Units approximate the size of an area used by an individual lynx and are the scale at which the effects of management activities are evaluated for lynx.

Figure 11. 2017 USFS Lynx Habitat Directly Affected by the Proposed Action, Lynx Linkage Areas, and LAUs

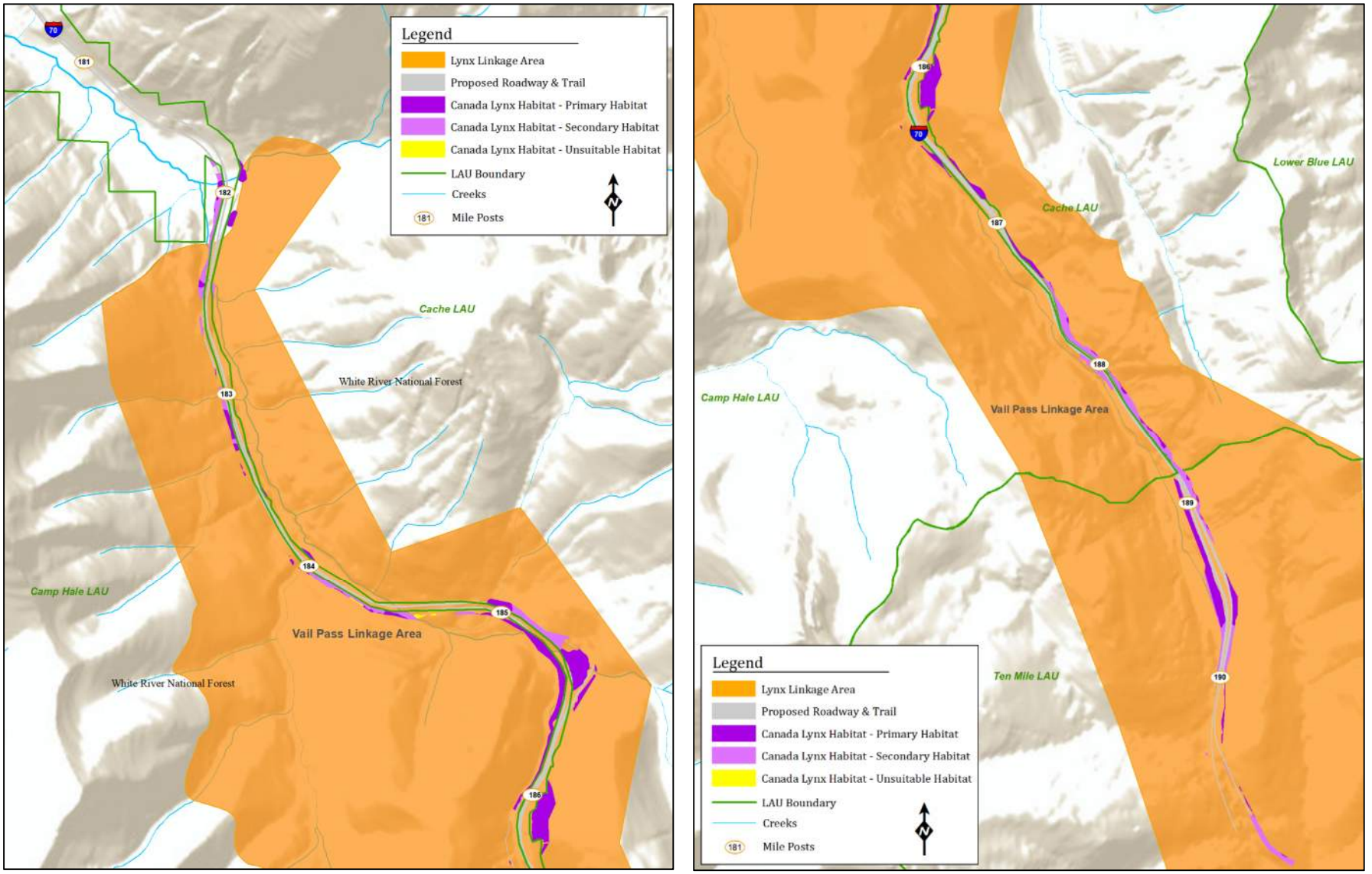


Table 8. Lynx Habitat Distribution in the Cache, Camp Hale, and Ten Mile LAUs

WRNF Mapped Lynx Habitat	Cache LAU	Camp Hale LAU	Ten Mile LAU	Total
Total LAU Acres	114,613	82,890	36,995	150,754
Primary Lynx Vegetation	43,637.1	36,466.3	15,516.5	95,619.8
Secondary Lynx Vegetation	26,786.9	15,670.5	6,095.9	48,553.3
Total Lynx Vegetation	70,424.0	52,136.9	21,612.4	144,173.20
Currently Unsuitable	3,760.1	2,613.7	206.5	6,580.4
% Currently Unsuitable	3.3%	3.2%	0.2%	4.4%

Colorado represents the southern-most historical distribution of Canada lynx, where the species occupies the higher elevation montane forests. Lynx were essentially extirpated from the state by the late 1970s, because of unregulated trapping, predator control and habitat incursion (Meaney 2002). CPW initiated a reintroduction program in 1997. From 1999 to 2006, 218 wild-caught lynx from Alaska and Canada were released in southwestern Colorado (Shenk 2009). All releases have been in the San Juan Core Area in southwestern Colorado. Of the transplanted animals, a majority (152 out of 218) remained within the Study Area in the San Juan Mountains of southern Colorado. Additional small population centers have been established in several locations farther north in Colorado (Shenk 2009).

Movement of lynx through the project area has been documented by CPW, USFS, and other research studies (Shenk 2009, Shenk and Kahn 2010, Ivan 2011, Squires et al. 2011, Theobald and Shenk 2011, Olson et al. 2017, Baigas, et al. 2017, Olson et al. 2018). Telemetry data collected by these studies shows that the easternmost lynx home range within the study area extends to approximately MP 185 (Squires et al. 2011) and that although occasional crossings occur on the west side of Vail Pass, these are rare in comparison to the east side of the pass (Ivan 2011, Squires et al. 2011, Baigas et al. 2015, Olson et al. 2018).

The Study Area contains the high elevation mesic coniferous boreal, subalpine, and western montane forest habitats typically preferred by lynx and movement through the project corridor is likely. The primary issues affecting lynx in this corridor are directly related to animal/vehicle collisions and the interference of I-70 with lynx movement – commonly referred to as the barrier effect. At least four lynx have died as a result of vehicle collisions on I-70 since 2000; two in the West Vail Pass area (discussed above) and two outside the Study Area near Bakerville (MP 217 – 220). An analysis of wildlife vehicle collision (WVC) data collected by CDOT does not identify any recent lynx collisions in the Study Area.

The ALIVE Committee has identified critical lynx-specific linkage interference zones along the I-70 Mountain Corridor where wildlife movements are impeded by the highway. One of these, the Vail Pass Lynx Linkage Area encompasses most of the Study Area (**Figure 11**). Lynx Linkage Areas are areas of movement opportunities. They exist on the landscape and can be maintained or lost by management activities or developments. They are not just "corridors" (which implies only travel routes), rather they are broad areas of habitat where animals can travel and find food, shelter, and

security. Using radio telemetry, CPW has identified 12 lynx crossing I-70 within the Vail Pass linkage area (Ivan 2011).

Baigas et al. (2017) found that lynx have success in locating below-grade crossings and use them repeatedly. They also found that lynx are capable of crossing I-70 at road-grade during periods of low traffic volume. They found that lynx use of underpasses for crossing high volume roads was consistent with other species such as mountain lions (Beier 1995) and bobcats (Henke et al. 2001). In addition, Baigas et al. (2017) found that lynx likely cross high-volume, four-lane highways similar to other wildlife in their proclivity to use larger underpasses with dense native vegetation close to passage entrances (Cain et al. 2003) in favorable habitat with low human disturbance (Beier 1995, Ng et al. 2004).

Direct, Indirect, and Cumulative Effects

Proposed Action Alternative

While two LAUs intersect the Study Area, impacts on lynx winter forage, denning, and other habitat are anticipated to be fairly limited. To quantify potential impacts on lynx linkage areas, the Proposed Action Alternative project extent was overlaid onto the WRNF lynx habitat map (Figure 11), and area of direct impact (in acres) was calculated. **Table 9** provides the estimated direct impacts on lynx habitat within the Cache, Camp Hale, and Ten Mile LAUs and **Table 10** breaks down the affected area by USFS lynx habitat categories and by LAU. In addition, the wildlife exclusion fences will remove nominal acreage of primary or secondary habitat from potential use by lynx.

Table 9. Direct Impacts by LAU (excluding non-habitat): Proposed Action Alternative

LAU	Affected Acres	Percent of LAU Affected
Cache	66.89	0.06%
Camp Hale	44.83	0.05%
Ten Mile	39.08	0.11%
Total	150.1	0.06%

Table 10. Direct Impacts on Canada Lynx Habitat by LAU (excluding non-habitat): Proposed Action Alternative

Habitat Type (Total LAU Acres)	Cache LAU		Camp Hale LAU		Ten Mile LAU		Total Project Extent	
	Affected Acres	Percent Affected	Affected Acres	Percent Affected	Affected Acres	Percent Affected	Affected Acres	Percent Affected
Primary	41.08	0.04%	23.94	0.03%	22.56	0.06%	87.57	0.07%
Secondary	25.82	0.02%	20.05	0.02%	16.53	0.04%	62.40	0.11%
Unsuitable	0.00	0.00%	0.85	0.00%	0.00	0.00%	0.85	0.005%

INDIRECT EFFECTS

The I-70 corridor at West Vail Pass, along with residential and recreational development and roads, constitutes a major source of habitat fragmentation, effectively dividing large home rangs and disrupting wildlife movements from north to south (USDA Forest Service 2002). High-speed, high-volume highways can result in lynx road-kills, fragment and restrict lynx habitat use, impair home range effectiveness, and inhibit local and dispersing movements that may lead to reduced habitat connectivity and the decline of some wildlife populations and species over time due to genetic isolation (Forman and Alexander 1998, U.S. Fish and Wildlife Service 2000, Clevenger et al. 2002, Forman et al. 2003, Alexander et al. 2004). As wide-ranging predators, lynx are especially susceptible to fragmentation impacts, and the Study Area intersects known lynx habitat and, as described above, intersects Lynx Linkage Areas.

Highway mortality levels can increase appreciably with relatively small increases in traffic volumes and speeds (Ruediger et al. 2000). Fourteen of the 218 lynx released to date in Colorado have been killed attempting to cross highways), including two within the Study Area. With lynx increasing in numbers, future WVCs are likely. Although the two lynx killed in the Study Area were within the West Vail Pass LIZ, the three LIZs encompassing portions of the Study Area have a lower WVC rate compared to others in the I-70 Mountain Corridor (Kintsch et al. 2011).

As a summary of highway traffic volume and carnivore road-kill probabilities, annual average two-way daily traffic (AADT) volumes within or above the 2,000-5,000 vehicles per day (VPD) range have been documented to impair lynx movements (Stevens et al. 1996, Clevenger et al. 2002, Alexander et al. 2004, 2005). The Lynx Conservation Assessment and Strategy (LCAS) identifies more than 4,000 vehicles per day on a roadway as a serious threat for wildlife mortality and habitat fragmentation (Ruediger et al. 2000). Travel on I-70 throughout the Study Area currently greatly exceeds 4,000 vehicles per day. The lowest traffic volumes recorded in 2018 by automated CDOT traffic counters occurred in the winter and were approximately four times higher than this threshold (16,600 per day) and the highest average daily volume occurred in the summer at more than 7.5 times the threat threshold (30,300 per day).

Without mitigation, the Proposed Action Alternative increases the width of the road surface and the total width of the roadway thus increasing the indirect barrier effect of I-70. For example, although additional highway lanes do not in themselves create physical barriers as compared to Jersey barriers and glare screens, additional lanes of traffic increase the barrier effect during high traffic volumes. The ALIVE Committee has developed measures to reduce the barrier effect and WVCs. These indirect barrier effects, identified by the ALIVE Committee, will be mitigated by means of a variety of actions including design elements (e.g. crossing structures) and by partnering opportunities with other stakeholders (e.g., recreation management at existing highway bridges). Proposed mitigation of existing barriers includes placing underpasses at key locations within linkage interference zones that allow animals to more easily cross I-70, and installing, repairing, and maintaining wildlife fencing that reduce contact with vehicles and help channel wildlife to crossing structures. Barrier effects will be reduced in accordance with the ALIVE Memorandum of Understanding.

CUMULATIVE EFFECTS

Under the ESA, cumulative effects are defined as the incremental impact of the action when added to other past and ongoing federal actions and past, present and reasonably foreseeable future non-federal actions. Cumulative impacts include direct impacts of action alternatives, impacts from forest

management activities on the WRNF, and impacts from planned development. A primary factor affecting lynx in the Study Area will be increased traffic growth on I-70 as Colorado's population continues to grow and additional Front Range residents use I-70 to access summer and winter recreational opportunities in the mountains. The I-70 Mountain Corridor PEIS (CDOT 2011) indicated that traffic volumes throughout the entire I-70 Mountain Corridor are expected to increase 29 to 43 percent by the year 2035. High traffic volumes can create a barrier to wildlife attempting to cross the roadway, and can result in indirect habitat loss/fragmentation or wildlife injury from vehicular collisions. The barrier effect is further increased from the direct loss of vegetation and cover resulting from additional lanes and an overall wider highway footprint. Indirect effects can result from increased lights, noise, air toxins, deicing chemicals, and increased human presence. As the barrier effect of I-70 continues to increase, wildlife populations north and south of I-70 in the Study Area and beyond are becoming incrementally isolated from one another, precluding genetic interchange between populations. Increasing recreational use of the Vail Pass area may cause lynx to further avoid the corridor due to human disturbance (Squires et al. 2011).

While the Proposed Action Alternative is likely to have only incremental effects on lynx movement, habitat connectivity or WVCs, the cumulative effects of multiple highway improvement projects in the vicinity, increasing traffic volumes, concurrent residential and commercial development, adjacent roads and fencing, recreation trails, and increasing human activity throughout the Study Area results in substantial effects to lynx habitat, lynx movements and lynx mortality over both space and time.

CDOT works closely with the USFS and CPW as projects are developed to make sure the appropriate mitigation is undertaken to minimize these effects. As future development is proposed along this corridor, CDOT and local jurisdictions will continue to address the cumulative effects of development on wildlife.

Another source of cumulative effects includes impacts from forest management activities on the WRNF and from planned development on private land. Future development that is planned for areas outside National Forest System Lands in Eagle County, will result in habitat loss and fragmentation. The larger human population in areas adjacent to National Forest System Lands and the transport of people through the Study Area would increase the amount of disturbance in lynx linkage areas and, which in turn, would increase the disturbance factor. It must be noted, however, that the planned growth would first occur at lower elevations in open areas of more gentle terrain, thus avoiding the steeper, more densely vegetated terrain that lynx typically use as habitat. Therefore, much of the planned growth would not occur in lynx habitat.

Interdependent and Interrelated Actions

For Section 7 consultation an interrelated activity is one that is part of the Proposed Action and depends on the Proposed Action for its justification (50 CFR §402.02). An interdependent activity is one that has no independent utility apart from the action under consideration. Following these definitions, there are no other activities that would occur "but for" the Proposed Action and, therefore, are not are interrelated to, or interdependent with, the Proposed Action Alternative.

Consistency with Southern Rockies Lynx Amendment Management Direction

In collaboration with the USFWS, most standards and guidelines in the LCAS were incorporated into lynx standards and guidelines in the WRNF Forest Plan and Record of Decision (USFS 2002). Those Forest Plan and Record of Decision lynx standards and guidelines were then superseded by Southern

Rockies Lynx Amendment Management Direction (SRLAMD) standards and guidelines (USDA Forest Service 2008b, USDA Forest Service 2009). A SRLAMD consistency analysis was conducted for the Proposed Action Alternative.

ALL 01 - MAINTAIN OR RESTORE LYNX HABITAT CONNECTIVITY IN AND BETWEEN LAUS, AND IN LINKAGE AREAS.

See ALL S1 (below) for how this proposal would meet the objective of maintaining lynx habitat connectivity in and between LAUs and linkage areas.

ALL S1 - NEW OR EXPANDED PERMANENT DEVELOPMENTS AND VEGETATION MANAGEMENT PROJECTS MUST MAINTAIN HABITAT CONNECTIVITY IN AN LAU AND/OR LINKAGE AREA.

Under the Proposed Action Alternative, approximately 150 acres of lynx vegetation (primary or secondary) would be affected by the Proposed Action Alternative. Only a small portion of this acreage, however, will be permanently converted to non-habitat as a result of the Proposed Action Alternative. In addition, some of that acreage will be offset by recovering the areas that will no longer be part of the roadway. It is important to note, however, that the entire Study Area is currently dominated by I-70, therefore, its effectiveness as lynx habitat is substantially reduced.

ALL G1. TECHNIQUES TO AVOID OR REDUCE EFFECTS ON LYNX SHOULD BE USED WHEN CONSTRUCTING OR RECONSTRUCTING HIGHWAYS. TECHNIQUES COULD INCLUDE UNDERPASSES OR OVERPASSES.

LINK S1. WHEN HIGHWAY CONSTRUCTION OR RECONSTRUCTION IS PROPOSED IN LINKAGE AREAS, IDENTIFY POTENTIAL HIGHWAY CROSSINGS

As discussed above, I-70 is a substantial barrier to habitat connectivity and suitable lynx habitat occurs within the Study Area on both sides of the highway, such that any and all of the recognized forms of lynx movements (e.g., daily, exploratory, and dispersal) are potentially hindered. The lower half of the Study Area (i.e., below MP 185.0), however, is highly permeable due to the seven bridges that allow wildlife to safely pass underneath the road surface. In addition, the Proposed Action Alternative includes new crossing structures (i.e., underpasses) above MP 185.0 which will result in a substantial net increase in lynx habitat connectivity.

HU O6. REDUCE ADVERSE HIGHWAY EFFECTS ON LYNX BY WORKING COOPERATIVELY WITH OTHER AGENCIES TO PROVIDE FOR LYNX MOVEMENT AND HABITAT CONNECTIVITY, AND TO REDUCE THE POTENTIAL FOR LYNX MORTALITY.

CPW, USFS, and USFWS were consulted regarding lynx movement, habitat connectivity, and crossing structure design and design throughout the planning stages of the Proposed Action Alternative through the ALIVE Committee and other meetings.

NO ACTION ALTERNATIVE

Impacts on lynx would be expected to increase with the No Action Alternative from increased traffic volumes and growth already occurring. The Study Area, as currently configured, is not designed to promote linkage between lynx habitat on either side of I-70. Furthermore, no commitment to mitigating this existing barrier is being made under the No Action Alternative.

CUMULATIVE EFFECTS

Cumulative impacts include impacts from forest management activities on the WRNF and from planned development on private land. Future development that is planned for areas outside National Forest System Lands in Eagle County, will result in habitat loss and fragmentation. The larger human

population in areas adjacent to National Forest System Lands and the transport of people through the Study Area would increase the amount of disturbance in lynx linkage areas and, which in turn, would increase the disturbance factor. It must be noted, however, that the planned growth would first occur at lower elevations in open areas of more gentle terrain, thus avoiding the steeper, more densely vegetated terrain that lynx typically use as habitat. Therefore, much of the planned growth would not occur in lynx habitat.

Consistency with Southern Rockies Lynx Amendment Management Direction

The No Action Alternative reflects a continuation of existing management practices within the Study Area without changes, additions, or upgrades. Applicable SRLMD (USFS 2009) standards and guidelines constitute forward looking management direction for new and expanded developments. Therefore, the No Action alternative is not in conflict with any applicable, lynx-related provisions of the SRLAMD (USFS 2008b, 2009) and SRLMD is not applicable.

Determination of Effects and Rationale

Proposed Action Alternative: May affect, likely to adversely affect.

Based upon the potential direct, indirect, and cumulative impacts resulting from the Proposed Action Alternative, CDOT has determined that the project **may affect, and is likely to adversely affect** Canada lynx. This determination is based on the direct loss of winter forage, denning, and other habitat, increase in barrier effect and linkage area disturbance, light pollution, and likelihood of future lynx strikes resulting from the project. The Proposed Action Alternative will include the addition of wildlife-proof fencing and new crossing structures, providing permeability to the already existing barrier and minimizing the likelihood of future lynx-vehicle collisions. As a result, the Proposed Action Alternative is unlikely to jeopardize the future lynx population viability.

The increase in barrier due to the wider highway footprint, avalanche mitigation, cantilevers, lighting, glare screens, guardrails, bridge rails, and retaining walls have the potential to adversely affect lynx. Although lynx can negotiate some of these barriers, such features may increase the amount of time that an animal becomes trapped on the highway, or cause confusion and panic, all of which could increase the likelihood of an animal being hit by a vehicle. These structures may also act as a deterrent to crossing and using habitat on both sides of the highway. The construction of new underpasses, in combination with wildlife fencing throughout the Study Area, will minimize these potential effects and result in a net improvement in habitat connectivity, but the potential for adverse effects to occur are not discountable.

Temporary noise and increased human activity could cause lynx to avoid habitat adjacent to the Study Area during construction but this would be temporary, intermittent and localized. Minor vegetation clearing will remove disturbed roadside habitat that has already been degraded and provides little habitat value to lynx or lynx prey. No critical habitat has been designated in Colorado; therefore, none will be affected.

No Action Alternative: May affect, likely to adversely affect

This determination is because direct effects on lynx movements (the Study Area serving as a barrier between linkage areas and WVCs) would continue under the No Action Alternative. The I-70 corridor, as currently configured, is not designed to promote linkage between lynx habitat on either side of I-70. WVCs would continue or increase with increased population and traffic.

Proposed Mitigation Measures

To minimize potential resource impacts from construction and implementation of any approved project components, Project Design Features (PDF) have been incorporated into The Proposed Action Alternative. PDFs are devised in the pre-analysis and analysis phases to reduce environmental impacts that must be complied with by law and/or regulation. They include, but are not limited to, Best Management Practices, standards and guidelines, and standard operating procedures. PDFs come from Federal, state, and local laws, regulations and policies, forest plans, scientific research, and from experience in designing similar projects. The bulk of the PDF are considered common practices CDOT has historically used in sub-alpine and montane environments to avoid or minimize potential resource impacts. They are highly effective methods that can be planned in advance and adapted to site conditions, as needed. PDFs recommended here also include measure recommended in the ALIVE MOU, I-70 Mountain Corridor PEIS (CDOT 2011), Regional Ecosystem Framework (Kintsch et al. 2011), and other relevant studies and reports.

Table 11 displays specific measures to mitigate the effects of project design elements that may exacerbate the barrier effect of I-70. **Table 12** describes PDFs by LIZ intended to facilitate wildlife movement through the Study Area and reduce WVCs. **Table 13** displays mitigation measures in Tier 2 NEPA processes based on the mitigation strategies described in the I-70 Mountain Corridor Record of Decision and Final Programmatic Environmental Impact Statement (CDOT 2011).

The selection of wildlife underpasses can be categorized into two distinctly different but general sizes; Large Mammal Underpass and Small to Medium Mammal Underpass. The general layout of two larger underpasses and several smaller underpasses follows the intent of the original ALIVE recommendations, with the exception of the exclusion of an overpass. These classifications of sizes are as noted and described in Table 4 of the FHWA "Wildlife Crossing Structure Handbook Design and Evaluation in North America" ("Crossing Structure Handbook", FHWA 2011) follows:

- Large Mammal Underpass (MPs 187.4 and 188.3): The target species for this category of wildlife passage are black bear, Canada lynx, elk, moose, mountain lion, and mule deer. The minimum dimensions of this classification of structure are noted as 23' wide x 13' tall for an arch opening and 20' wide x 10' tall for a box structure. The proposed size of the underpass will be further defined in final design. These crossings were preliminarily found to be topographically possible in only two locations within the study area and their general lengths are around 150', shorter than the recommended maximum of 230'-260'. It should be noted, however, that the same author of the 2011 FHWA Guide, Clevenger, studied 4 underpasses with dimensions of about 24' wide by 12' tall and lengths of 205', 167', 188' and 185' passing under a 4 lane highway with a median. These underpasses were consistently found to be 76% effective for the passage of deer (Clevenger 2014). The underpasses in the study area will be located where all six lanes are together with no median, thus minimizing the length of the crossing structures. The 150' potential length is inclusive of an area for catching snow, so that under most scenarios only seasonal snow will accumulate at the entrances to the underpasses and snow thrown from the highway by plows will be minimized. Although the Crossing Structure Handbook indicates that additional research is needed regarding lynx use of this type of underpass, in the 5+ year study of highway crossing structures in Banff by Clevenger (2014), a lynx was recorded using a box culvert that was 10' wide x 8' tall x 190' in length as well as an arch culvert 24' wide x 11' tall and 205' in length, compared to only 5 lynx using two overpasses in their

study area during the same period. Although lynx crossings are not well documented and little other information is available for reference, there are documented accounts by Clevenger and others (Clevenger et al. 2003; Grilo et al. 2009, Baigas et al. 2017). The four underpasses in the 2014 Clevenger study were used repeatedly by bears, wolves, coyotes, moose, deer and elk.

- Small to Medium Mammal Underpass (MPs 186.9, 187.8, 188.7, 189.7): Target species include American marten, bobcat, coyote, red-tailed fox, yellow-bellied marmot, small mammals, short-tailed weasel, snowshoe hare. The Crossing Structure Handbook recommends small to medium underpasses that are 1' to 4' (diameter for culverts or square for concrete boxes). In order to increase the likelihood of use by a large range of small to medium animals and account for snow accumulation, however, the minimum size for the locations under consideration should be 6' diameter culvert or similar sized concrete box. This is the recommended passage for coyote, fox, fisher, marten, weasels and badgers (FHWA 2011). Ruediger (2007) has noted smaller diameter culverts also work for bobcats and notes that a 4' diameter culvert is the minimum for bobcats. These culverts should not be too large or they may encourage predators to enter. If the 6’ size is used, smaller diameter culverts can be placed inside to limit movement of larger predators.

In addition, the following measures will be implemented to further improve habitat connectivity and reduce WVCs through the Study Area:

- Fulfill responsibilities set forth in the ALIVE Memorandum of Understanding to address issues related to improving wildlife movement and reducing habitat fragmentation in the Study Area.
- Wildlife fencing to be installed from west of the bridge at MP 181.0 east through the entire Study Area to prevent WVCs and guide animals to all of the crossing structures. Where ramps are not feasible due to topographical and/or other limitations other measures such as wildlife gates will be installed at a similar spacing.
- Small mammal shelves will be installed within drainage and stream crossing culverts wherever feasible to increase below grade crossing opportunities for smaller animals.
- Maintain or install woody vegetation at either side of crossings for cover and light attenuation.
- Add features to bridges to promote day and night roosting for bats where appropriate.
- Wildlife escape ramps will be installed throughout project area at a minimum of every 0.25 miles. Ramps will be built following the most current design specifications to improve wildlife use.
- Measures to minimize snow loading in front of crossing structures will be included in crossing structure design.
- Coarse woody material and rocks will be placed at the entry and within each crossing structure to provide cover and promote use by smaller animals.
- Where site conditions allow, "wildlife lanes" will be incorporated within any crossing structure intended for or that may otherwise be used by people (**Figure 12**). Such lanes will be separated by grade from crossing intended for people (i.e., trail) and will include coarse woody material and rocks at entry and within crossing structure to provide cover and promote use by smaller animals.

Highway lighting standards are based on the Illuminating Engineering Society of North America's (IES) standards, and newer designs are available that meet the IES standards but have reduced light pollution effects. Lower wattage flat lens fixtures on highways and city streets direct light down and reduce glare, thus reducing light pollution.

Figure 12. Wildlife lane incorporated into an existing underpass that was originally for vehicle use only. Logs and boulders were added to promote wildlife use.

Source: Ruediger and Jacobson 2013.

Table 11. Barrier Effect Mitigation Measures

CONTEXT			
The lower portion of the pass (MP 181.7 through MP 185) has a series of bridge structures over drainages and rivers (Figure 6). This area allows for wildlife movement across the highway without the need for animals to traverse over the roadway. The upper portion of the Study Area (MP 186 through MP 191.5) does not have any structures that allow for unimpeded wildlife movement. Additionally, there are multiple barriers along the roadway that wildlife must negotiate (e.g., guardrails, median barriers, and grade separation of the east and west bound lanes of I-70).			
IMPACT TYPE	**NO ACTION ALTERNATIVE**	**PROPOSED ACTION ALTERNATIVE**	**MITIGATION**
Increased wildlife barrier effect	**Permanent Impacts**: None- no new impacts would occur **Temporary Impacts:** None- no new impacts would occur	**Permanent Impacts**: Potential to create new barriers to wildlife movement and create habitat fragmentation from highway widening, glare screens, new retaining walls, and drainage improvements. **Temporary Impacts:** Some temporary impacts for access or construction activities may occur	• Six new wildlife crossing structures (underpasses) constructed between MP 185.0 and 191.5. Wildlife fencing to be installed on both sides of the highway throughout the Study Area to prevent WVCs and guide animals to crossing structures. • Where possible, avalanche mitigation structures will be placed such that they do not impede wildlife movement or use of crossing structures and outside of primary and secondary vegetation. If the avalanche mitigation is inside the wildlife exclusion fence, there will be no impact and mitigation is unnecessary. • Wildlife fencing will be installed on both sides of the highway throughout the Study Area to keep animals off the road surface, prevent WVCs, and guide animals to crossing structures. • Where possible, retaining walls will be placed such that they do not impede wildlife movement or use of crossing structures and outside of primary and secondary vegetation.

Table 11 continued. Barrier Effect Mitigation Measures

IMPACT TYPE	NO ACTION ALTERNATIVE	PROPOSED ACTION ALTERNATIVE	MITIGATION
			• Construction should be conducted as to not permanently impede movement of the species and prevent it from accessing habitats necessary for breeding, feeding, sheltering, and dispersal. This determination shall be made by a CDOT approved biologist.
Habitat and vegetation impacts during construction	**Permanent Impacts**: None- no new impacts would occur **Temporary Impacts:** None- no new impacts would occur	**Permanent Impacts**: None **Temporary Impacts:** Temporary ground disturbance and vegetation impacts may occur during construction.	Construction should be concentrated to as small of an area as possible in order to minimize the amount of habitat affected at one time and keep adjacent habitat areas available for use by the species to forage, hide, or travel. Re-contour and restore all temporarily impacted habitats on the project site so that they become available for use.

Table 11 continued. Barrier Effect Mitigation Measures

IMPACT TYPE	NO ACTION ALTERNATIVE	PROPOSED ACTION ALTERNATIVE	MITIGATION
Light pollution from I-70	**Permanent Impacts**: None- no new impacts would occur **Temporary Impacts:** None- no new impacts would occur	**Permanent Impacts**: Impacts to foraging and travel behaviors **Temporary Impacts**: Impacts to foraging and travel behaviors	Temporary lighting will be used with directional shielding to focus the lighting onto the driving surface to avoid disrupting foraging and travel behaviors of this primarily nocturnal species. For the same reasons, ensure that permanent lighting is "dark sky" compliant and shines only on the area(s) that need to be illuminated. Do not install lighting in areas of lynx or snowshoe hare habitat to prevent disturbing these species' foraging behaviors. Ensure that lights are on only when necessary (i.e., at chain stations ensure that lights are on only when chain-up or chain-down is necessary). Monitor lighting to ensure that it does not exceed the approved lighted area and that lights are on only when necessary to reduce the effects of the project on Canada lynx populations to an insignificant amount.
Light pollution during construction	**Permanent Impacts**: None- no new impacts would occur **Temporary Impacts:** None- no new impacts would occur	**Permanent Impacts**: None **Temporary Impacts**: Impacts to foraging and travel behaviors during construction	Conduct work during daylight hours when lynx are less active to avoid disrupting this nocturnal species foraging and travel behaviors. If night work must be conducted, concentrate the activity in as small an area as possible, and work for four (4) consecutive nights separated by three consecutive nights of no work to allow any individuals in the vicinity to recover and potentially use the site for foraging or travel.

Table 12. Barrier Effect Mitigation Measures for Linkage Interference Zones

Linkage Interference Zone	Mile Post	No Action Alternative Impact	Proposed Action Alternative Impact	Mitigation
Gore Creek	180.8	Bridge spans natural habitat and offers an excellent passage beneath the interstate for all types of wildlife.	Bridge to be replaced with similar structure.	During final design CDOT will coordinate with the neighborhood to develop acceptable measures that would allow wildlife to access habitat on the south side of the neighborhood, completing the north-south connection on either side of I-70. If wildlife passage through or around neighborhood can be accommodated then install guide fencing to direct wildlife towards the structure.
Gore Creek	181.9	Large divided span bridge spans natural habitat and offers an excellent passage beneath the interstate for all types of wildlife.	Bridge to be replaced with similar structure.	Implement measures to minimize human activity beneath the structure. Restore dirt lot/road with native vegetation cover. Requires coordination with local community and user groups to implement effective control measures and to educate the public on the importance of segregated wildlife/human uses at this location.
-	182.4	Divided bridge over steep, narrow channel.	Bridge to be replaced with similar structure.	Maintain connectivity at site including natural stream channel and stream banks.
West Vail Pass	183.0	3.3 foot diameter culvert piped under bridge structure. Culvert is heavily skewed relative to road. Outlet drops onto metal apron. Metal wing wall at outlet broken and leaning across outlet. Inlet inaccessible, surrounded by willows. Crossing integrity is affected by heavy backcountry skier use.	Bridge to be replaced with similar structure.	Create wildlife lane to separate human and animal use. Complement structure with guide fencing to direct animals toward structure and discourage at-grade crossings.

Table 12 continued. Barrier Effect Mitigation Measures for Linkage Interference Zones

Linkage Interference Zone	Mile Post	No Action Alternative Impact	Proposed Action Alternative Impact	Mitigation
West Vail Pass	184.0	Large divided span bridge over Timber Creek. Spans natural habitat and offers an excellent passage beneath the interstate for all types of wildlife.	Bridge to be replaced with similar structure.	Structure is highly functional for target species. Maintain connectivity at site. Complement structure with guide fencing to direct animals toward structure and discourage at-grade crossings.
West Vail Pass	184.4	Large divided span bridge over Black Gore Creek. Spans natural habitat and offers an excellent passage beneath the interstate for all types of wildlife.	Bridge to be replaced with similar structure.	Structure is highly functional for target species. Maintain connectivity at site. Complement structure with guide fencing to direct animals toward structure and discourage at-grade crossings.
West Vail Pass	184.9	Large divided span bridge over Miller Creek. Spans natural habitat and offers an excellent passage beneath the interstate for all types of wildlife. Natural upstream barrier maintained to protect conservation cutthroat trout population.	Bridge to be replaced with similar structure.	Maintain connectivity at site including natural stream channel and stream banks. The existing fish barrier will remain in place and will be improved and/or repaired if necessary.
West Vail Pass	185.4	Large divided span bridge over Polk Creek – Black Gore Creek confluence. Spans natural habitat and offers an excellent passage beneath the interstate for all types of wildlife. Upstream barrier maintained CPW to protect conservation cutthroat trout population.	Bridge to be replaced with similar structure.	Maintain connectivity at site including natural stream channel and stream banks. The existing fish barrier will remain in place and will be improved and/or repaired if necessary.
West Vail Pass	186.9[1]	No crossing structure. Small to medium-sized mammals must cross road surface.	Additional lanes and safety features will pose a substantial barrier to small to medium-sized mammal movement, potentially increase WVCs, and decrease habitat connectivity.	Construct Small to Medium Mammal Underpass Target species include American marten, bobcat, coyote, red-tailed fox, yellow-bellied marmot, small mammals, short-tailed weasel, and snowshoe hare.

Table 12 continued. Barrier Effect Mitigation Measures for Linkage Interference Zones

Linkage Interference Zone	Mile Post	No Action Alternative Impact	Proposed Action Alternative Impact	Mitigation
West Vail Pass	187.4[1]	No crossing structure. Large mammals must cross road surface.	Additional lanes and safety features will pose a substantial barrier to large mammal movement, potentially increase WVCs, and decrease habitat connectivity.	Construct Large Mammal Underpass. Target species include black bear, Canada lynx, elk, moose, mountain lion, and mule deer.
West Vail Pass	187.8[1]	No crossing structure. Small to medium-sized mammals must cross road surface.	Additional lanes and safety features will pose a substantial barrier to small to medium-sized mammal movement, potentially increase WVCs, and decrease habitat connectivity.	Construct Small to Medium Mammal Underpass Target species include American marten, bobcat, coyote, red-tailed fox, yellow-bellied marmot, small mammals, short-tailed weasel, and snowshoe hare.
West Vail Pass	188.3[1]	No crossing structure. Large mammals must cross road surface.	Additional lanes and safety features will pose a substantial barrier to large mammals' movement, potentially increase WVCs, and decrease habitat connectivity.	Construct Large Mammal underpass Target species include black bear, Canada lynx, elk, moose, mountain lion, and mule deer.
West Vail Pass	188.7[1]	No crossing structure. Small to medium-sized mammals must cross road surface.	Additional lanes and safety features will pose a substantial barrier to small to medium-sized mammal movement, potentially increase WVCs, and decrease habitat connectivity.	Construct Small to Medium Mammal underpass. Target species include American marten, bobcat, coyote, red-tailed fox, yellow-bellied marmot, small mammals, short-tailed weasel, and snowshoe hare.

Table 12 continued. Barrier Effect Mitigation Measures for Linkage Interference Zones

Linkage Interference Zone	Mile Post	No Action Alternative Impact	Proposed Action Alternative Impact	Mitigation
West Vail Pass	189.7[1]	No crossing structure. Small to medium-sized mammals must cross road surface.	Additional lanes and safety features will pose a substantial barrier to small to medium-sized mammal movement, potentially increase WVCs, and decrease habitat connectivity.	Construct Small to Medium Mammal underpass. This location was selected as a collar study Squires et al. (2011) noted a Canada lynx crossing in this location. This location is topographically challenged for a Large Mammal Underpass but a smaller size crossing may fit in this area, perhaps as large as 6' to 8' in diameter. The passage may need to be open at the median. As stated previously, there is little information captured about lynx using any type of passages over or under the highway so this installation may be somewhat experimental. Martinig and Mclaren (2019), however, found that crossing structures that include natural habitat in their design, such as by maintaining safe access to a vegetated median within the highway corridor may increase wildlife use and successful crossings. .

[1]Approximate location

Table 13. Pertinent mitigation measures in Tier 2 NEPA processes based on the mitigation strategies described in the I-70 Mountain Corridor Record of Decision and Final Programmatic Environmental Impact Statement.

POTENTIAL IMPACTS	MITIGATION STRATEGIES
Vegetation and habitat loss due to construction Disturbance of nesting birds Downstream impacts to Colorado River species	CDOT will identify areas of potential habitat restoration, in coordination with the USFS and local entities. Construction work affecting migratory birds will comply with the requirements of the Migratory Bird Treaty Act and will be performed according to CDOT specifications to avoid impacts to migratory birds before and during construction. Additionally, the project will comply with the Upper Colorado River Endangered Fish Recovery Program for any water depletions resulting from construction activities.
Introduction and/or spread ofnoxious weeds into lands adjacent to the I-70 Mountain Corridor	CDOT will manage the clearing and earthmoving operations to minimize the potential for weeds to infest new areas and/or increase in abundance through the construction disturbance area. This includes the application of BMPs to all construction sites to manage open soil surfaces and topsoil stockpiled for reuse, including landscape and planning designs that incorporate the use of native vegetation and integrated noxious weed controls. CDOT will prepare and implement Noxious Weed Management Plans for the project, which will be completed prior to construction so they reflect the most recent federal and local noxious weed lists and guidance. Noxious Weed Management Plans will identify the status and location of noxious weed infestations in and near individual project areas and identify control methods (e.g., herbicides) and BMPs that will be used to eradicate or control weeds during and after construction. These BMPs generally include, but are not limited to, minimization of soil disturbance, use of native species in seeding and revegetation plans, use of weed-free hay, topsoil management, equipment cleaning and management, and coordination with relevant stakeholders such as County Weed Managers.

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APPENDIX A

OFFICIAL USFWS LIST OF THREATENED AND ENDANGERED SPECIES THAT MAY BE AFFECTED BY THE PROPOSED PROJECT (IPAC)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Western Colorado Ecological Services Field Office
445 West Gunnison Avenue, Suite 240
Grand Junction, CO 81501-5711
Phone: (970) 243-2778 Fax: (970) 245-6933
http://www.fws.gov/mountain-prairie/es/Colorado/
http://www.fws.gov/platteriver/

In Reply Refer To: December 11, 2019
Consultation Code: 06E24100-2017-SLI-0400
Event Code: 06E24100-2020-E-00222
Project Name: I-70 West Vail Pass Safety Improvements

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Western Colorado Ecological Services Field Office
445 West Gunnison Avenue, Suite 240
Grand Junction, CO 81501-5711
(970) 243-2778

Project Summary

Consultation Code: 06E24100-2017-SLI-0400

Event Code: 06E24100-2020-E-00222

Project Name: I-70 West Vail Pass Safety Improvements

Project Type: TRANSPORTATION

Project Description: The overall purpose of the project is to improve safety on West Vail Pass including decreasing the number
of accidents, reducing erratic driving behavior due to speed differentials, and reducing speed differentials.
Detailed goals will be defined by the Project Leadership Team.
Preliminarily, this project is intended to
produce the following improvements:
A. Environmental – minimize environmental effects
B. Follow context sensitive guidelines and principles
C. Improve Safety and Quality of Multi-Use Trail
D. Implement Black Gore Creek SCAP

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/39.58642390355746N106.24443565519564W

Counties: Eagle, CO | Summit, CO

Endangered Species Act Species

There is a total of 9 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 4 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Canada Lynx *Lynx canadensis* Population: Wherever Found in Contiguous U.S. There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3652	Threatened

Birds

NAME	STATUS
Mexican Spotted Owl *Strix occidentalis lucida* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8196	Threatened
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Bonytail *Gila elegans*	Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.
This species only needs to be considered under the following conditions:

- Water depletions in the upper Colorado River basin adversely affect this species and its critical habitat. This species does not need to be considered if the project is outside of its occupied habitat and does not deplete water from the basin.

Species profile: https://ecos.fws.gov/ecp/species/1377

Colorado Pikeminnow (=squawfish) *Ptychocheilus lucius*	Endangered

Population: Wherever found, except where listed as an experimental population
There is **final** critical habitat for this species. Your location is outside the critical habitat.
This species only needs to be considered under the following conditions:

- Water depletions in the upper Colorado River basin adversely affect this species and its critical habitat. This species does not need to be considered if the project is outside of its occupied habitat and does not deplete water from the basin.

Species profile: https://ecos.fws.gov/ecp/species/3531

Greenback Cutthroat Trout *Oncorhynchus clarkii stomias*	Threatened

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/2775

Humpback Chub *Gila cypha*	Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.
This species only needs to be considered under the following conditions:

- Water depletions in the upper Colorado River basin adversely affect this species and its critical habitat. This species does not need to be considered if the project is outside of its occupied habitat and does not deplete water from the basin.

Species profile: https://ecos.fws.gov/ecp/species/3930

Razorback Sucker *Xyrauchen texanus*	Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.
This species only needs to be considered under the following conditions:

- Water depletions in the upper Colorado River basin adversely affect this species and its critical habitat. This species does not need to be considered if the project is outside of its occupied habitat and does not deplete water from the basin.

Species profile: https://ecos.fws.gov/ecp/species/530

Flowering Plants

NAME	STATUS
Ute Ladies'-tresses *Spiranthes diluvialis*	Threatened

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/2159

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Brewer's Sparrow *Spizella breweri* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9291	Breeds May 15 to Aug 10

NAME	BREEDING SEASON
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Rufous Hummingbird *selasphorus rufus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8002	Breeds elsewhere
Willow Flycatcher *Empidonax traillii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/3482	Breeds May 20 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

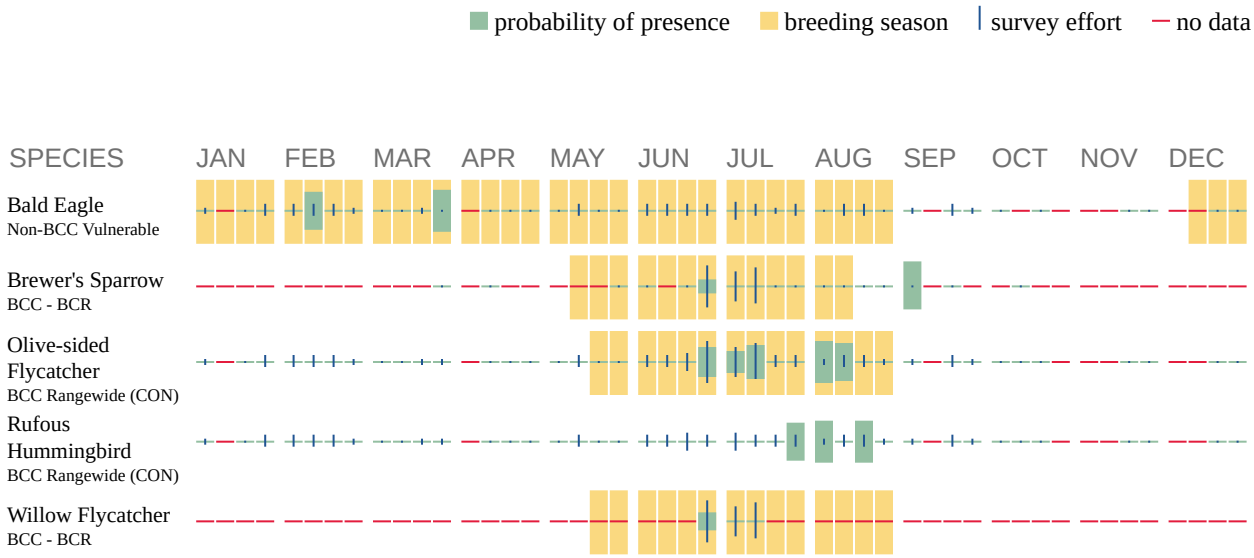
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php

- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.
Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?
The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and

how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER EMERGENT WETLAND

- PEM1B
- PEM1C
- PEM1Ch
- PEM1D

FRESHWATER FORESTED/SHRUB WETLAND

- PSS1B
- PSS1C
- PSS1Ch
- PSS1Eb
- PSS1A

FRESHWATER POND

- PABF
- PABFh
- PABG
- PABGb
- PUBFx
- PUBGh

LAKE

- L1UBHh

RIVERINE

- R3UBG
- R3UBH
- R3UBHx
- R4SBC
- R5UBH

- R3USA
- R5UBFx

APPENDIX B

ALIVE ITF, SWEEP ITF, AND AGENCY MEETING MINUTES

Project: 21685 CDOT R3 West Vail Pass Auxiliary Lanes

Purpose: US Forest Service Scoping Meeting

Date/Time: July 19, 2017

Location: CDOT R3 and Phone

Notes by: Hannah Polow and Kara Swanson

Attendees:

US Forest Service: Jen Austin, Carole Huey, Tom Fuller, Donna Graham, Kristen Pelz, Miles Barkhurst, Matt Grove, Aaron Mayville

CDOT R3: Mike Vanderhoof, John Kronholm, Cinnamon Levi-Flinn

FHWA: Stephanie Gibson

Colorado Wildlife Science: Jonathan Lowsky

AlpineEco: Andy Herb

David Evans and Associates (DEA): Hannah Polow and Kara Swanson

Matt Klein and Paula Peterson weren't able to make the meeting.

1. Introductions

2. Project overview

- Mike provided an overview of the project including historic work already completed associated with the project. CDOT and FHWA undertook a PEIS from Golden to Glenwood Springs and identified a number of improvements throughout the entire corridor. One of the recommendations was to implement auxiliary lanes on West Vail Pass from MM 180-190. We will complete a Tier 2 EIS for this project. In 2006, EA was initiated to investigate difference of speed.
- This project will require a template EA, which is more concise than some other environmental documents. It will include an introduction, alternatives in an appendix and impact analysis in table format.
- Will do some field work this summer with some completed next summer as well.

Question (Carole): Will all of the work be within the Highway Easement Deed (HED)?

Answer (Mike): We are assuming that most of the work will be within the HED but there may be things outside the deed. A possible wildcard are the bad curves throughout the corridor. We are going to address the feasibility of fixing some of those curves as part of this project.

3. Current status and schedule

- CDOT intends on inviting US Forest Service (USFS) as a cooperating agency.
- CDOT wants to get a sense of field work that we should do. In 2006, we did a fair amount of field work but want to make sure we cover all the pieces.

Project leadership team (PLT) initial meeting is next week and then additional PI activities will follow that meeting. 4. Review consultant team natural resource specialists

- AlpineEco has experience focusing on wetlands for this type of project. Has experience working on another similar project. Andy's analysis will include wetlands and rare plants.
- Colorado Wildlife Sciences will be focusing on wildlife and fisheries. Jonathan has a bunch of NEPA experience with Forest Service, CDOT and FHWA. Stick to wildlife.
- Mead and Hunt will lead the historic work (Dianna Litvak).
- Archeology and paleontology will be done in house.

5. Resource discussion

a. Wetlands

Question (Mike): Who is surveying plants?

Answer (Kara): AlpineEco with the help of someone who specializes in plants.

Question (Kristen): Were you the people who did the surveys in 2006?

Answer (Kara/Mike): No.

Question: Study area is not going to expand that much more from the I-70 corridor, right?

Answer (Mike): We are going to try to do that in the maximum way possible. But if we are coming up to a bridge, we might have to swing out or construct something right next to an existing facility. There may be some situations that may move the road a little bit. The original study area was pretty conservative and we are probably going to narrow it a little bit.

Answer (Kara): We anticipate the study area being 100 to 200 feet from pavement. Noise would have a slightly different study area since it would be based on receptors.

Question: Have you all done any preliminary assessment for grading?

Answer (John): Someone did do some initial analysis of this and there would be an impact.

Question: Do you have landscape architect?

Answer (Kara): Yes.

- The consultants are preparing most of the technical reports and then specialists from CDOT will be involved in the project to provide guidance and oversight. We want to make sure we're all in good communication. Before work goes out to the public, information will go to USF S and FHWA first.

Question (Stephanie): We are making the assumption that USFS wants to be a cooperating agency. Is that the case?

Answer (Aaron): Yes, that makes the most sense for this project.

b. Wildlife

- There is a concern associated with an increased barrier as a result of the climbing lanes.
- The ALIVE community has a bunch of crossing opportunities identified and want to make sure those are seriously considered to assist in the crossing of Lynx.

- Would be good to have crossing opportunities on east side or on the other side of Vail Pass. Covers much of the study area (MP 182-193).

Question: How were Lynx originally addressed in the 70s?

Answer (Jonathan): Lynx populations weren't really an issue then, so didn't really address it.

Answer (Mike): ALIVE has a lot of ideas on this. Proposed wildlife crossing at 192.3 or 192.6 and it's a location where you cross westbound lanes and eastbound bridge. Decided not to include this in this project because it might run down to Copper as well.

- There were two Lynx killed here. So it's a problem.
- ALIVE committee will be convened for this project.
- There are additional recreation issues that we'll need to work out as well. Maintenance issues need to be work out. This project is an example of exceptions from the exemptions. The whole roadway is eligible for the National Register because it's one of the first examples of CSS.

Question (Jen): ALIVE committee—will impact mitigation be implemented?

Answer (Mike): If there are more lanes, yes we know that is a barrier effect. If you asked me if there would be game fence, I would say yes but I don't know exactly. Mile posts 181/182 has a wildlife crash spike.

- We will need to review the Linkage Interference Zones (LIZ) recommendations.

Question (Jonathan): Make camera information available?

Answer (Cinnamon): It wasn't me per se. Julia Kintsch had videos out there looking at presence/absence. She is trying to find some of those archival photos. Still need to reach out to Paige Singer, who has done more research recently. She is going to reach out to her about photos and locations. Do have information, some is old and some is newer. Some cameras were approved near MP 192 for the overpass.

Action: Cinnamon to follow up with Julia and Paige about information available. Then everyone will have a conversation about other camera locations.

Action: Kara will set up conversation internally (with Cinnamon and Jen) to discuss what they need for the game cameras. Jen will see Julia next week and will touch base with her about this.

Question (Mike): If we can find some different photos from different years will that actually be helpful information?

Answer (Jen): Aware of the data on the east side of Vail Pass, and this data sounds old but old data is better than no data.

- ALIVE has identified MP 187.4 and 185.5 for camera locations. We need to figure out the camera locations ASAP.

Action: Jen and Jonathan to coordinate on cameras and work through CDOT on locations.

Action: Jonathan to get collar information that is available for Lynx. He is reaching out to the conservation manager for the state. This will highlight some of the areas that are used the most. I think what Jen's looking for is if they are crossing now.

Question: If we put up all the cameras, is the purpose really to figure out the mitigation of the lanes opposed to determine whether the aux lanes will happen at all?

Answer (Stephanie): We mitigate for impacts that we have. If there is additional mitigation identified by the Forest Service, that would be have to be paid for by USFS.

Answer (Mike): FHWA decides about the lanes. CDOT and FHWA has the authority to do this, but need approval from the USFS. But in general, we're going to move forward with installing auxiliary lanes unless we run into severe opposition. It's not guaranteed but it's moving forward. We wouldn't be putting out game cameras out to determine whether we do aux lanes, it's to determine whether FHWA needs to do mitigation.

- (Aaron): Good clarification for this type of project. And that's a good point for us as far as us being a cooperating agency to provide feedback and review.

Question (Mike): Any critters with specific windows for field review?

Answer (Jonathan): We started a little late but luckily we have elevation on our side. Songbirds and raptors are a little later on being delayed. Missed window for toads (but USFS has that information). Western bumble survey is through the end of July. Boreal owls, Lynx, and other species can be done in the winter. And then endangered fish information.

c. Cultural

- USFS: No problem with what we're going to do. The other CDOT work that the USFS has reviewed has been exceptional.
- Highway has already been identified as location on historic register. We already know it's potentially eligible for the National Register.
- Dianna will go through the process necessary for the historic component.
- Mike: Trying to get CDOT to do context study for Glenwood and Vail Pass. Headquarters will help with context. Old US 6 is a separate historic resource. So if we do have impacts there, we'll deal with that separately.
- We'll just have to see which elements are impacted based on the improvements.

Question (Mike): Would it be possible to change path to the other side of the highway?

Answer (Tom): That's generally where the cultural resources are. But did review pieces for this during the East Vail Water Quality Project. The sites that could have been impacted were already determined to be non-eligible. Everything is looking good. Might be stuff at Black Gore Lakes. Don't know of anything super significant.

- Mike talked to Dan Jepson (CDOT Cultural Resource Lead) last week and discussed the possibility that CDOT might reconstruct the Vail Pass rest area. We understand there were significant archaeological finds in that area. Environmental clearance for the rest area will be part of the environment review, but might be constructed separately in phasing.
- For the bike path, we were going to assume that we could never shut down the bike path. It always has to be open.

Question: Is there any resolution on who deals with the bike path?

Answer: No resolution. It's a partnership between the USFS and CDOT.

- If we're going to keep it open all the time. If we widen the highway at all in certain areas, we would have to move the bike path. We could use some walls if we are going to move the bike path.

Action: Mike/team to follow up on recreation and other resources with Stephanie since she had to leave the call for another meeting.

- The issue with the bike path and rec area at the top of Vail Path is that they are protected by Section 4(f) and FHWA has to adhere to a lot of regulations. If we keep trail open, we may be able to get an exception from Section 4(f). If we have to shut the bike path down, our options are reduced.

Question: All field work completed this summer? And does the 18-month schedule include construction?

Answer (Mike): Field work will be completed this summer, but there's a chance to do some work next summer as well. No construction will happen within the next three years. Need to have at least 30% design before get NEPA decision. There's not construction funding currently identified right now. Going to try to get the design/NEPA and then identify money.

Question (Aaron): What is estimated cost of the whole project?

Answer (Mike): PEIS says it would be $300M but it's likely up to $450M. Tried to make it as low as $225M for the recent transportation bill but don't really know.

d. Visual

- Vail Pass has made a lot of extra efforts to make it fit into the landscape. So when you start adding another 40 feet for lanes, seems like a lot of cut and fill. Important to get it to blend into what is already there and consistency with what is already there. Want to make sure it looks like we didn't add anything.
- Kara: the visual impact guidance has been recently updated and we understand how important it is.
- Donna: Worked on Iron Springs project and a lot of extra effort to make it blend in, so understand the process we will be going through to make this happen.
- Mike: PEIS did identify some CSS. It would be an adverse effect if we didn't follow that. Understanding any visual qualities that they want will be important to include.

Question (Donna): Will there be visual simulations for major structures or grading?

Answer (Mike/Kara): Yes. It will be important for us to convey what the new project is going to look like from multiple locations.

e. Toads/Fish

- Boreal toad site is right below study area (MM 179). Probably have 10+ years of data on this site (they coordinate with CPW on data). Don't really have any habitat on the other side. No problems with beetles. Outskirts talking about dispersal for construction—1.5 miles. Haven't seen the adults moving into the mountains but they are not moving past the cliffs and so they are confined to this little area. Haven't heard about any mortality on the bike path. They are also not crossing the creek. USFS has a lot of data they can share and don't have a lot of concern with this project.

- All fish within the study area are blue lineage fish. (There are no green lineage fish). Closest green population we would have is probably over in Dillon. They are in tributaries to Gore Creek.

Question: Is there a water depletion requirement?

Answer (Mike): wouldn't surprise me if we do this.

- Water depletion process would require a description and then get approval. There are withdrawl limits that trigger the need for reporting on depletion.
- We have done a ton of work in this area for controlling sediment and keeping it out of Black Gore Creek. Expanding 20 feet could eliminate some of the basins that are there.

Question: How do we work in here?

Answer (Mike): Going to have to be a challenge to our design team to be a mitigation given the limited space there is to work in.

Question (Matt): If we can't mitigate it here, can we do it somewhere else and can we do it elsewhere? Have done a lot of work to reduce sediment. Would it affect Basin of Last Resort?

Answer (John): Have talked about using US 6 as detour but no we wouldn't change access. Would strive to mitigate on-site.

- Wetlands affects the same thing. If we have wetland mitigation, that would be hard to do onsite. Might be good to do something for off-site mitigation. Biggest thing is to minimize impacts of sediments.

Question (Aaron): Have you brought in Vail about this project?

Answer (John): Greg Hall is invited to be a member of the PLT but haven't had a pre-scoping meeting with them.

- Have been working with them on a number of things, including water quality.

Question: Do sediment ponds include mag chloride?

Answer (Matt): Just sediment. Can't really test for mag chloride. Haven't really seen negative effects in the aquatic life.

<u>f. Plants</u>

- Significant populations of oxide daisy. This work has the potential to get rid of this plant as part of this project.
- Documented moonwart (at MP 184.5 or 185.4). That specific species was considered sensitive, but is no longer. There are separate species of moonwarts, including three that are protected. So we need to do pretty comprehensive surveys to see if they are out there. Don't think there are any other sensitive species in the area.
- There are some fens and some high quality fen near the rest area. There are a lot of wetlands in the ditches near the highway. Need to work with Tom Probart on this.
- Pollination friendly vegetarian would be great to put in after the project is completed.
- Seems like a reasonable project since it's a congested area.
- Andy: I think there is really suitable habitat of moonwarts all along the highway.

- We can assume presence but need to know if the three particular species are sensitive. Rumored that there might be some out here (Kristen will see if she can find out the location). They like disturbed areas and don't think it's likely that there are the three sensitive species.

Action: Kristen to ask to see if she can determine where the rumored moonwart was located.

- Andy: Suitable habitat all along the corridor. Need to do a survey for sensitive species and if they find any, will have locations. Would be a significant effort to survey (probably three weeks with a crew).

Answer (Mike): Could do some sampling?

Answer (Andy): They are pretty much everywhere but not necessarily the sensitive species. It takes close examination to determine which species. Would have to get moving quickly since the season is through mid-August.

- Tom: Tribes are also concerned about plants as well.
- Mike: When we first started the project, none of the tribes responded but we will be reaching out again through FHWA.
- Mike: Seems like moonwart is a self-mitigating (grows well in disturbed areas) so it wouldn't be a barrier to get this approved from that perspective.
- Longer term doesn't look like it would be a negative impact.

Question (Andy): Does the orchid have any legal status?

Answer: No, doesn't have any legal status.

- We can get Andy contracted to do wetlands information (which is until the end of growing season/October) but probably not for the moonwarts.

g. Recreation

- Aaron: moving bike path away from highway would be a positive thing.

Question (Mike): Would this throw us into an EIS?

Answer (Aaron): It might but there might be option to do some minor changes. Not looking to clear through a whole hill.

Additional considerations:

- Coordination with rec events (will give us event information).
- Also some that use Vail Pass for parking area.
- How would it affect Black Lakes in Vail Pass?
- Vail Pass is quite a hub for recreation. Looking at installing a parking kiosk at the top of Vail Pass. Looking at this as a pilot program.
- How this might affect Gore Creek campground—take reservations 200 days in advance. So need to know what's going on.

- John: If we were to send traffic down old US 6, it would be hard to access the campground. The quality would be impacted. Would likely do downhill for this detour. If we send traffic down US 6, probably want to close that campground.
- Aaron: Tell us what you need and we will make things work.
- Mike: if got into the Section 4(f) process, would have to do alternatives process, coordination, FHWA would have to determine no other option feasible. It would be pretty substantial effort to make everything work.
- Aaron: Not our number one choice to shut down the campground for whatever amount of time is necessary but we can make something work if we need to. We can talk through it.

Question: Are detour options are evaluated as part of the NEPA process?

Answer: We will have to evaluate detour options for phasing and impact purposes.

Question (Aaron): How long would the detour be in case that would affect the campground?

Answer (John): It really depends on the bridges and if they need to be replaced.

- Aaron: It's a concession-based campground so there would be revenue loss that we would have to consider.

Question: Then how does that affect the path bike?

Answer (Mike): We can't close the bike path.

Answer (John): Could maybe use concrete barriers along the old US 6 to separate cars.

Question (Aaron (from Matt)): Is SF299 needed or appropriate?

Answer (Carole): That's a good question because we've got the ROW set up and if we do modifications outside of the deed (HED), do we need to amend it? It's really hard to keep track of all the amendments. Would be good to have a shapefile to go along with the boundary. Probably do an amendment and letter of consent. SF299 is nice to have so we can see the whole project. The big book that FHWA approves would be sufficient as well.

Action: Aaron will look to see if there will be cost recovery fees and follow up to see if they are pursuing that.

- Jen: Would still like to be part of the ALIVE committee.

Question (Miles): Any possibility with design and implementation for need or potential request for federal rock request or disposal?

Answer (John): Hasn't been discussed yet.

Answer (Mike): I would think so but not sure how to answer that question. CDOT doesn't like to claim materials because then it can be a liability issue. We can prohibit staging on federal lands. Normally don't like to do so with borrow areas. We'll put this on the list and run it forward. We need to make sure we describe things from occurring from an environmental standpoint. CDOT has been burned in the past by having named borrow area and then it doesn't pan out and we have to pay the contractor.

- Miles: This question is coming from a project from Oregon. We are leaning on the contractor to figure out their source.

- Mike: We should keep it on our list. Depending on the contracting method (CMGC) We might have a contractor on early enough to hear this information but we may not have that. We should think about possible quarries.

Question (Aaron): Would construction happen during the winter as well?

Answer (John): I anticipate a winter shutdown. The weather is crazy out here.

Question (Carole): If FHWA funds this, do you get it all at once so the project wouldn't run out of funding?

Answer (Mike): CDOT gets maybe $500M statewide but it's not likely that the project would be wholly funded by FHWA or that they would give us the full amount of money for the project. Almost guaranteed that the project will be done in different phases. Whatever we build would have to be usable.

Action: Make sure to include John, Mike and Kara on all communications.

MEETING NOTES

PROJECT:	21685 I-70 West Vail Pass Auxiliary Lanes
PURPOSE:	ALIVE Issue Task Force (ITF) Meeting #1
DATE HELD:	April 18, 2018
LOCATION:	Miller Ranch Community Center, 25 Mill Loft Road, Edwards, CO
ATTENDING:	Joel Barnett, FHWA Martha Miller, Program Engineer, CDOT Region 3 John Kronholm, Project Manager, CDOT Region 3 Karen Berdoulay, Resident Engineer, CDOT Region 3 David Caesark, Environmental Manager, CDOT Region 3 Jeff Peterson, CDOT Paige Singer, Rocky Mountain Wild Alison Deans Michael, USFWS, Colorado Field Office David Singer, CDOT Jonathan Lowsky, Colorado Wildlife Science Mark Hablitzell, Town of Vail Julia Kintsch, ECO-Resolutions Cinnamon Levi-Flinn, Biologist, CDOT Regions 3 Craig Wescoatt, Colorado Parks & Wildlife Bill Andre, Colorado Parks & Wildlife Jen Prusse, US Forest Service Greg Hall, Town of Vail Don Connors, Consultant Project Manager, Amec Foster Wheeler/Wood Kara Swanson, Consultant Environmental Task Lead, David Evans and Associates Matt Figgs, CDOT Region 3
COPIES:	Attendees

SUMMARY OF DISCUSSION:

(Please Note: Action items are shown In ***bold italics***.)

1. **Introductions & Agenda Review**
    a. John did introductions, covered the agenda, and talked briefly about the purpose of today's meeting, which is to discuss wildlife on the West Vail Pass corridor and receive input from the members of the ALIVE (A Landscape Level Inventory of Valued Ecosystem Components) Issue Task Force (ITF).
2. **Agenda and Goals**
    a. John covered the agenda and discussed the goals of today's meeting
3. **Project Background**
    a. John discussed the background of the project including highlighting the I-70 Mountain Corridor Programmatic Environmental Impact Statement (PEIS), the

recommendations from the PEIS (including stipulations in the ALIVE Memorandum of Understanding [MOU]), the Tier 2 NEPA process, and the past 2007 Environmental Assessment (EA) for the West Vail Pass area

i. He explained that this project is the Tier 2 NEPA process as it address site specific details for West Vail Pass

ii. Don added that the PEIS identified the auxiliary lanes for safety purposes, not for capacity

4. CSS Process/ITF Responsibilities

a. John outlined the Context Sensitive Solutions (CSS) process that the Project Team is following for this project and what stage the project is at in the process

i. The Project Team has gathered information from the Technical Team (TT) that is being considered for the development of alternatives that will then be screened through a screening process

ii. He also highlighted the Success Factors that the Project Team, in conjunction with the Project Leadership Team (PLT) and TT, have developed. The specific Core Values that have been established for the project were also discussed.

b. John covered the roles and responsibilities of the various ITF groups which come directly from CDOT's CSS guidance. There are other roles and responsibilities that are a part of the ALIVE MOU that will be covered later in the presentation

i. He explained that the intent of an ITF is to focus on a specific issue

ii. David Singer added that this ALIVE ITF is comprised of experts for this specific issue, and the results of this discussion will then be reported to the TT which is comprised of a broader diversity of backgrounds and expertise

5. Current Project

a. John discussed the limits of the West Vail Pass Auxiliary Lanes project and talked to some of the unique characteristics along the corridor.

i. The elevation of West Vail Pass summits at 10,603 feet

ii. There are several sections of steep grades which are at 7%

iii. There are areas of substandard roadway geometry with some compound curves that were designed for a 55 mph speed limit (the current speed limit is 65 mph)

iv. There are 23 different retaining walls totaling 23,515 linear feet

v. There are 16 bridges that make up 1.6 miles of the corridor

vi. The Vail Pass/Tenmile Canyon National Recreation Trail sits in the corridor. This paved bike trail gets 39,000 annual users with a peak daily count of 3,500 users

vii. West Vail Pass is the access point for the Vail Pass Winter Recreation area which saw 56,000 users in the 2016/17 winter season

viii. There are numerous wetlands and waters of the US in or near the corridor including Black Gore Creek. There is also considerable wildlife activity in the lower five miles of the corridor.

ix. There is a Sediment Control Action Plan for Black Gore Creek that another ITF will discuss implementing

x. The West Vail Pass corridor is subject to Section 106 of the National Historic Preservation Act as it is a nationally and exceptionally significant feature of the federal interstate system. West Vail Pass was one of the first highways to purposefully sculpt cut-and-fill slopes to fit in its unique setting, as well as being one of the first to use precast and cast-in-place segmental bridges.

xi. 80% of the project is within the White River National Forest

xii. 20% of the project runs through the residential portion of east Vail

xiii. The weather on the west side of the pass is a challenge as this side routinely sees more snow than the east side of the pass

b. John talked about the topography and layout of the interstate on the corridor with sections that are barrier separated, have a retaining wall in the median, open in the median, and bifurcated.

c. He then covered the Purpose & Need of the project which is to improve the safety and traffic operations for both eastbound (EB) & westbound (WB) directions of West Vail Pass

i. He highlighted several specific safety and traffic operations issues that exist on the pass that have necessitated this project

ii. He talked about the Level of Service of Safety (LOSS), which compares West Vail Pass to all rural, mountainous 4-lane divided highways. The safety assessment that was completed for this project showed that every section of West Vail Pass has a moderate to high potential for crash reduction. Improvements made to the corridor have the potential to significantly reduce crashes on the interstate as this section of highway is significantly worse that other similar sections.

iii. David S asked why the bridges are a specific crash problem

1. John replied that the bridges ice over and some of them are on substandard curves, which lead to a lot of crashes

iv. Joel asked what the red circles on the crash chart on Slide 26 represented as there are other peaks in the chart

1. John replied that those areas are where the high crash rate corresponds to substandard geometry

d. John covered the crash distribution by type from 2014 to 2016. He highlighted that only 5.4% of crashes over that timeframe that are officially recorded (i.e. they cause property damage and/or injuries) are from wildlife collisions

i. He highlighted the specific wildlife crash data on the West Vail Pass corridor. Most of the collisions occur on the lower half of the corridor where it is most permeable (with the 8 pairs of sister bridges). Very few collisions occur on

the upper half of the pass where there is nearly no permeability. The East side of Vail Pass has a similar amount of crashes as the lower half of West Vail Pass.

ii. Most animal collisions are in dry and dark conditions, in the WB direction, and with deer

1. Bill added that it's important to note that these are only crash numbers that are reported to State Patrol (CSP). Vehicles that hit animals and drive away are not shown in this data and would add a significant amount of hits
2. John showed a graph of data collected from a different source (CDOT's Road Kill Report where maintenance reported dead animals on the side of the interstate)
    a. The trends generally stays the same as CSP's data except with a spike at MM 190
3. Greg added that Vail Police has data on animal hits from MM 180-182 that would be available if needed
    a. Bill replied that Colorado Parks & Wildlife's (CPW's) reports show two to three times the amount of bear hits than CDOT or CSP due to their mandatory reporting of bear kills
        i. He added there are studies that may show as little as 30% of animals that are hit on the interstate are reported
    b. Dave Cesark asked if CPW has a dataset they could give to the Project Team
        i. Bill replied CPW has good data on bears, lions, and moose, but not on other animals.
        ii. ***The Project Team will reach out to Bill to gather their wildlife crash data***
4. Julia added that some of the half-mileposts are missing, so some data may be incorporated in a 1 mile data point, showing an artificial spike at that location possibly
    a. She added that the bridge at MM 182.5 does have an opening underneath, but it is over a large, steep gorge that doesn't allow for animal permeability. Not every bridge can be considered permeable due to the terrain in the area.
5. Greg asked if the CDOT Road Kill Report noted direction of travel
    a. John replied that CDOT's Road Kill Report does not note direction, but CSP's crash data does
        i. The group noted that the WB direction is where the traffic moves the fastest on the steep downhill areas and may be the reason there are more animal-vehicle collisions in that direction

6. **ALIVE MOU Review**
    a. David S talked about the ALIVE MOU background
        i. He said that the interstate has always been a barrier for wildlife, and an ALIVE committee was formed to work on making sure this barrier issue did not get worse with future improvements
        ii. The intent was to go beyond the bare minimum to improve wildlife conditions and permeability with projects
        iii. It also established roles and responsibilities noted below:
            1. CDOT/FHWA: integrate the ALIVE process into Tier 2 projects and create design criteria so projects don't prevent improving permeability
            2. BLM/US Forest Service: be aware of the ALIVE requirements as they perform their land management functions
            3. US Fish & Wildlife Service (USFWS): Champion the protection of streams and aquatic life on projects
            4. CPW: cooperation, consultation, data sharing, monitoring, and promoting mitigation measures on projects
7. **LIZ Review – 2003 and 2011**
    a. David S spoke to the Linkage Interference Zones (LIZs) that were identified as part of the ALIVE process along the I-70 Mountain Corridor
        i. In the 2003 study, 13 LIZs were identified along the corridor.
            1. Recommendations for improvement were also made at specific Mile Markers (MMs), including for sections of West Vail Pass
        ii. In 2011, the PEIS Record of Decision adopted the ALIVE MOU and further refined the LIZs
            1. CDOT wanted to bolster the original findings and have a more data driven method to update the LIZs which lead to 13 zones becoming 7, and the actual mileage of LIZs was reduced as well
            2. The specific MM recommendations were also refined with this update, and an implementation matrix was created to help projects think about how to advance ALIVE efforts
        iii. Bill added that there is probably 50% less animal populations in Eagle County compared to when the original LIZs were created, so it is hard to compare recent data with this older data
            1. John asked if there was data to back this statement up
            2. Bill stated CPW does have this and can supply that to CDOT if needed
8. **ALIVE Implementation Matrix Review**
    a. Kara referred the group to the ALIVE implementation matrix handout for this section of the presentation. The West Vail Pass project is currently in the Project Development phase on that matrix.

i. She highlighted the different considerations that the Project Team will be looking at as alternatives are developed, as well as the desired outcomes and products that will come out of this effort. She pointed out that the project is working through the NEPA and EA phase and is not jumping to final design

9. Current Surveys and Data

a. Jonathan talked about the different background data sources that the Project Team will be referring to as alternatives and design options are being developed.

i. He added that deer are the best indicator of hits along the corridor and may be focused on

ii. There will be a lot of communication from the Project Team to the different agencies as this data is being collected

b. He also discussed some of the field work that has been done to date and the remaining surveys that are still to be completed

i. Bill asked why boreal toads are being surveyed as their common habitat is outside of the project limits

1. Jonathan replied that while their breeding habitat is outside of those limits, not enough is known about adult habitat, so the project team thought it'd be good to survey for them

ii. Bill asked if peregrines will be surveyed

1. Jonathan said they have not been surveyed yet, but they can. He added that in his work with CPW, lynx will be looked at but not wolverine

2. Alison added that the USFWS & CPW has good lynx data

iii. Jen asked if the accipiter survey results were positive

1. Jonathan replied that it was not positive

iv. Bill asked what distance off roadway was for these surveys

1. Jonathan said the team looked 250 feet from the edge of the roadway

v. Greg asked why the survey didn't go down to MM 180 and stopped at the Gore Creek campground

1. Jonathan replied that every time they went out, there were too many people and dogs for any wildlife to really be west of the campground, and no activity was noticed in the winter. Once he got further uphill, he started to notice a lot of animal sign

10. Discussion

a. **LIZ and Aquatic Recommendations**

i. Kara presented the current LIZ & Aquatic recommendations from the 2011 ALIVE update and asked to hear feedback from the ITF on what the Project Team should be considering while considering alternatives and design options

ii. She covered LIZ G (MM 180.9-182.1)

1. These recommendations are focused on coordination with the East Vail neighborhoods and includes fencing removal and concentrating human activity
2. Bill stated that the fence near MM 181 has been down for many years for an elk that was moving through that area. The fence wasn't long enough to begin with
    a. He added that mule deer, bighorn sheep, & lion should be added to the secondary target species, and that leopard frogs haven't ever been found in Eagle County
3. Alison added that the Project Team should consider wildlife movement while some of the SCAP features are being designed. As sediment ponds with standing water next to the interstate attract animals, this could draw wildlife closer to the road and increasing the risk that they get hit
    a. Several in the group concurred with this statement and encouraged the Project Team to consider this
    b. John replied that the values of many concepts may conflict and coordination will be vital In order to come up with the best improvements with the Core Values in mind
    c. Bill added that depending on where fence goes and where the ponds are, if a pond is on the proper side of the interstate it could be a benefit to keep animals from crossing the road. Coordination between the Project Team and the ITF to review items like this will be needed as the project progresses
4. John added that this LIZ does not specifically address wildlife fence and asked the ITF for their thoughts on this potential feature
    a. Julia said that fencing should be on the table for this segment especially since many of the wildlife crashes take place in this area
    b. Greg pointed out that the trails in this area don't undergo seasonal closures, so humans are there year round
    c. Jonathan added that the high recreation usage in this area may cause deer and other wildlife to cross the interstate to avoid human interaction

iii. John next covered the recommendations specified for LIZ H (MM 182.9-188.1). The recommendations here include maintaining connectivity in the western portion of the LIZ and adding permeability for the eastern portion of LIZ, as well as fencing additions

1. John asked the ITF group about the MM 183 culvert and if this should be removed as recommended

a. Julia stated that all of these recommendations from the 2011 report should be reconsidered and reanalyzed in light of new data and knowledge.

2. John asked about the next four recommendations which cover fencing between bridges to direct wildlife to cross under those structures and not on the interstate
    a. Bill stated that the biggest problem with fencing is that is has to be maintained (especially with snow, people trying to get through it, and vehicles crashes). He suggested that a more permanent wall would be better for the pass than traditional wildlife fencing
    b. Craig added that any break in a wall/fence would be the spot an animal will cross. Continuous fencing between those bridges is very important. He added that when holes are created in a fence and they get through, animals are not good at getting back on the other side of the fence
    c. Bill said that there is not much movement in the winter, but when snow removal operations take place, the location of the fence will be critical. Depending on how close the fence is to the road, plowing operations could pile snow next to and around the fence, allowing animals to get over it.
        i. He added that the project may not need a 6-8 foot tall concrete wall, but maybe a concrete barrier with 4 foot fence on top of it would be sufficient
    d. Craig added there is good research on high tensile strength fence that may work on top of a barrier.
    e. Julia said that WASHDOT did a study on fence in high snowfall areas that Project Team can refer to
    f. John replied that the maintenance of the fence will be an issue and the Project Team will need to consider it. There is also snowcat operations that take place, so working with CDOT Maintenance on developing this solution will be critical
3. Greg added that glare screen on the median barrier can be an issue as small animals can't get over it
    a. Martha replied that there is a safety issue with glare and glare screen could be strategically placed in areas to significantly improve safety on sections of West Vail Pass. This will need to be done in comparison with animal crossings
    b. Bill added that the glare screen in Dowd that has segments of shorter heights that allow for animals to get over the barrier and he feels those have been successful

c. John stated that a recent CDOT safety assessment for the Dowd Junction area showed there was a 30% decrease in crashes from installation of new pavement and the taller glare screen

d. Bill said that fencing and culverts underneath the roadway to keep animals from getting onto interstate while still allowing passage underneath is important. If installed properly, glare screen wouldn't be as much of an issue

4. John highlighted the recommendation for MM 186.5 which was to construct a wildlife underpass, and at MM 187.4 which was to construct a wildlife overpass

    a. Don asked if there was an official rule for implementation of recommendations from the 2011 report (i.e. "must a crossing be put in?) as there are different recommendations from different LIZs and other subsequent wildlife reports

        i. David S stated that for this project, as it is a Tier 2 of the I-70 Mountain Corridor PEIS, the ALIVE MOU will require the project to take a hard look at these 2011 LIZ recommendations. Projects should run those recommendations through Core Values and Success Factors to see if they are good for the overall benefit of the project

        ii. Greg asked if the MM 187.4 location was where the ARC design competition was for several years ago. The ITF group replied that it was the location.

        iii. Bill added that a previous recommendation to install an overpass at MM 188 gave guidance that the location could be +/- ½ mile from that mile marker. MM 188 was selected because 2 lynx were hit there, but the recommendation allowed for flexibility to select the best location that could be built the cheapest. The ARC competition selected the MM 187.4 location for the completion as it was best location for a structure for wildlife that had a projected cheaper cost.

    b. John said that while there are these recommendations for an overpass and underpass structure, the animal crash data is lowest in this area. He asked how the crash data could support either of the recommended structures.

        i. Bill replied that for 7-8 months of the year it is winter on the upper half of the pass and that deer & elk won't cross in this area during winter conditions, so that could be a big cause of the low crash data. For Threatened and Endangered species, the question is how many need to be killed on the highway before its

worth installing one of the recommended structures, especially when the state is trying to restart a lynx population

ii. Kara asked when lynx hits happened

1. Paige replied that the first was in July of 1999 and the other one was in May of 2004

c. John asked if an overpass would be for smaller animals too or if its needed only for bigger animals

i. Bill thought that any money spent on a structure should be for greatest amount of animals and not restricted to size

ii. Craig said that he thought animals will use it if it is build. As the interstate is a barrier, they don't cross and don't get hit (as the data shows), but an overpass would provide the ability to cross. Animal populations are rapidly declining and the cost of an overpass is expensive, but all this needs to be considered

iii. Bill added that there aren't a lot of crossing locations along the entire I-70 mountain corridor for wildlife, so a major crossing here could be a huge benefit

d. John asked if animals would cross over a structure on a day to day basis or if it would be more for migration

i. Bill surmised it would be more seasonal for migration

ii. Julia said that the upper half of the pass is summer range and agreed that movement would be seasonal

e. Jen said that there is a Forest Plan document that states additional highway crossings are recommended when highway improvements are made

i. ***Jen will send this document to the Project Team***

f. Bill said that there needs to be some sort of structure on upper part of pass for animals to cross over. It doesn't necessarily need to be an overpass or on the West side of Vail Pass, but something is needed

g. Greg asked if a shed for snow/rock/avalanches that is designed in combination with an animal overpass could be considered. The group discussed the feasibility of this briefly

h. Julia said that while the crash data is low, the upper section of interstate is a huge barrier. This location is different than State Highway 9 as animals don't cross the interstate every day but more in migratory patterns. The West Vail Pass corridor should be looked at uniquely as wildlife numbers

will be much lower than other areas of the state, but there is significant ecological value to adding permeability on the upper half of pass

i. John responded that the Purpose & Need of this project is for safety and traffic operations, but the ALIVE MOU notes that CDOT needs to go above and beyond to address wildlife permeability.

i. John asked the ITF if they felt an overpass or underpass would be better

i. Julia replied that it depends on how long and wide the overpass would be, and that it might be more expensive to do an underpass. The goal should be to get multiple species across a structure and not just target one kind

1. Don added that the topography of the upper half of the pass doesn't lend itself to an underpass
2. John said the Project Team hasn't studied whether a certain option would be better and is only gathering information today

ii. Alison said that the goal was to get lynx across the interstate when this effort initially started for an overpass. There is not much data that shows lynx will use an underpass, so an overpass would be better

1. David S asked what adding a 3rd lane would do to lynx and if that would further the need for an overpass
2. Alison responded that it already is a barrier and a Section 7 process should look at if improvements of lynx movements across the highway can be made
3. Kara added that whatever alternative is picked, the permeability will need to be considered
4. Greg added that the PEIS requires this evaluation
5. Paige said West Vail Pass is one of the higher priorities for lynx (#2 statewide) for the Lynx in Lieu Fee Priority List (an advanced mitigation program)

a. David S informed the group that this list exists to take the impacts to lynx from several small projects across the

state and mitigate in one location. West Vail Pass is the second highest priority as a location for this larger mitigation

j. Bill stated that when a 3rd lane is added in both directions, the path that an animal needs to cross is much longer and barrier effect will be even worse.

i. He was not sure if the solution has to be an overpass as that may not work on the pass, but maybe an underpass works better. The Project Team should really evaluate the best solution and not have a predetermined answer

5. Martha asked about the 2013 recommendation to build an overpass on the East Side of Vail Pass and how that works with this potential West Vail Pass location

a. Bill said he's not sure CDOT would need 2 overpasses

b. Julia said the next LIZ study wanted an overpass on the east side of Vail Pass, but that was a separate LIZ and a separate recommendation. For West Vail Pass, an overpass is challenging and human activity in the West Vail Pass recreation area has increased (impacting lynx habitat), so more animals may be moving on the east side of the pass. There is still a lot of value on the west side, but it might be that shifts in movement require one on the east side. She added that a past geotechnical survey in 2009 didn't find bedrock at the MM 187.4 location which could be a challenge for building an overpass

c. Martha asked if the ARC competition moved their location to the east side of the pass.

i. Julia responded that it did not, but Rocky Mountain Wild in conjunction with CDOT Region 1 looked at this topic and recommended the east side as the first location of an overpass

ii. Bill said that the east side overpass may be challenging as Copper Mountain wants to expand and encroach towards the area where the overpass is recommended. West Vail Pass has recreation though that impacts wildlife herds

iii. John added that while bedrock wasn't found, that doesn't mean the project couldn't build a bridge, but that it would be more challenging. He also stated that the geotechnical drilling found remnants of an ancient glacier at the MM 187.4 location.

d. John said the report from 2013 ruled out the MM 187.4 crossing as the east side crossing was the most effective location for an overpass.

i. David said that this report was to identify wildlife enhancements that could be go through Tier 2 process on its own (i.e. not with another larger project), but it didn't preclude or eliminate other recommendations from past LIZs.

6. John asked if an underpass that snowplows could drive through in winter would be acceptable (i.e. animals would cross under during summer)

a. Julia said fox and coyote would need it for winter use.

b. Bill said the box would need to be big enough to have an asphalt substrate and a dirt substrate. It couldn't only be a paved bottom as animals wouldn't want to use it. Very few animals would use it in the winter (fox, coyote, lynx, pine martin). It would be better than no mitigation, but not the most desirable

c. Julia asked if the maintenance underpass at Straight Creek was used year round and if the one on West Vail Pass would then have a maintenance seasonal restriction

i. The ITF group discussed this could be a challenge

d. Jen said if a box comes close to the bike path, recreation users could be explore it and make user-created trails

i. Greg added that there are sections of the bike path that will need to be rebuilt, so this ALIVE ITF could provide good insight on a potential location

iv. John then presented the aquatic recommendations in the LIZ reports

1. The recommendation for the culvert at MM 180 said to keep this location as a fish barrier. CDOT has recently completed a project (with CPW input) to line this culvert and keep it as barrier

2. The recommendation for the MM 180.6 location was to replace the existing culvert with a 3 sided box

a. John said this was rebuilt in an Emergency Repair project but it still could be fish barrier

b. Bill said he was not too worried about fish, he would spend money on the upper part of the pass rather than on the lower half

c. Julia said work was done with CPW to look at aquatic resources and provide recommendations, but it wasn't a huge priority to improve aquatic passage. Many of the other recommendations are to maintain the creeks at the existing bridges

d. The ITF group agreed that the MM 180.6 location wouldn't need improvements

3. The recommendation for the MM 183 location was to remove the existing culvert
    a. The ITF group discussed where this location was and the conditions of the culver. It was decided that further investigation will be needed on it
        i. Julia added it will probably be a low priority. She added that these recommendations show where known fish barriers are and whether they should remain or be removed
    b. The group then discussed that some of this discussion can be deferred to the SWEEP meeting. The ALIVE MOU does talk about aquatic recommendations, but this will be discussed again at the upcoming SWEEP ITF meeting
4. The recommendation for the MM 183.3 location was to improve fish passage
    a. Bill said the Project Team needs to look at this and see if there are fisheries upstream and if it is really needed
5. The group decided to not discuss more of the recommendations and then focus more on it at the SWEEP ITF

b. **Design Options**

i. Kara stated that the previous 4 TT meetings talked about design options that will lead into alternative developments and highlighted what was discussed at those TT meetings

ii. Don covered some details on the content that was discussed at the TT meetings including roadway template, construction phasing options, and trail options

1. The bridges may need to be replaced on realignments of the interstate, the trail may need to be relocated where impacted (especially on the upper ½ of West Vail Pass), and roadway widening widths have been discussed
2. The Project Team is developing criteria from the TT & ITF meetings to screen the alternatives that are developed
3. Bill asked what the definition of "near the creek" is for trail relocation
    a. The Project Team didn't know at this point in the project. Kara said this was a higher level discussion at a TT meeting and the exact distance to the riparian area was not discussed
4. David S asked if wildlife had an impact on any of the options
    a. Don said the use of old US 6 as a detour considered this as many of the crossings would be eliminated as no bridges

would be needed to install this detour. This design option was eliminated for 4f recreation issues too.

b. Martha said the Project Team's challenge is to take input from all of the stakeholders and come up with the recommended alternative that best fits all of the input received so far

11. Schedule and Next Steps

a. Kara covered the project schedule. The project is currently developing Purpose & Need criteria for the Level 1 screening, then will further develop that criteria for the Level 2 screening. The Project Team will come back to the ALIVE ITF during the Level 2 screening process

   i. She added that the next ALIVE ITF presentation will show the results of the Level 1 screening and what alternatives moved onto the Level 2 screening. This will be done before the recommended preferred alternative is identified

   ii. John asked group if the ITFs will be before the Level 2 analysis or as that second level screening is taking place. He wanted clarification as the goal is to have only one more ALIVE ITF meeting before the recommended alternative is identified

      1. Bill said this topic is too complicated and that one meeting may not be enough to fully discuss the mitigation

         a. John said he hoped it could be done in one meeting and may need to be looked at and addressed as the project progresses

b. Greg added that there is a potential for noise walls in East Vail and asked how that impacts wildlife

   i. Bill replied that a noise wall would prevent crossings and could be tied to the wildlife fence for a continuous barrier and push animals underneath the bridges

c. Bill stated that he felt it would be counterproductive to get the bike path too close to the stream as it could add impacts and sediment to Black Gore Creek. The pedestrian bridges could narrow the creek and allow for beavers to dam them up and create big issues. He felt the design should stay well out of riparian areas and try not to cross the creek. Impacting riparian areas could go against some of the Core Values of the project

   i. Greg said that there are pros and cons to moving the path closer to creek. It could help to clean sediment out of creek and provide a better user experience, but it would impact the riparian area and potentially increase winter activity next to creek as well as affect emergency response for incidents on trial. There is a lot to be considered in looking at trial realignments

   ii. Jen said that the Forest plan has guidance on permanent trails in lynx habitat

      1. ***Jen will send this to Project Team***

iii. Julia said that in other areas in Colorado, trails are closed in the winter due to the lynx habitat and asked if this could be done for the Vail Pass trail

1. Jen replied that it is feasible and the Forest Service would be able to enact this as they manage recreation use of the trail

MEETING NOTES

PROJECT:	21685 I-70 West Vail Pass Auxiliary Lanes
PURPOSE:	SWEEP Issue Task Force (ITF) Meeting #1
DATE HELD:	May 16, 2018
LOCATION:	CDOT Gypsum Maintenance Yard, 10519 Highway 6, Gypsum, CO
ATTENDING:	Joel Barnett, FHWA John Kronholm, Project Manager, CDOT Region 3 Karen Berdoulay, Resident Engineer, CDOT Region 3 David Cesark, Environmental Manager, CDOT Region 3 Jennifer Klaetsch, Environmental Unit, CDOT Region 3 Paula Durkin, Environmental Unit, CDOT Region 3 Becky Pierce, Statewide Wetlands Program Manager CDOT Matt Klein, Realty Specialist US Forest Service Matt Grove, Fish Biologist US Forest Service Andy Herb, Alpine Eco Siri Roman, Eagle River Water & Sanitation District Bill Andree, Colorado Parks & Wildlife Caroline Byus, Leonard Rice Engineers, on behalf of Eagle River Water & Sanitation District Lisa Lloyd, EPA Seth Mason, Leonard Rice Engineers, on behalf of Eagle River Water & Sanitation District Pete Wadden, Town of Vail Bob Weaver, Leonard Rice Engineers, on behalf of Eagle River Water & Sanitation District Taylor Elm, Colorado Parks & Wildlife Don Connors, Consultant Project Manager, Wood John Loranger, Wood Kara Swanson, Consultant Environmental Task Lead, David Evans and Associates Matt Figgs, CDOT Region 3
COPIES:	Attendees

SUMMARY OF DISCUSSION:

(Please Note: Action items are shown In ***bold italics***.)

1. **Introductions & Agenda**

    a. John Kronholm did introductions, covered the agenda, and talked briefly about the purpose of today's meeting, which is to provide SWEEP (Stream and Wetland Ecological Enhancement Program) Issue Task Force (ITF) members with an understanding of the project to-date, gather feedback on existing conditions and the current Black Gore Creek Sediment Control Action Plan (SCAP), and to gather input on mitigation and protection opportunities.

2. **Project Background and Overview**
    a. John K discussed the background of the project including highlighting the I-70 Mountain Corridor Programmatic Environmental Impact Statement (PEIS), the recommendations from the PEIS (including stipulations in the SWEEP Memorandum of Understanding [MOU]), the Tier 2 NEPA process, and the past 2007 Environmental Assessment (EA) for the West Vail Pass area
        i. He explained that this project is the Tier 2 NEPA process as it addresses site specific details for West Vail Pass, alignments, costs, and potential mitigation measures
        ii. He also highlighted that the 2007 EA focused solely on safety, which the current Purpose & Need focuses on both safety and traffic operations.
3. **CSS Process/ITF Responsibilities**
    a. John K outlined the Context Sensitive Solutions (CSS) process that the Project Team is following for this project and what stage the project is at in the process
        i. The Project Team has gathered information from the Technical Team (TT) that is being considered for the development of alternatives that will then be screened through a two-level screening process
        ii. He also highlighted the Core Values that the Project Team, in conjunction with the Project Leadership Team (PLT) and TT, have developed.
        iii. Kara pointed the ITF group to the handout which included more details on the Core Values as well as the Success Factors.
    b. John K covered the roles and responsibilities of the various ITF groups which come directly from CDOT's CSS guidance.
        i. He explained that the intent of an ITF is to focus on a specific issue and make recommendations back to the Project Team and TT.
4. **Current Project**
    a. John K discussed the limits of the West Vail Pass Auxiliary Lanes project (Mile Marker [MM] 180 to 190) and talked to some of the unique characteristics along the corridor.
        i. The elevation of West Vail Pass summits at 10,603 feet
        ii. There are several sections of steep grades which are at 7 to 7.4%
        iii. There are areas of substandard roadway geometry with some compound curves that were designed for a 55 mph speed limit (the current speed limit is 65 mph).
        iv. There are 23 different retaining walls totaling 23,515 linear feet
        v. There are 16 bridges that make up 1.6 miles of the corridor
        vi. The Vail Pass/Tenmile Canyon National Recreation Trail sits in the corridor. This paved bike trail gets 39,000 annual users with a peak daily count of 3,500 users

vii. West Vail Pass is the access point for the Vail Pass Winter Recreation area which saw 56,000 users in the 2016/17 winter season

viii. There are numerous wetlands and waters of the US in or near the corridor including Black Gore Creek. There is also considerable wildlife activity in the lower five miles of the corridor.

ix. There is a Sediment Control Action Plan for Black Gore Creek that another ITF will discuss implementing

x. The West Vail Pass corridor is subject to Section 106 of the National Historic Preservation Act as it is a nationally and exceptionally significant feature of the federal interstate system. West Vail Pass was one of the first highways to purposefully sculpt cut-and-fill slopes to fit in its unique setting, as well as being one of the first to use precast and cast-in-place segmental bridges.

xi. 80% of the project is within the White River National Forest

xii. 20% of the project runs through the residential portion of east Vail

xiii. The weather on the west side of the pass is a challenge as this side routinely sees more snow than the east side of the pass

b. John K then covered the Purpose & Need of the project which is to improve the safety and traffic operations for both eastbound (EB) & westbound (WB) directions of West Vail Pass

i. He highlighted several specific safety and traffic operations issues that exist on the pass that have necessitated this project

ii. Siri asked if there is an economic impact that has been determined for closures on I-70

1. David replied that CDOT is using $1 Million per hour of economic impact when I-70 is closed.

2. John K stated that the original amount CDOT had used historically ($800,000/hour of closure) was based on when mountain resorts were open. More work has gone into trying to determine an overall number that includes impacts to freight, drivers, and other businesses.

3. Don added that there was over 200 hours of closure on Vail Pass over the past three years.

4. Joel asked if all of those closures were during hours when resorts were open.

a. John K replied that CDOT hasn't determined that yet. More work could go into determining an exact economic impact closures on West Vail Pass has if it is deemed necessary.

c. John K then talked about the Level of Service of Safety (LOSS), which compares West Vail Pass to all rural, mountainous 4-lane divided highways. The safety assessment that was completed for this project showed that every section of West Vail Pass has a moderate to high potential for crash reduction. Improvements made to the

corridor have the potential to significantly reduce crashes on the interstate as this section of highway is significantly worse that other similar sections.

i. John K highlighted that I-70 on West Vail Pass sees about 22,000 vehicles per day

ii. Joel asked how many miles of 4-lane divided highway were used statewide for a comparison.

1. John K stated that it is all 4-lane divided highways in the state, but isn't sure how many miles that is.

2. Joel then asked how many of those miles are above 9,000 feet in elevation.

3. ***John K stated the Project Team can look at these requests and determine those numbers.***

5. SWEEP MOU and Implementation Matrix Review

a. Becky presented on a brief history on the SWEEP effort which began in 2001. She added that she was one of the authors of the SWEEP MOU.

i. She stated that SWEEP is a program developed out of the PEIS to avoid or minimize environmental issues

ii. The SWEEP effort included biologists, hydrologists, water quality experts, community representatives, and other potentially-affected parties. Three major drainages were covered in the entire PEIS corridor.

iii. The parties (signatories) to the SWEEP MOU are CDOT, Federal Highway Administration (FHWA), US Fish & Wildlife Service (USFWS), the Bureau of Land Management (BLM), Colorado Parks & Wildlife (CPW), the Forest Service (USFS), Clear Creek County, the Clear Creek Watershed Foundation, the Upper Clear Creek Watershed Association, and Colorado Trout Unlimited

1. US Army Corps of Engineers representatives, EPA, the Colorado Watershed Association, and the Eagle River Watershed Association were all part of the effort as well but did not sign the MOU.

b. Becky then talked about what is in the SWEEP MOU

i. It is an MOU that defined parties and their roles and responsibilities

ii. It identified and recommended appropriate mitigation strategies, applied to all parties (not just CDOT and FHWA) to allow all of the stakeholders to gather together and contribute to potential solutions on projects, and identified primary issues of concern (including water quality, natural habitat, and information)

1. She highlighted that not all of the issues in water quality in the overall SWEEP MOU may come up as they had to do with mining and mine tailings

2. Lisa asked for clarification on what the information gathering requirement in the MOU was about

a. Becky replied it was a big effort to gather information (mapping, best practices, etc.) to ensure future mistakes weren't made along the corridor.

iii. Becky then stated that there is an implementation matrix that outlines the 3 issues of concerns with associated inputs, considerations, and outcomes for each phase of a project

1. Kara referred the ITF group to one of the handouts which is a specific implementation matrix for this project

iv. John K asked if there was an expectation to come up with a new SCAP for Black Gore Creek as many of the existing water quality features may be wiped out with this project

1. Bob added that the SCAP was developed by a consultant to CDOT (Clear Creek Consultants), but that the SCAP was never fully implemented. It looked at sediment issues on the corridor (Zone 1), the problems that had occurred over time between the corridor & Black Gore Creek (Zone 2), and the impacts on Black Gore Creek (Zone 3). The SCAP only focused on sediment control on the interstate and had a recommended program of $20M, and would never be fully completed without a large I-70 project.
2. Eagle River Water & Sanitation District (ERWSD) and Eagle River Watershed Council did work to generate funds ($1M) to do interim improvements to Zones 2 & 3.
3. He added that the SCAP was a guide for these improvements, but was never finished. He stated that the sediment control and management strategy needs to be added in the planning/design of the project, not as an afterthought or as a later mitigation measure and encouraged the Project Team to address water quality issues that are problematic along I-70.

a. John K replied that the Project Team has the opportunity to make these improvements and will look at designing them into the roadway and not include them as an afterthought.

6. SWEEP Implementation Matrix Discussion

a. **Water Quality**

i. John L stated that his goal was to ask the group for input on if the SCAP's recommendations met the objectives that were originally determined, what the costs and benefits were for each strategy, and what revisions may need to be added in the SCAP

ii. **Sediment – Black Gore Creek SCAP**

1. John L presented some background on the development on the Black Gore Creek SCAP and talked about some of the proposed recommendations that came out of the SCAP (4 implementation scenarios)

2. He covered the 4 implementation scenarios that came out of the SCAP
    a. The Baseline-Existing Maintenance Program which basically maintained the amount of sediment removal that took place on the pass
    b. The Enhanced Maintenance Program which did not add any new control structures, but added $500k annually to enhance sediment removal
    c. The Large Capital Construction & Enhanced Maintenance Program which included all of the elements of scenario #2 plus $20M in capital improvement projects for sediment control structures
    d. The Prioritized Capital Construction & Enhanced Maintenance Program which included all of the elements of scenario #2 plus $4M in annual capital improvements
3. John L talked about a few of the projects that had been completed since the completion of the SCAP. 67 permanent BMPs have been constructed since the 2002 implementation of the SCAP. He stated the Project Team will continue to look at what has been completed and what remaining items are not implemented.
    a. He also added that CDOT has increased its annual maintenance budget by about $250k per year

iii. **303(d) Listing**

1. John L added that Black Gore Creek is listed under Section 303(d) of the Clean Water Act
    a. Matt Grove added that Black Gore Creek is not listed for macroinvertebrates but it is monitored
    b. Caroline added that one portion of Black Gore Creek is still listed as 303(d) for macroinvertebrates (the upper portion)
    c. Matt G added that he didn't believe it was listed but is still on the M&E list. Siri added that the M&E list is still very important.
    d. Karen asked for clarification for what the M&E list was
        i. Matt G replied that it is a classification that isn't bad enough to be listed on 303(d), but does have pollutant concerns and is therefore monitored

iv. Kara asked if there were any other questions for mitigation or implementation that needed to be covered by the ITF

1. Bill stated that some of the discussions surrounding the original SCAP was to add concrete barrier and additional paving to trap sediment and give a location for sediment to be cleaned, but this installation could be a barrier to wildlife trying to cross the

interstate. He added that the location of the sediment ponds is important too as those can attract wildlife. If they are on the interstate side of a wildlife fence, could draw animals to I-70

   a. John K added that CDOT Maintenance needs to weigh in on those locations and how easy they will be to access and clean
   b. John L stated the Project Team can work with the ITF group during design to makes sure these different concerns are all balanced and considered

2. Siri stated that CDOT Maintenance manages snow much differently than how it was done in 2002 when the SCAP was completed. The Project Team should look at how it is operated now and update the recommendations of the old SCAP
3. Seth asked if it is worth working with CDOT Maintenance to look at the operational recommendations in the SCAP and add onto those old recommendations with new practices and new technologies
   a. John L agreed that there is an opportunity to do this
   b. John M added that CDOT Maintenance uses technology in their application of product on the roads, so there is some opportunity to look at this. Maintenance doesn't want to waste material under their new practices
   c. John L stated that the Project Team is still in early development of work on this issue and will reach out to the ITF members as questions arise
4. Siri added that in her perspective, on the scale of a $500M project, spending money to update the SCAP within the limits of the project is very worth it as a whole new look should be given to the corridor
   a. Bob concurred with this recommendation
   b. Jen also concurred as just an update to the 2002 SCAP would not be relevant with a large change to the corridor as part of this project. She added that Maintenance will need to be at the table for this effort
5. Seth asked for the timeline for construction of this project
   a. John K replied that there is no identified construction funding at this time, only money for EA effort. The EA is expected to be completed in early 2020. The project is on a potential ballot measure list for $225M which would allow the project to move into design and some phase of construction in a few years.
   b. Seth asked that if there is significant uncertainty on when or if this project gets done, would be worth just an update to the SCAP and not re-doing it. If there is a high chance it will be constructed in the next 5-10 years, it would be best to do a new SCAP now

   c. Karen added that if the Project Team gets design funds to get to FIR (CDOT's 30% design level), it would makes sense to do a new SCAP, even if construction funding isn't identified yet. CDOT has identified this project as one of the top 5 projects in the state. Several potential funding scenarios exist that will continue to develop in the upcoming future.

6. Bob asked how the identification of the alternative for this project works with the Tier 1 PEIS as it has already identified a 3rd lane
   a. Karen replied that the TT is working through this question right now and whether there are multiple alternatives or if there are only design options for 1 alternative (adding a 3rd lane). The Project Team and FHWA are working closely to develop this. She added that the Project Team hasn't looked at the level of effort for generating new reports (such as a new SCAP) but is looking to the ITF groups for guidance
7. Siri added that a new water quality management plan needs to be generated for the whole corridor including the Black Lakes and not just Black Gore Creek
   a. Bob stated that certain areas on the corridor were difficult to determine how to install mitigation measures that could be maintained, so the alternatives for sediment control were limited by the footprint of the highway. The strategy for managing sediment and keeping it from leaving the roadway should be looked at as alternatives are developed so that the same issue doesn't arise with a new footprint.
      i. Karen replied that the Project Team is looking at screening criteria for sediment control and maintenance, so all of the Core Values will be considered as alternatives are scored.
      ii. John K added that there may be opportunities to improve maintenance access as the alternatives and design progress for this project. They can be determined in conjunction with design and not installed as an afterthought
      iii. Karen highlighted the schedule the Project Team handed out to the ITF group. The refinement of the preferred recommended alternative would be the time the Project Team starts to dive into the details of looking at specific improvements and will look to the ITF for guidance on these.
8. Bob asked what the Level 1 screening will cover
   a. Kara stated that the Project Team is still determining the alternatives right now that will be screened, but the Level 1 criteria will be applied to the alternatives. Design options

will also be determined later and compared to the Core Values

b. John stated that once the preferred alternative is identified, the mitigation measures will be looked at through the different ITF groups

c. Bob asked if the impacts for each alternatives would be the same or not

i. Kara replied that not necessarily, it depends on what alternatives come out and are screened

d. Siri asked if an alternative to focus on fixing geometry and widening shoulders while keeping I-70 as a 4-lane interstate could be its own alternative

i. Karen replied it could be an option. The Project Team is discussing whether to approach this in light of the PEIS as the TIER 1 decision recommended adding the 3rd lane. The Project Team is looking at whether going back and changing the recommended improvement from the PEIS should be considered as an alternative as this is a Tier 2 decision to the PEIS's Record of Decision. This could also be a standalone phase of a larger project

ii. Siri asked for clarification on the difference between the Tier 1 and Tier 2 effort

iii. Joel stated that the Tier 1 effort defined a recommended suite of improvements for the I-70 Mountain Corridor. Tier 2 projects would be built upon that and may not implement the Tier 1 decision, but those projects can't preclude the Tier 1 decision

iv. Lisa stated the Project Team could segment the project to have different solutions in different areas to try and minimize impacts

9. Seth asked what the SWEEP ITF will help the Project Team accomplish with this meeting today

a. Kara stated that the intent of this meeting is to provide the SWEEP ITF group with the project background and then gather information to consider in moving forward with the project

b. **Natural Habitat**

i. **Wetlands Protection**

1. Andy talked about the wetlands work the Project Team is planning on accomplishing as a part of the project. The Project Team is working with the CDOT Region 3 Environmental unit, the Colorado Natural Heritage Program (which completed general wetland and

fen mapping within 500 feet of the edge of interstate, but not outside of the Right-Of-Way), Colorado Parks and Wildlife, as well as using the data set from PEIS. He asked the ITF group for more data or information they may have that was not listed.

   a. He explained the work completed by the Project Team to date as well as the identified work that will take place in the future. Field work will start this July to map wetlands. That mapping will be done both by field work and by aerial mapping. The Project Team will be conservative in its look and will include more areas in the mapping limits than potentially needed. When permits need to be pulled for design and construction in the future, those limits will then be further refined.

   b. Fens will also be mapped and more closely examined.

2. Andy then presented some of the wetlands criteria on the implementation matrix that the Project Team will be attempting to answer

   a. He stated whether the project is subject to the US Army Corps of Engineers Merger Agreement is still being determined. Although the US Army Corp of Engineers was not at this SWEEP ITF, the Project Team is still working with them

   b. Lisa stated that in light of the Trump Administration's effort to streamline the NEPA process, she recommends that all of the information needed for a permit or for the merger agreement should be complied so the Project Team doesn't have to go back and re-do work. Involve the US Army Corps of Engineers early on so their requirements don't impact the selection of the preferred alternative

      i. Andy added that the US Army Corps of Engineers' and NEPA's definition of environment is different, so the Project Team will make sure they are included

   c. Becky added that the US Army Corp of Engineers doesn't decided whether the project will enter into a merger agreement; it will be FHWA (with concurrence of CDOT). The merger agreement is being re-written right now after EPA and the US Fish & Wildlife Service conduct a final review. She stated that other state DOTs use the merger agreement much more than CDOT does, but CDOT should look at using it more, especially when there is more than one alternative or one alternative with many design options. It will prevent the Project Team from having to back track

      i. Andy added that depending on the alternative, a permit may not even be needed.

ii. Kara added that further conversations will be needed to determine the potential future permit strategy for this project

iii. Andy said the Project Team is taking the conservative approach by assuming an individual permit is needed right now and can always not go down that route if it is determined that the permit is not needed.

1. The goal of the Project Team would be to avoid wetlands first, minimize impacts second, then mitigate lastly. He added that the ITF group could provide the Project Team data on wetland sites that have been degraded and could be restored as part of this project

d. Matt G asked if the Project Team's survey will include any potential realignment of the bike path

i. Andy replied that yes it will

ii. Kara added that the original study limits may not go down all the way to the creek, so if any design options impact areas outside of the original limits, the Project Team will need to go back out to re-map

e. Paula stated that there are many areas below Black Lakes that have a lot of sediment in that should be looked at. These could be good potential mitigation areas for the project

i. Bill asked how that could be considered mitigation as that is fixing an old problem from the original construction of the interstate

3. Bob asked if this project will require an amendment to the Highway Easement Deed FHWA has with the Forest Service

a. Karen added the Project Team doesn't know at this time.

b. Don added the road probably will stay inside boundaries of easement, but bike path may not.

c. Bob wanted the Project Team to look at whether the highway was in a Special Use Permit or in an easement

i. ***The Project Team will confirm whether I-70 sits in an easement or under a Special Use Permit***

ii. **Aquatic Special Status Species**

1. Matt G talked about the list of Threatened & Endangered aquatic species the Forest Service has identified as a potential to be in the project limits

a. He added that the Greenback Cutthroat Trout doesn't exist in the Black Gore Creek watershed (the Greenback in the creek is not a genetically pure species)

2. Kara showed the questions from the implementation matrix that the Project Team will work through
    a. Matt G spoke to some potential outcomes
        i. This project is not a good candidate for enhancing the recovery effort, but the Team will work with CPW
        ii. Fish barriers do exist and could be looked at for enhancement or removals if necessary
        iii. Black Gore Creek primarily is full of non-native fish species or brook trout
    b. Bill added that there are fish barriers for Pitkin and Booth Creeks, but CPW would potentially look at sites of future recovery and would like to keep the barriers in place
3. Andy presented the recommendations for the aquatic connectivity that were originally established in the ALIVE Linkage Interference Zone (LIZ) report. These recommendations are site specific along the corridor and were discussed among the ITF group.
    a. Matt G stated that any work that has to do with fish passage has to go through the Forest Service's hydrologist for 100-year flood elevations
    b. Bill added that CPW wouldn't want to remove any barriers (even ones that exist naturally) as it is tougher to put one in than it is to later pull one out. This would allow for sections of creek to do future habitat recovery efforts
4. Bill stated that the unknown tributary at MM 183 may be Timber Creek
    a. John K hasn't found this location in the field and isn't sure why CDOT would install a culvert for the creek underneath a bridge
    b. Matt G stated this may not be Timber Creek (as it shows up later on the list); it could be part of the sediment basin
    c. ***John K will try to find this location and send pictures to members of SWEEP ITF for their review on the ALIVE recommendation***

iii. **Aquatic Species Recreation**

1. Kara talked about the question on the implementation matrix for recreation regarding aquatic species
    a. Bill stated that the Gold Medal Water designation is below the project limits, so the project wouldn't have a special designation segment within the limits

2. Bob asked how the use of Black Lakes for fishing applies to this matrix (as ERWSD does a lot of stocking of those lakes via agreement with the Department of Natural Resources & CPW). He stated that the accumulation of sediment in those lakes has been problematic over time and remains an issue of concern. The sediment control measures that are implemented with the project should include protection of Black Lakes too
3. Bill added that restoring vehicle access to Black Lakes #2 would be beneficial as well to provide more recreation access
    a. John K stated that this may be an issue between CPW and the USFS & ERWSD and may not be a part of this project. This project will only mitigate those recreational facilities that are impacted and not provide additional access or parking

c. **Information (Research Needs)**

i. Kara showed the questions from the implementation matrix for this category that the Project Team will need to answer

1. Seth asked why the first question is limited to aquatic vegetation
    a. Andy replied that this probably relates to wetland vegetation
    b. Matt G added that there is a lot of data on macroinvertebrates and fisheries, so missing areas would include vegetation
    c. Andy asked if anyone in group had data on magnesium chloride and sand impacts on aquatic vegetation
        i. Seth replied there is research from CU on this that the Project Team may be able to obtain
2. Matt G said that there is not much published literature on the effect of mag-chloride on aquatic bugs. This should be considered as CDOT has been using more mag-chloride and less sand without knowing the effects on aquatic life. The Forest Service has seen a slight decrease in bug populations over the past 5 years. Abandoning sand because of sediment issues may not be the best solution because of the potential effects of the mag-chloride
    a. Seth added there is an effort with Eagle River Watershed to answer the second question right now. He recommended the Project Team to go back to Clear Creek Consultants to get the data that was generated with the original studies and asked if it could be shared with ERWSD
    b. Bob added that he felt CDOT collected data on monitoring requirements for Black Gore Creek in addition to what Clear Creek Consultants did
    c. Jen added that monitoring is ongoing but nothing additional outside MS4 areas is taking place and Black Gore Creek is not designated as MS4

d. Bob stated that the ERWSD collects macroinvertebrates and water chemistry data above mouth of Black Gore Creek and on Main Gore Creek and has seen that macroinvertebrates scores are significantly lower in Black Gore Creek than at those other locations. He feels the reason for those lower scores is due to lower bug densities from sediment impacts and mag-chloride. He can share the data with the Project Team.

i. Siri stated that there is a Black Gore Creek steering committee that is looking at starting to sample bugs

ii. Bob said he would greatly appreciate the opportunity to review the data that is used to establish the baseline criteria of the health of Black Gore Creek.

3. Seth asked how the Project Team will answer the matrix implementation questions

a. Kara replied that the questions were for entire I-70 Mountain Corridor. The Project Team needs to ask if the particular questions are applicable first, and then if they are, is there an opportunity to gather data to answer the question

b. Seth added that there is an opportunity to coordinate with other groups that are asking similar questions

c. Andy said that there is a good opportunity for data sharing with this project

d. Kara added there are some concurrent efforts that members of ITF can work together on

e. Siri stated that it may be good to have a member of the Project Team present at the Black Gore Creek steering committee

f. ***SWEEP ITF Members agreed to share data/information as it is collected***

d. **Design Options**

i. John K stated that the bike path design options are complicated with all of the pros and cons to weigh with user experience, safety, aquatic/riparian impacts, wildlife impacts, etc.

1. The Project Team would like to do another ITF specific to the bike path and have varying stakeholders provide input on where this relocated path could go. The Project Team will set this up at a later date and reach out to the necessary stakeholders

ii. Don talked about several design options that the Project Team has talked through with the TT including the roadway template width, construction phasing, and trail relocation options

7. Schedule and Next Steps

a. John K presented the overall EA schedule. He highlighted the EA is expected to be completed in early 2020, the preferred recommended alternative will be identified in the fall of 2018, and alternative refinements and environmental reports will take place from fall 2018 to mid-2019.

   i. If design funds are obtained by CDOT, an effort towards FIR will be taken, but the project can't progress past FIR until the EA is signed.

   ii. Kara added that the Project Team will come back to this ITF group in the early fall after the preferred recommended alternative is identified.

   iii. Karen stated that as part of the EA process, the commitment to re-do the SCAP could be agreed upon, but that would need to take place after the recommended alternative is identified. She doesn't feel the work needs to take place right now, but the Project Team could commit to doing it

      1. Bob asked when the Project Team would start doing more detailed design work

         a. Karen replied design funding is needed first, but that it wouldn't start until early 2019 at the earliest

      2. Bob asked what level of design is done when the preferred alternative is recommended

         a. Karen replied it would be very high level (i.e. 5-10%). She added the Project Team will make sure to have the right timing for redoing the SCAP to make sure it makes sense

         b. John K added the limits of disturbance for design and construction need to be established with the EA, and the proposed mitigations will needed to be looked at as well

         c. Kara said the design is going to be an iterative process with the different ITF groups

b. Siri asked if some specific metrics for preserving or enhancing water quality as part of the project could be added to the Success Factors (this could also be done for other Core Values like safety, etc.). Stipulations could be added to the project that would require measurements in the future that if the metrics aren't met, it would trigger a set of required actions by CDOT

   i. Karen replied that she wasn't sure if CDOT had done this broader commitment on other projects and would want to look more into this.

   ii. Joel stated that he felt Success Factors don't measure 10 years down the road, but are meant to look at what is designed. It is not typically within the scope of work to tie future metrics to projects

   iii. Bob disagreed with this view as agencies like Forest Service & US Army Corp of Engineers often require follow up monitoring after large projects to make sure metrics have been met and then required follow up mitigation if those metrics aren't met

iv. Paula added it depends on the permit type and who writes EA. The Forest Service is not writing the EA for this project as in the examples given

v. Kara added that it is tricky when trying to determine this in an EA. The Project Team could commit to something like producing a new SCAP but not necessarily future metrics

vi. Joel felt that the Success Factors are for the CSS work on the EA, not a measure for after construction

vii. Bill responded that he felt this would go against the MOUs signed as part of the PEIS. If construction takes place and the stream gets worse, the SWEEP MOU wouldn't have been met

1. Joel felt that concern would be better identified in an MOU rather than in the Success Factors

viii. John K asked the group to table this discussion and allow the Project Team to look further into it and then discuss at next SWEEP ITF. He did ask for some specific measurements that could be considered to be included in some metric that CDOT would look into.

1. The group discussed that reading through the SWEEP MOU to see what is included in that document would help the ITF group determined potential measurements
2. ***Kara will send the SWEEP MOU to the ITF***

ix. Bob added Enhanced Environment is one of the Core Values and encouraged the Project Team the stand behind that Core Values

1. John K added he felt this effort would be part of the Success Factors, but would more likely be a part of a permit or an MOU

x. Matt G said that since the Forest Service isn't doing the NEPA, the EA process will be a bit different than the stipulations that they would typically outline. His hope is that the Project Team will put the effort to maintain or improve sediment removal efforts

1. If the efforts are not improved or maintained, he felt it may kick this EA to an EIS, but it doesn't appear the Project Team desires to go down that road.

xi. Kara said that when the design options are being reviewed, the Core Values will be used extensively in looking at the options

xii. Joel added that FHWA's expectation is that the NEPA and CSS process is strictly followed for this project. He felt that this is a good project and the process is being followed with good stakeholder involvement so far.

c. Karen thanked the group for their time and effort and contributions to today's meeting.

MEETING NOTES

PROJECT:	21685 I-70 West Vail Pass Auxiliary Lanes
PURPOSE:	CPW and USFS Meeting re: Wildlife
DATE HELD:	November 26, 2018
LOCATION:	CDOT Region 3, Eagle, CO
ATTENDING:	John Kronholm, Project Manager, CDOT Region 3 Karen Berdoulay, Resident Engineer, CDOT Region 3 David Cesark, Environmental Manager, CDOT Region 3 Cinnamon Levi-Flynn, Biologist, CDOT Region 3 Matt Klein, US Forest Service Jennifer Prusse, US Forest Service Taylor Elm, Colorado Parks & Wildlife Michelle Cowardin, Colorado Parks & Wildlife Jonathan Lowsky, Consultant Biologist, Colorado Wildlife Sciences Kara Swanson, Consultant Environmental Task Lead, David Evans and Associates
COPIES:	Attendees

Action items are shown in ***Bold Italics***

SUMMARY OF DISCUSSION:

1. **Introductions & Meeting Goal**
    a. John and Karen provided an overview of the goal of the meeting- we wanted to meet with CPW and USFS prior to the ALIVE meeting and have these details discussed so there are no surprises walking into the ALIVE meeting.
2. **Connectivity Recommendations**
    a. Jonathan provided an overview of the matrix. CDOT is recommending fencing throughout the corridor. Fencing can be a problem with separating populations but we believe that with improvements to existing structures and new structures that we're increasing permeability.
    b. Michelle C. stated that the fencing on SH 9 is horrible to keep up. Having to contact CDOT maintenance a lot. Biggest problems is with gates. She recommends talking to CDOT maintenance about gates- suggest lighter gates. Suggested to drive SH 9 with fencing over dry washes and sediment is built up. Maintenance is the biggest issue- suggest paying attention to these issues more, even if they're little. Gates were falling off in the first year. Would be helpful to know where we will have walls that can act as fencing- show a visual. Kremmling maintenance was not supportive of the project because they were brought in late. **ACTION- engage maintenance staff in the wildlife discussions.**
    c. Jonathan stated that the existing bridges are very well used, except 182. If you look at wildlife-vehicle collision data, there are far fewer records on the upper half of the corridor. Track surveys confirmed this as well. Not any real reason for ungulates to cross on the upper part. Even though there's greater permeability on the lower half, there's more of a need for fencing there. Michelle stated that there was a successful

lynx crossing at 189.9. She showed a map with lynx mortality, successful crossing, and proposed crossing locations. Jonathan stated that the 1999 lynx mortality occurred when there were heavier populations of lynx in the area. Lynx seek out places in their habitat right up near the road, which was used to help site the crossing locations. Alison M. agrees that the lynx have settled down a little.

d. Jonathan mentioned that crossings will also benefit martens and weasels. The track survey also showed skunks and weasels walking parallel to road. Only found two locations of coyotes where tracks went right toward pavement.

e. MP 182- Bridge very heavily used by people and dogs. Find a better way to regulated leash laws. Provide interpretive signage on dangers of dogs to wildlife. Saw a lot of wildlife usage. John asked if posting signage could be a partnership with Vail. Karen stated that CDOT would likely just need permission but CDOT can put the signs up.

f. MP 183- Carried forward 2011 recommendations. Potential issue with removing the culvert- it would be a tradeoff removing culvert bc you would be putting more sediment and mag chloride. Jonathan suggested keeping it covered and improve the culvert. Suggest adding structure to provide cover and adding woody vegetation and potentially a PVC pipe for smaller animals to use. Michelle thinks vegetation is a better idea than a pipe because a pipe has to be maintained. Suggested using a half pipe if CDOT wants to put in a pipe at all.

g. MP 186.5- recommended 12x24 arch. Based on the various data back to 2003 as well as contractibility limitations, we're recommending not putting one here but instead at 188.3. Also recommending at MP 186.9 to put in a mid-size animal crossing structure. Michelle asked if 4-foot was the largest we could go. Jonathan said it was based on Banff results. Michelle thinks if we can go larger everywhere we can, it'd be good. Would need to figure out how to shield crossings from snowpack. Previous recommendations called for oversized culverts every .5 mile. CDOT decided to actually recommend some larger structures in other places as it didn't make sense just to oversize every culvert. Making this one larger would be better given the spacing of other crossing locations.

h. Michelle stated that on SH 9 where culverts aren't tied in to the fencing, they become otter slides.

i. Michelle reiterated that larger underpasses are better. John said there are ways to minimize snow pack. This is what we'll hear at the ALIVE meeting.

j. MP 187.4 – looking at a larger underpass. Banff study was the first one that looked at adoption of the structures by different species. Elk were slower to adopt. Deer and mountain lions were early adopters. After about 4 years, elk would then use it.

k. Michelle stated that there is a 42' x 14' underpass on SH 9- elk still aren't using it after 3 years.

l. Michelle asked what the distance is on I-70 that the underpass would have to be. John stated that we can squeeze ours in at 150' long. Roadway section is 106'. To get outside of clear zone is additional 20-feet on either side. Michelle- Would recommend going higher than 10'- maybe at 14'. Suggested seeing what the largest is we can put in there. If it's 20x10, have our justification ready. This is our one shot for decades to do anything on this side. Michelle is okay without an overpass since

we aren't catering to elk; but we could have moose and if there are issues with snow; bigger is better.

m. Jonathan asked is hares are eating the veg on the overpass on SH 9. Michelle- yes, and deer are as well. There are a lot of hares are using the overpass.

n. Since it's summer range, deer and elk drop off during winter. Even if there's snowpack, smaller animals may still use it. But there's really no data on that.

o. Concrete box culvert- is there any literature on the diff between box vs. arch? Not too much.

p. Michelle also mentioned escape ramps- they can add up pretty quickly. One thing about concrete wingwalls is that they can be used as jump downs.

q. MP 187.8- another small to medium sized box or culvert. Any place where there is poor veg, we are also recommending planting additional cover for protection and comfort.

r. MP 188.3- siting is a combo of data we have. Michelle- again, make it as big as possible.

s. MP 188.7- good forested cover. Based on telemetry data there is good lynx habitat on either side.

t. Michelle asked if there is anything we can do closer to MPs 189 and 190. She wants CDOT to look at what we could do closer to 190. John stated that there is a lot of man-placed fill between 190 and 189.7 but that we may be able to place a 4-foot culvert. ***ACTION- CDOT will look at it and see if even a 4-foot diameter one would work.***

u. Michelle talked to Patty Kramer (PI on SH 9 crossing). Only issue with metal culverts is they can be loud when there is a median with an opening. Is an open-bottomed concrete structure better? On the noise issue- is a skylight bad because of noise? Yes and would have maintenance issues. Jonathan stated that the other thing we're looking at is to include a shelf in existing culverts to allow small animals to cross that don't like walking in water.

v. Jonathan said that CDOT will also look at adding features to bridges to encourage roosting for bats.

w. The group reviewed the aquatic recommendations. John stated MP 183 is essentially a clean water bypass. CDOT is currently throwing sand right into the river. We could pipe Polk and Timber creeks under the bridge to keep sediment out. Even though biologist say that Black Gore is a challenged stream, this might actually improve it. CDOT will identify those areas that could be piped.

x. MP 183 and 183.3 are the ones that said to look at removing culvert. Since they're already "clean water diversions" CDOT recommended keeping them piped.

y. Jonathan mentioned that back on the terrestrial recommendations at MP 183.3 under bridge is heavily used by skiers. If possible, he would like to widen it and dedicate a skier-only crossing.

z. Any comments or input from USFS? Matt K.- Not much additional input. It's been helpful listening to Michelle. Matt does want to make sure there's "cross-pollination" between ITFs. Should talk about proposed structures as they relate to recreation.

3. Trail Relocation Options

a. Trail alignments- CDOT's plan is to take the three different alignments and put them in front of all the ITFs to get feedback.

b. Michelle- are we looking at cost for the three locations? John- it only really makes a difference if it's a large magnitude of cost. We will use the Core Values to help balance issues and impacts. CDOT will also look at ease of maintenance. Michelle stated that she doesn't have an overall alignment recommendation other than disturb as little area as possible. She also understands that there are a lot of things to consider.

c. Kendall Bakich (CPW) couldn't attend the meeting but did say that timing for instream work is important. Alignments between stream and road- a shelf to catch sediment. If it does go on other side of stream, does it cause more off-trail use?

d. Michelle- try to stay out of timber stands. When you get up higher, up in the meadow, you may still be in line of sight of animals. At MP 185.2 under the bridge- CDOT should keep the trail as close to highway as possible bc we're going through a lot of timber stands. Most people aren't biking this trail for a "wilderness experience". Doesn't think we have to provide recreationalists a wildlife experience.

e. John stated that any path on south side of highway will have walls.

f. Michelle wanted to know what the feasibility is of putting the trail back to existing alignment. John- we could put it near the road, but maybe 20' away to avoid snowcasting and have it drop vertically.

g. Put the crossing structures and wall locations and details. ***ACTION- have Tyler add wall details.***

h. Michelle said to look specifically at area near 186. She suggested adding distance from highway and where the fencing may go to the maps. Michelle wanted to know if CDOT could run the trail diagonally near 185.2 to get it back to where it is currently. Maybe tree stand on south side of creek is more valuable than north side. Get it over Black Gore sooner rather than later.

MEETING NOTES

PROJECT:	21685 I-70 West Vail Pass Auxiliary Lanes
PURPOSE:	ALIVE Issue Task Force Meeting #2
DATE HELD:	December 14, 2018
LOCATION:	Miller Ranch Community Center
ATTENDING:	John Kronholm, Project Manager, CDOT Region 3 Karen Berdoulay, Resident Engineer, CDOT Region 3 David Cesark, CDOT Jeff Peterson, CDOT Drew Stewart, CDOT Cinnamon Levi-Flinn, CDOT Environmental Matt Klein, US Forest Service Alison Deans Michael, USFWS Paige Singer, Rocky Mountain Wild Michelle Cowardin, Colorado Parks & Wildlife Taylor Elm, Colorado Parks & Wildlife Pete Wadden, TOV Kristen Bertuglia, Vail Dick Cleveland, Representing Vail Town Council and EcoTrails Jonathan Lowsky, Colorado Wildlife Science Leah Langerman, Public Involvement Coordinator, David Evans and Associates Kara Swanson, Environmental Task Lead, David Evans and Associates Tyler Bowman, Engineer, Wood
COPIES:	Attendees, ALIVE ITF Members

Action items are shown in ***Bold Italics***

SUMMARY OF DISCUSSION:

1. **Introductions & Agenda**
    a. The group did introductions and Kara presented an outline of the agenda.
2. **Brief Overview**
    a. Kara reviewed the Issue Task Force (ALIVE) roles and responsibilities, Purpose and Need, recap of ALIVE meeting #1, and work completed to date on the project (see PowerPoint presentation).
3. **Wildlife Connectivity Comments**
    a. Kara noted that a summary of stakeholder comments from all sources and meetings regarding wildlife connectivity is in the presentation and handout packet.
4. **Wildlife Connectivity Recommendations**
    a. A multidisciplinary report was completed in 2011, as part of the PEIS. This looked at linkage interference zones (LIZs) for I-70 from C-470 to Glenwood Springs. These have been fine-tuned and made more realistic since. Jonathan Lowsky reviewed the

handout detailing the 2011 recommendations and updated 2018 recommendations by location (see Wildlife Connectivity Recommendations handout).

i. Proposing to fence the entire study area to keep animals away from the road surface and direct them to safe crossings.

ii. ***ACTION: Distribute 2011 report to attendees.***

b. MP 181

i. Improving/adding fencing will help guide animals to this underpass.

ii. Consideration: there is a lot of human traffic in this area, and could impact animals trying to cross here.

c. MP 182

i. Includes bridges near US 6 trail; this also spans the creek.

ii. Significant riparian habitat and wetland areas.

iii. A lot of animals use this crossing following the creek.

iv. Domestic dogs are a problem. Users let dogs roam leash-free. Surveys found a lot of dog tracks. Other animal tracks were discovered, but they were likely crepuscular/nocturnal.

v. Recommend working with USFS and CPW to encourage users to keep dogs on leash & away from riparian habitat.

d. MP 183

i. Follow the 2011 recommendations.

ii. Any benefit from removing the stream culvert offset by greater impact to stream due to contamination & sedimentation.

iii. Add vegetation on west side & coarse woody debris under the bridge to provide cover for smaller mammals.

e. MP 185.5

i. Follow the 2011 recommendations.

ii. Animals benefit from having a "wildlife lane" (separate from the recreation lane) with coarse materials under the structure to increase use of crossing structure.

f. MP 186.5

i. 2011 recommendation was for a crossing structure/arch at this location, but now have recommended it is moved to higher on the pass (188.3) instead.

g. MP 187.4

i. An overpass was recommended in 2011, but now is not recommended. Traffic safety issues and wildlife research shows that it is better to build more underpasses throughout the area.

ii. At the upper end of the project area, mule deer and elk are not target species for crossing structures. There is no reason for these animals to move perpendicular to the highway at this section; it's all summer range. Mule deer and elk often follow drainage patterns. The upper area of the project has no major drainages running perpendicular. Deer typically cross lower, crossing below MP 186.

iii. Lynx do exist in the upper portion of the project area. Studies in Banff have shown that lynx readily use underpasses. Lynx shown to prefer crossing where their habitat approaches the roadway.

iv. Michelle Cowardin noted that Craig sent an email last night and has changed position – now believes the underpass structures should be larger.

v. John stated that State Patrol records two animal collisions per year in the upper portion of the pass. A recommended 150' overpass would cause more than the two accidents per year due to icing and shading. This is one of the areas with the highest crashes (peak at 187.5) already.

vi. Karen noted that CDOT doesn't want to impact safety on the roadway and go against the project Purpose and Need. This is why more underpasses would be a better balance for connectivity and safety.

h. MP 186.9

i. Michelle suggested that bigger is better for crossing structures.

ii. Julia Kintsch sent an email and recommends six-foot instead of four-foot diameter underpasses for medium to small species and substantially larger structures for large animal crossings at 187.4 & 188.3 sites. The project team is looking into making these changes and plans to follow this recommendation where possible (constructability will be considered).

iii. A small PVC pipe within the culvert has been shown to help encourage smaller animals such as martens to go through the larger culverts.

iv. John noted that the locations shown on the map and matrix are approximate, and will be adjusted slightly during final design as needed, and refined throughout the process.

i. MP 187.4

i. This is one of the largest crossings proposed. Julia and Michelle have suggested an even larger size.

ii. Elk is a species that is reluctant to use new crossing structures. Some have been shown that it takes elk three to five years to adopt underpasses. This is one of the reasons to consider even larger structures to help the elk and deer be more willing to use them.

iii. Michelle noted there is an underpass that is 42' wide and 14' high on SH 9 across two lanes of traffic. Four years later elk are still hesitant to use it, and deer are also slightly hesitant. The 211 is 14' tall and 16' wide and under six

lanes (this is a different purpose, by Eisenhower, but team members could go look at the size).

iv. Jonathan pointed out that moose have been seen in CDOT video using crossing structures. So there may be another species to consider.

v. Michelle brought up preference for a 14'x80' arch underpass (not a box culvert).

1. Deer prefer larger structures according to Michelle.
2. Typically takes animals 5 years to adopt smaller box structures.
3. Jonathan noted that the team is continuing to study to ensure that what gets constructed get used by animals.

vi. Michelle noted she is glad to see the team taking into consideration Julia's comments.

j. MP 187.8

i. A small underpass is proposed here. There is a lot of small animal activity here. Research shows lynx like to cross in this area where suitable habitat (indicated by presence of prey such as snowshoe hares and pine squirrels) is located on both sides of the highway. They also prefer natural crossings where streams intersect roads.

k. MP 188.3

i. This is the largest structure proposed.

ii. This should be large to accommodate elk if they choose to use it. There is no elk collision evidence to suggest that a problem exists. Although no current evidence of elk crossing activity in this area, they may once suitable crossing structure is placed. May not be crossing in area because of I-70 as barrier.

iii. Julia recommended a 16' x 80' arch with vegetation because there is research showing elk prefer to use arches for underpasses.

l. MP 188.7

i. A 4-6' structure is recommended for small to medium animals. Julia recommended 6-foot.

ii. Adding structure to the substrate will improve the use.

iii. Studies show that a smaller adjacent pipe would improve use.

iv. Adding vegetation on either side will also improve use.

m. Entire Project Area

i. Research has been shown that shelves installed within any existing drainage structures crossing the highway would be used by small mammals such as mice, voles, etc.

ii. Will be examining improving bat habitat under existing bridges, as recommended in the 2011 study.

iii. Vail Pass accumulates more snow than Banff. The Banff study has been used a lot as reference, so this needs to be kept in mind. Snow may block some structure openings if using Banff guidance. The team is considering designing the structures long enough so the openings extend away from the road and they don't get blocked by plow casting.

iv. Michelle recommended a lynx crossing between the interchange at 190 and the sand shed. John noted that the project team looked at this. In general, the topography isn't friendly for this, but there is a potential for one spot south of the truck parking. It could be two separate culverts with an opening in the median.

v. Michelle obtained lynx data from John Squires from 2010-2011. There are two females and two males that had a lot of movement on the west side. Successful female cross at 189.7. This is what spurred Michelle's recommendation for the lynx crossing at the top of the pass.

vi. Michelle questioned if culvert at 188.6-188.7 was part of the original discussion? Yes. Michelle noted this should also be enlarged because this will likely fill with snow in winter. The 4x4' should be made 6x6' or 8x8'.

vii. Michelle noted that Julia suggested for larger structures (especially 188.4) will need barriers to prohibit snowmobiles from using the structures (a barrier such as concrete bollards, which allows animals but not snowmobiles). John suggested additional signage could be paired with this. Michelle suggested the signage will be ignored. Jeff noted that snowmobilers use muddy pass crossing and signs have not deterred them. John suggested this should be taken into account in the detailed final design phase.

viii. John asked if there is a reason snowmobiles aren't allowed to go past Black Lakes. Dick Cleveland noted that it is part of travel management plan to prohibit them. Michelle suggested it was because of wildlife.

ix. Jonathan noted that skiers coming down East Vail chutes at MP 183 diminish the benefits of the wildlife crossing there.

x. Kristen asked if there is a big difference in effectiveness between underpasses and overpasses. Jonathan noted that there is evidence that overpasses are great for larger animals since they are more willing to use them. However, underpasses are also used by all of those species. The target species in this area aren't really the ungulates. In this area it seems more beneficial for more underpasses than one or two large overpasses.

xi. Kristen asked how to mitigate for snow plow casting. John said Julia recommended 80' wide underpasses. John noted this would mean a bridge in those locations. At 187.4, for instance, this is one of the highest accident locations already. Building a bridge here would add another ice hazard on the roadway. There are some variables to consider before recommendations

are finalized. There are some locations where the roadway dips down, where there could be an opportunity to build a bridge and flatten the roadway.

xii. Michelle noted that the CO 9 overpasses were never planned to accommodate big horn sheep, but they do use it. So, even though big horn sheep are not expected to cross I-70 on Vail Pass, they may use a crossing if it is provided. CPW released big horn in Gore range that are moving east.

xiii. Michelle commented that 22,000 mule deer crossings were documented using the CO 9 five underpasses and two overpasses in a three-year period. Not migratory, but building a larger structure to encourage more crossing would improve the situation. She agreed with recommendation for more underpass structures.

xiv. Jonathan showed tables from the Banff study to show that WVP target species used both overpass and underpasses. Banff study of five - 23' wide by 12' tall structures at 190' in length had a 76% success rate of deer using structure. No studies have yet to report a structure as 100% effective, as either an overpass or underpass

5. Aquatic Recommendations

a. CPW strongly believes fish barriers at Pitkin, Miller, and Polk Creek need to be maintained and/or improved to protect upstream cutthroat trout conservation population.

b. The 2011 recommendation was to use culverts to restore streams flowing below bridges.

c. Jonathan and Kendall agreed that the threat of the contamination from mag chloride, petro chemicals, sand, etc. supersedes the recommendation to pull culverts to improve aquatic habitat.

d. Michelle noted that pipes are not CPW's preferred improvement. They create a barrier for animals to cross the stream. In areas where there is an open stream, there isn't a need to cover it because the pollution and plow casting can enter anywhere else along the stream. This could also cause maintenance problems. She suggested maybe sediment traps could be more useful.

e. The biggest thing will be to maintain and repair fish barriers.

6. Trail Realignment Options

a. John reviewed comments received regarding trail alignments (see PowerPoint). Highlights include:

i. Need to fix sight distance and radius of curve near 185.2.

ii. Kevin Sharkey with Eco Trails has provided a lot of feedback, including a recommendation to widen trail to 14-feet where possible.

iii. Shared sentiment has been to keep the trail away from the creek.

iv. Add etiquette signs to encourage good interactions (passing lane mentality).

v. Need to keep trail open during construction.

vi. Karen noted that all of the ITF and public feedback is being considered and incorporated and will be shared at Technical Team (TT) meeting #8.

b. Karen emphasized that the trail challenges are balancing the recreational needs with environmental, and the team is looking at it from many avenues.

c. Michelle asked how sediment is considered in the trail design. John noted that there has been discussion to strategically locate the trail between the creek and the highway, add a concrete pan to collect the sediment. However, this is not yet decided and could create a safety issue on the trail. More investigation is needed and this will be discussed with the SWEEP ITF.

d. Trail alignments were reviewed by Tyler Bowman (see PowerPoint slide).

i. All three options have pros and cons, and more investigation is needed before a decision can be made. All involve moving the portion of the trail that is currently adjacent to the highway, and all tie into the same places at either end.

ii. Mid slope – closest to existing.

1. Constructability challenges of building a trail near the existing

2. Less environmental impact

iii. Intermediate – hybrid of the existing and across the creek.

iv. Creek – crossing to the after side of the creek.

1. More environmental impacts

e. Jonathan reviewed the trail alignment option matrix. He noted that his comments are from a wildlife perspective only, which is a viewpoint that can typically be in conflict with user experience perspective.

i. From wildlife perspective, it is best to keep trail where it currently exists.

ii. Largest wildlife concerns are where the trail relocation will cut through wildlife habitat and threaten integrity of Black Gore Creek aquatic habitat. Also, walls are a concern.

iii. A 3,675 long wall is proposed with a maximum height of 23', around MP 186.

1. Michelle noted that even 4-6' tall wall is a barrier.

2. John noted the wall would get even taller if the trail is widened beyond the 10' that is assumed on the plans currently.

iv. Jonathan noted Option 2 may cause more problems because it goes through the forested habitat and crosses Black Gore Creek.

v. Michelle noted that there is a possibility to limit walls and limit crossings of the creek by using a hybrid alignment.

vi. Jonathan noted that between MP 186 and 187 there isn't as large of a wildlife presence.

vii. Jonathan summarized that overall from a wildlife perspective, the best course of action would be to avoid forest fragmentation, avoid disturbance of wildlife habitat, stay close to highway as possible, and avoid introducing another area of influence to wildlife habitat.

viii. Michelle said where MP 187 begins, would want to have the trail converge sooner to avoid more wall.

ix. Dick Cleveland can't support the trail as proposed due to potential impacts to water quality and animals. He suggested that this trail should be elevated similar to Glenwood Canyon, built on a very narrow footprint, put on whatever route works best for everyone else. It would reduce cutting forest, increase ability for all animals to cross area, cross avalanche chutes with minimal impact, span creeks without touching creek banks or riparian areas. It could be built all in advance and not disrupt trail use. Moving trail from ROW gives additional 50' of area for sediment control. If the trail was elevated there would no human impact. From a maintenance standpoint, it would require little to no maintenance (no roots pushing, no sedimentation). This would be a continuous bridge viaduct.

1. Michelle will think about how this will affect wildlife.
2. Would need a rail and would need to be aesthetically pleasing.
3. Jonathan noted that building the trail over the habitat may not have much benefit, because it is the presence of humans at all that has impact on many species.
4. Michelle and Jonathan thought it would reduce impact to water quality, but may not benefit wildlife as much.
5. Jeff noted that if the viaduct is cheaper than the huge walls, and there isn't a difference in a certain location wildlife-wise, maybe go with the viaduct.
6. Michelle noted the visual impacts from I-70 will also need to be considered.
7. Jonathan noted walls are barriers to all non-avian species.
8. John noted the raised viaduct could be used as another tool to dovetail with the other options in a combined solution.

x. Michelle noted Option 3 is very hard for Parks and Wildlife to support.

xi. John noted most of Vail Pass is not built on bedrock, it is on moving alluvial soil.

xii. Michelle noted on page 21 -22 wall will have minimal impacts to wildlife, as long as pink line is brought up to blue line before it gets to the crossing structure.

xiii. Michelle also suggested stream crossings should be limited. This will help limit human contamination of streams.

xiv. John noted people sometimes swim, fish and picnic at Basin of Last Resort (page 10).

xv. Jonathan noted that all wildlife species use riparian areas, and riparian habitat is the most important habitat. Plant and wildlife diversity along Black Gore Creek is thriving and we should avoid disturbing it.

xvi. Kara noted also need to consider this as a contributing feature in the historic district.

7. Next Steps for Trail Alignment

a. SWEEP meeting moved to end of January.

b. Additional USFS coordination.

c. Final recommendation will be presented at TT #8 in late February.

8. Upcoming Schedule

a. Design will be refined over the next month based on TT and ITF feedback.

b. CDOT and FHWA will make design decisions.

c. Next TT meeting in Feb/March 2019.

d. Decision document is expected in early 2020.

e. No final design or construction funding yet.

f. ***ACTION: ITF members should send any additional comments on today's information by January 4th.***

9. Wildlife Fencing Along Highway

a. Michelle questioned if with snow loads, should a higher fence be used (from 8 – 10 feet).

b. Jonathan noted that powder snow is different than sun-hardened snow or snow plow spray.

c. Paige Singer asked if there will be issues with maintenance to the fence in this area with so much snow.

d. ***ACTION: Alison Deans Michael will send information on CDOT Region 1 and Region 5 mesh/grates to Jonathan.***

e. Michelle noted that CPW would like to keep disturbance through entire project as small and narrow as possible, and not impacting any areas that could be avoided.

10. Additional Comments Received After Meeting

a. Jen Prusse feels strongly that Options 2 & 3 retaining walls will be an impediment to wildlife. Especially Option 3, since it could impede wildlife from accessing water source.

MEETING NOTES

PROJECT:	21685 I-70 West Vail Pass Auxiliary Lanes
PURPOSE:	SWEEP Issue Task Force Meeting #2
DATE HELD:	February 11, 2019
LOCATION:	Avon Library
ATTENDING:	Andy Herb, Alpine Eco Dave Cesark, Environmental Lead, CDOT Region 3 Paula Durkin, CDOT Region 3 Jen Klaetsch, CDOT Region 3 John Kronholm, Project Manager, CDOT Region 3 Becky Pierce, CDOT Devin Duval, Colorado Parks and Wildlife Taylor Elm, Colorado Parks and Wildlife Kara Swanson, Consultant Environmental Task Lead, David Evans and Associates Siri Roman, Eagle River Water and Sanitation District Caroline Byus, Consultant for Eagle River Water and Sanitation District Larissa Read, Consultant for Eagle River Water and Sanitation District Pete Wadden, Town of Vail Matt Klein, USFS Brad Bettag, Wood
COPIES:	SWEEP ITF Members

SUMMARY OF DISCUSSION:

1. Introductions & Agenda

a. Kara apologized that this meeting has been rescheduled three times in an attempt to better accommodate ITF member schedules and the weather, but still some are unable to attend today.
b. Karen offered one-on-one meetings with any ITF member requesting additional discussion.
c. Kara reviewed the agenda. Will discuss how SWEEP ties into future parts of the project.
d. Meeting goals- everything presented today ties back to the implementation matrix from the MOU

2. General Project Information

a. ITF Responsibilities
    i. Recommendations to take back to PLT – decisions lie with CDOT and FHWA – identify mitigation and enhancements
b. Project Purpose & Need
    i. Purpose and Need is to improve safety and operations on West Vail Pass
c. Recap SWEEP Meeting #1
    i. Introduction to the project, CSS, SWEEP MOU, - this was prior to field work or proposed action, reviewed list of background data sources, used to refine data work.
d. Project Status

i. Kara described the alternatives screening process.
    1. Criteria for Level 1 screening was based on Purpose and Need (P&N), if any alternative answered "no" to safety and operations questions, it was eliminated as CDOT cannot carry forward an alternative that does not meet P&N, other than the No Action. ,
    2. There were also criteria based on Core Values, but only ones that could easily be answered as "yes" or "no" since Level 1 is not a comparative analysis between alternatives and we didn't have enough information to answer "yes" or "no" for most of the Core Values. However, understanding that the Core Values are extremely important, many of them were used to develop the Level 2 criteria.
    3. After Level 1, only one action alternative met the P&N, which was the auxiliary lanes with curve and ITS improvements alternative. Because of that, the criteria from the Level 2 screening will actually be considered during the impact and mitigation assessment for the EA.
    4. After the Proposed Action was identified, there was an internal design team workshop and to start incorporating design options such as wildlife crossings, water quality, recreation path realignment, etc.
    5. The team also met with CPW and USFS to discuss wildlife and the trail.

ii. Caroline – when will you complete the EA? Kara – public can submit comments at any time, looking towards the end of the year for the EA. There will be a 30 day time period for public comment on the EA,

iii. Caroline – regarding public comments, how do the comments fit into the final report? Kara- the comments are included in the decision document,

iv. Larissa – will there be a draft and final EA? Kara – no, only the final EA for review and comment. Any changes would be included in the decision document.

e. Stakeholder Comments Summary
    i. Kara went through the slide –conversations and involvement of ITF will still happen as the project moves forward and into design

3. Sediment Management Implementation Flow Chart

a. The flow chart focuses on sediment management – water resources tech memo happens during the EA – this all feeds into the EA and decision document, blue box first and then move into the green box, will incorporate both project specific and other mitigation measures outside of the project

b. John – this EA will commit to re-doing the SCAP as part of the design process

4. Project-Specific SWEEP Implementation Matrix

a. Talks about how we are addressing each one of these categories

b. Sediment Management
    i. Brad reviewed the matrix. There are a lot of limits to what we can incorporate due to space. Developing maintenance manuals for BMPs. Continued monitoring in basin.

ii. 2002 SCAP project review – numerous SCAP recommendations have been implemented in the time since the 2002 SCAP. Those that are marked "complete" are green, partially complete are yellow. There were instances where certain BMPs were recommended but something else was implemented. Corridor has not been static. There has been noticeable improvement since 2002. Some things that have been implemented haven't been structural- better equipment and training, shoulder cleaning, increased use of deicing elements other than sand, etc.
iii. Not all recommended improvements have been implemented. What's next? Low-hanging fruit have been implemented. A lot of the additional BMPs would be good to implement with large project construction. Opportunities for BMPs to be installed when traffic is being diverted. Since 2002 there has been a lot innovations in BMP technologies. Project team has been looking at other states and SCAPs for ideas.
iv. Taylor- are the "green" BMPs still going to work with the proposed action? Brad- if the BMP will be impacted by the alignment, we will have to replace or mitigate for it.
v. Siri- what level of detail will be in the EA vs. what will come later? The concepts will be identified in the EA but will not specifically where items will go because we're only at conceptual design. At the decision document we will describe the intent.
vi. Don't make water quality an afterthought- input from stakeholders will continue throughout the EA process.
vii. Funding? CDOT is trying for a freight grant. Will look at phasing for other funding options. Can't be funded solely from asset funding. There are other funding options out there, but need to have a phasing plan in place. The project will be assessing impacts and mitigation as a project as a whole and not be identified piecemeal. This corridor is #1 for crashes per volume of traffic in the state.
viii. Pete- back to the alternatives- we looked at several different options of alternatives. Did they consider other options such as traction law enforcement, carpooling, etc. We had a PEIS, which identified a preferred alternative. The PEIS identified and implemented non-structural measures for the I-70 Corridor. We took it a step beyond that and analyzed additional alternatives. A TDM type alternative wouldn't have necessarily helped with safety.
ix. Brad described project-specific BMPs. Will describe locations the type of BMPs that may be useful at that location. The BMP menu will allow the designers to pick and choose BMPs based on intent, site constraints, etc.
x. USFS- have any of the BMPs in the menu been previously installed from the 2002 SCAP? Yes, some have, others have been used on other projects. These have also been vetted with CDOT maintenance in terms of ease of maintenance. Type D WQ inlet- Brad discussed the pros of them. But may not be good because of the volume of sediment. Karen- we compiled BMPs we know work well and others we found through research.
xi. The goal isn't necessarily to fill in everything from the 2002 SCAP but to create a new one that looks at feasibility of the previous recommendations, changes in roadway alignment and what's feasible.

xii. When does the analysis occur for sediment loading? When does modeling occur? Usually there will be initial examination during the alignment. There are also very specific requirements for the technical report for the EA that can be found in CDOT's NEPA manual.
xiii. How will this project enhance the environment? Proactive rather than reactive. Instead of a band-aid, it's a holistic approach. From a wetland perspective, there are opportunities for wetland enhancement. Looking at areas where we can enhance wetlands. We have the opportunity to be proactive. Can attract wildlife and have them use the underpasses.
xiv. In terms of the sediment impacts in the future- are you trying to capture 100%? It's always the goal, but can't guarantee anything. We will try as best as possible to capture everything but there may be areas we miss. We need to honor where we are in the process. Andy- also talking about redundancy- not just going to drop an inlet in. There will be secondary and tertiary opportunities as well- veg swales, riparian enhancement.
xv. Siri- thinks there should be adaptive management. The ERWSD wants it documented well. Less interested in what we're implementing but focused more on the intent of the mitigation measure. Let's focus on the science- what can we achieve? Would like to see defined goals.
xvi. Larissa- when would the SCAP update happen? A little more definition of the timeline of when the SCAP will happen.
xvii. John- some of the items for the SCAP update may be outside the scope of this project. Monitoring the steam would be one of those. This project will implement the construction of physical features within the project limits and does not pay for other items, such as monitoring. Monitoring has already been put into place by the State since 2001 and is on-going.
xviii. Martha- Collaborative Effort ensures that the PEIS is followed.
xix. Karen- how has CDOT's approach been in the past? Jen- Straight Creek- TMDL was done right after the SCAP was completed. Committed to 25% of sand pick-up. Continue to track that and just revisited past numbers. Varies year to year – lots of variables. Have been talking to maintenance about the variances.
xx. Karen- will need to talk as an organization on how we can commit to meeting our goals. Can we even commit to a certain level of chlorides?
xxi. Siri- structures only work as well as they're maintained. Could you look at averages for goals? The board talked about it last month. They really want to have a monitoring approach- doesn't matter how it happens, just that we work together to do it.
xxii. Larissa- monitoring is integral. A FONSI needs to be truly a FONSI. They need more confidence in what "no significant impact" means since FHWA doesn't have a standard for what significant is.

c. Section 303(d)
   i. Brad reviewed 303d listing for BGC. BGC has been delisted from 303d for Macroinvertebrates, but is still listed as M&E. The stretch of BGC above Miller Creek has also been delisted from 303d for sediment. The lower portion remains 303d listed for sediment. We are specifically targeting sedimentation impacts and that we are addressing those concerns with this project.

ii. Siri- Dave Reece is sampling macroinvertebrates. New data is available linking macro to mag chloride. Siri would be happy to have Dave present to the project team.

d. Wetlands Protection
   i. Andy presented an update on the wetland information. Andy conducted field work this past summer/fall. All mapped wetlands are shown on the handout maps. Wetlands were mapped based on hydrophytic vegetation and hydrology, not soils. When we are ready to permit, they will be officially delineated. Andy also recorded wetland type, classification, water source, stressor, photos, and mapped them. Each wetland was given a score – A, B, C, D. there are some "A" wetlands. A lot of other "B" ones. Ones close to the road are "D" as they are primarily created by roadway runoff.
   ii. Where are the high-functioning wetlands and what do they mean to the project? They will be color-coded on maps but the only way to determine if there are fens/peatlands is to check soil, which will be done in 2019.
   iii. Larissa- will wetlands be analyzed in the EA? Yes.

e. Maps
   i. A couple highlights- MM 182. Wetland study area is the green line. There may appear to be truncated but it's just because of the study area. MP 184- there are some big wetlands above Timber Creek. As you travel up the pass, MP 187- large wetland complexes along Black Gore Creek and more and more wetlands as you go higher in elevation. Andy has identified wetland enhancement/mitigation opportunities, which can be included in the EA. The actual mitigation package will be done when it's time to permit the project.
   ii. Will do the soil confirmation for fens after the snow is gone.
   iii. USFS and CNHP both did fen studies, we have that data.
   iv. Generally, wetlands closer to the road are lower quality and stormwater fed, with a few exceptions. Creeks and tributaries hold a lot of restoration/enhancement opportunities.

f. Special-Status Aquatic Species
   i. Jonathan Lowsky is our biologist and has been talking to Kendall with CPW and the USFS. The USFS doesn't recognize any special status species in this area. CPW does recognize native cutthroats in some tributaries. Our recommendations are to maintain the existing fish barriers. There are other tributaries near 183 – at the ALIVE meeting we discussed whether we should remove the culverts and restore the tributaries or keep the culverts in place. The decision was made to keep everything in place because an open channel could fill with sediment.
   ii. * Follow up with Jonathan on the toads. There is a beaver pond/wetland area there too. The pond is outside of the project limits.
   iii. Caroline- how far west does the project start? East Vail. 180-190. Another concern is the potential for accidents/spills for hazardous materials. How does that factor in to this project? Karen: We haven't looked at it yet. Martha: The responsible party (trucking company) is responsible for the impacts. We are looking at improving truck ramps.
   iv. Existing BMPs could be improved to help reduce the hazmat reaching the creeks. Existing BMPS have helped collect hazmat spills, an example is the

hydrochloric acid spill at MP 183 that a sediment pond helped to capture and prevent the spill from spreading.

g. Aquatic Species as a Recreational Resource
    i. Pete – gold medal fisheries are downstream (5 miles). Impairments start in East Vail. It's been worse in Gold Medal section. East Vail area – there is a very definite impact to macroinvertebrates. Could be close proximity to highway. More pavement along with other impacts cause issues in the creek. In that area, the highway is primary land use and there is concern about macroinvertebrates.
    ii. Siri- The downstream Gold Medal Fishery should be considered. Thinks it should at least be acknowledged as an input. She thinks that if we have enhancements from the project that it would directly improve that area too.
    iii. Martha- macroinvertebrates goes down near East Vail to the wastewater treatment plant?
    iv. Vail tends to deemphasize impacts from I-70 since residents don't have much control over that.
    v. Siri - Impacts to the Gold Medal stream are from urbanization of Vail
h. Information and Research Needs
    i. Jen presented the water quality monitoring reports for Black Gore Creek- what's measured and when. CDOT has been monitoring BGC since 2001 and issues reports every 3 years.
    ii. Connectivity and chloride are measured year round. Turbidity probes are used in high run-off times.
    iii. With suspended sediments there is a correlation to erosion. Phosphorus was also found to be high. Highway runoff is dominated by chlorides. Sodium chloride is high as well as mag chloride. This data has been shared with other groups and the consultant will summarize the 18 years of data and share it.
    iv. Siri- for mag chloride- are there proprietary ingredients? Jen- had talked to maintenance but they haven't gotten the MSDS sheets yet. We can try to get those again. Pete- Chris Kobesach- CSU- worked with CDOT and got the slurry to do his tests and the impact of that product on water quality.
    v. Siri- take the wet effluent and test that. Kara requested that ERWSD send any results they may have.
    vi. Jen- the "ice-slicer" mixed with sand is also used, which is proprietary.
i. Trail Discussion
    i. *send out the 11x17s of the trail relocation maps and the detailed matrix. Add sections that are within 100 feet of the creeks.
    ii. The end result will likely be a hybrid of the alignments shown today. John reviewed the three different alignments. Least impactful one is likely the one between the current road and the creek. The stretch that we're impacting is 2.5/3 miles of the trail. We will leave the rest of the trail where it is currently. Feedback we're looking for is for concerns regarding locations of trail realignment.
    iii. Pete- minimize creek crossings – there is more potential for people to use the creek. User experience is important but keeping it on the same side as the road and use walls or barriers to separate the trail from the road.

iv. Taylor- crossings and wetland impacts are a concern – should minimize the trail paralleling the creek through wetlands. Try to make crossings perpendicular instead. Will talk to Kendall after this as well.
v. Devin- sediment accumulation on path that could run off is a concern. Should mitigate the runoff from the path.
vi. Pete- might be opportunities to also capture sediment from path. Karen- yes, we've been discussing that.
vii. USFS – have you looked at how potential walls could interact with wildlife crossings? Yes, these areas were identified and moved where appropriate.
viii. Andy- most of the orange alignment is not in wetlands with the exception of higher up.

5. Schedule and Next Steps

a. Matt- please let the USFS know if we do have any data needs.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
134 Union Blvd
Lakewood, Colorado 80228

In Reply Refer to:
FWS/IR05/IR07/COFO

TAILS: 06E24000-2020-F-0471

June 12, 2020

Stephanie Gibson
Federal Highway Administration – Colorado Division
12300 West Dakota Avenue, Suite 180
Lakewood, Colorado 80228

Dear Ms. Gibson:

The U.S. Fish and Wildlife Service (Service) received your request for formal consultation on December 17, 2019, regarding the addition of auxiliary lanes on I-70 eastbound and westbound on the west side of Vail Pass from milepost 180-190 in Summit County, Colorado. The project will be constructed by the Colorado Department of Transportation (CDOT) with funding from the Federal Highway Administration (FHWA). Your letter initiated formal consultation for the federally threatened Canada lynx (*Lynx canadensis*) and determined that the proposed project is likely to adversely affect the species.

This letter transmits our biological opinion regarding the proposed project in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq*.) and the Interagency Cooperative Regulations (50 CFR 402).

In this biological opinion, we find that the proposed project may affect the Canada lynx, and that the actions carried out pursuant to the proposed project are not likely to jeopardize the continued existence of the species. The proposed project does not occur in, or in the vicinity of, critical habitat; therefore, none will be affected.

We base this biological opinion on the December 2019, biological assessment prepared by Colorado Wildlife Science, LLC, and the April 13, 2020, amendment, as well as any additional clarifying correspondence.

Consultation History

As part of the initial National Environmental Policy Act (NEPA) analysis, a Tier 1 Environmental Impact Statement (EIS) for the I-70 Mountain Corridor (C-470 to Glenwood Springs) was completed in 2011. This EIS, the I-70 Mountain Corridor Programmatic Final Environmental Impact Statement (I-70 Final PEIS), recommended the addition of auxiliary lanes eastbound and westbound on the west side of Vail Pass from MP 180-190 as part of the minimum program.

"A Landscape Level Inventory of Valued Ecosystem Components" (ALIVE) Memorandum of Understanding (MOU), which focuses on Wildlife/Vehicle Collisions (WVC) and habitat connectivity, was signed in April 2008 and was developed during the NEPA process that was completed for the I-70 Mountain Corridor Final PEIS. The MOU details the responsibilities of each agency in addressing a project. The agency and public scoping process includes working with the ALIVE Committee to fulfill the commitments set forth in the 2008 MOU. These commitments can be found in the MOU and in the biological assessment.

Meetings to discuss the project and solicit input from environmental specialists and resource agencies were held throughout 2018 and 2019. These included some agency-specific meetings and meetings with various technical teams as detailed in the biological assessment.

On December 17, 2019, we received your request for formal consultation, and on April 13, 2020, we received an amendment to the biological assessment.

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BIOLOGICAL OPINION

1. DESCRIPTION OF THE PROPOSED ACTION

The I-70 West Vail Pass Auxiliary Lanes project is located in Eagle and Summit Counties, with the eastern terminus just east of the Vail Pass Rest Area and the western terminus in the Town of Vail. The project area limits include eastbound and westbound I-70 from milepost 179.5 to milepost 191.5 (Figure 1). The project is needed to address safety and operational concerns due to highway geometric conditions (steep grades and tight curves) and slow-moving vehicle and passenger vehicle interactions that result in inconsistent and slow travel times along the corridor.

The proposed action will add a 12-foot auxiliary lane, both eastbound and westbound, for 10 miles from approximately the eastbound I-70 on-ramp in East Vail (milepost 180) to the westbound off-ramp at the Vail Pass Rest Area exit (milepost 190). Existing lanes will be maintained at 12 feet and the shoulders will be widened to a minimum of 6 feet for inside shoulders and be maintained at 10 feet for outside shoulders. All existing curves will be modified as needed to meet current federal design standards.

Intelligent Transportation System equipment will also be installed along the I-70 project corridor. Additional variable message signs will be installed at key locations to warn drivers of upcoming curves, grades, and incidents. Additional variable speed limit signs will be installed to manage driver speeds to conditions. Automated lane closure signage will be installed approaching the East Vail exit on eastbound I-70 and approaching the westbound I-70 Vail Pass Rest Area exit to quickly and efficiently close lanes when needed.

Additional elements of the proposed action include:

- The Vail Pass Recreation Trail will be relocated for approximately two miles from milepost 185 to milepost 187.
- Existing emergency truck ramps, located at approximately milepost 182.2 and 185.5, will be upgraded to current design standards.
- Six wildlife underpasses and wildlife fencing will be constructed throughout the corridor.
- Capacity will be added to the existing commercial truck parking area at the top of Vail Pass.
- Shoulders will be widened (minimum of eight feet of additional width beyond the 10-foot shoulder) at multiple locations to accommodate emergency pull-offs, emergency truck parking, and staging for tow trucks.
- Median emergency turnaround locations to accommodate emergency and maintenance turnaround maneuvers will be improved.
- The chain station located at approximately milepost 182.5 will be improved with additional parking, signage, lighting, and separation from the I-70 mainline.
- Avalanche protection located at approximately milepost 186.

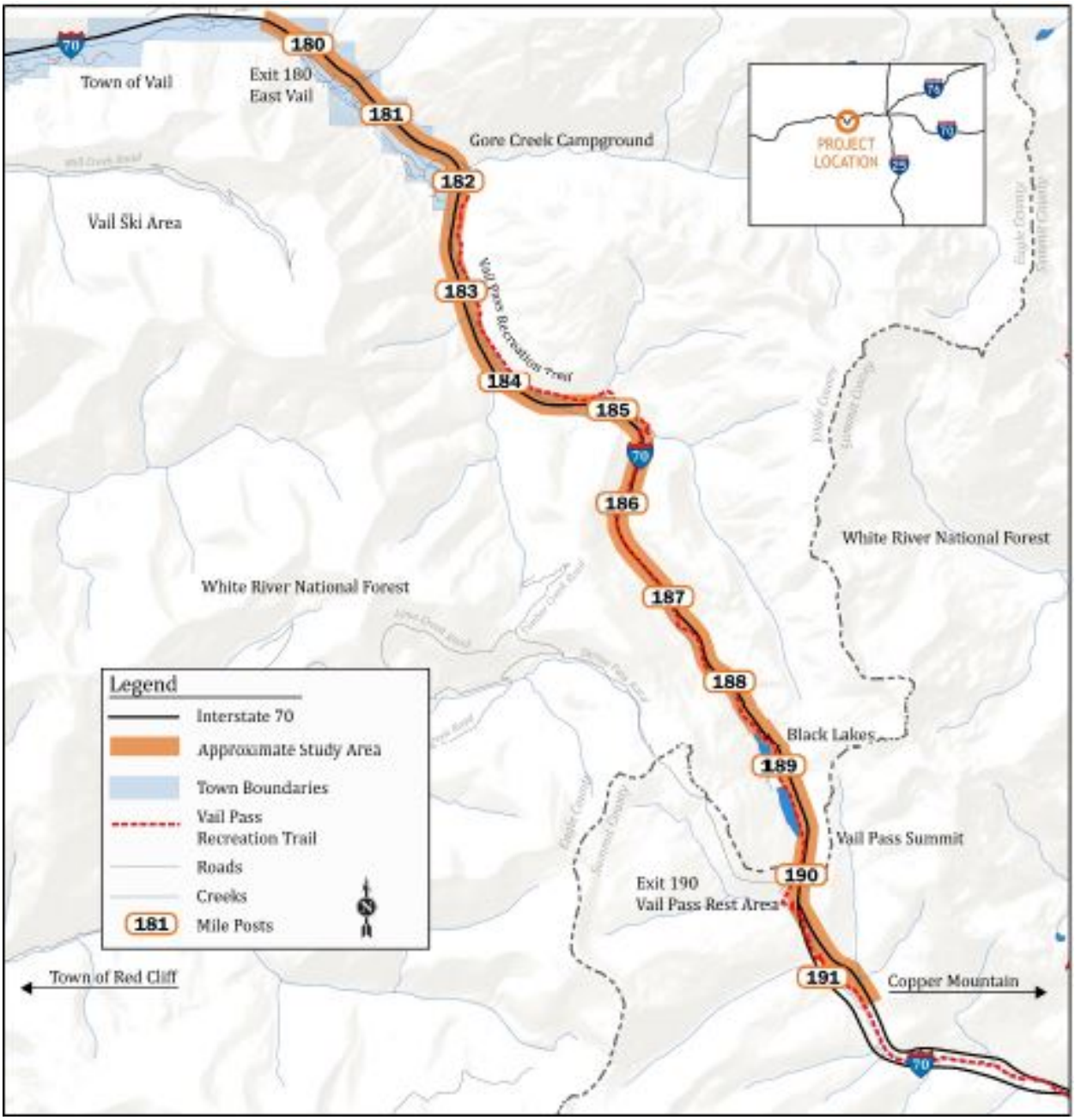

Figure 1. Project location. Map provided by Colorado Wildlife Science, LLC.

1.1. Conservation Measures

Conservation measures are actions outlined in the project description that the project proponent will implement in order to reduce the environmental impacts of the action or promote the recovery of threatened and endangered species. The Service considers the beneficial effects of these conservation measures during the jeopardy and adverse modification analyses. Conservation measures are part of the proposed action and their implementation is required under the terms of this consultation.

Project Design Features (PDF) have been incorporated into the proposed action to minimize potential impacts to various resources from construction and implementation of approved project components. PDFs include, but are not limited to, best management practices, standards and guidelines, and standard operating procedures. The bulk of the PDFs are considered common practices CDOT has historically used in sub-alpine and montane environments to avoid or minimize potential resource impacts. Recommended PDFs also include measures recommended in the ALIVE MOU, I-70 Mountain Corridor PEIS, and other relevant studies and reports, as described in Tables 11, 12, and 13 of the biological assessment.

Six new wildlife crossing structures (underpasses) will be constructed between mileposts 185.0 and 191.5. Wildlife fencing will be installed on both sides of the highway throughout the project corridor to prevent wildlife-vehicle collisions (WVCs) and guide animals to crossing structures. Two of these crossing structures will be large mammal underpasses (mileposts 187.4 and 188.3). The target species for this category of wildlife passage are black bear (*Ursus americansus*), Canada lynx, elk (*Cervus canadensis*), moose (*Alces alces*), mountain lion (*Puma concolor*), and mule deer (*Odocoileus hemionus*). The minimum dimensions of this classification of structure are 23 feet wide x 13 feet tall for an arch opening and 20 feet wide x 10 feet tall for a box structure. The proposed size of the underpass will be further defined in final design, but is not expected to be more than 150 feet in length, inclusive of snow catchment area. The other four crossing structures will be small to medium mammal underpasses (mileposts 186.9, 187.8, 188.7, 189.7) with the target species to include American marten (*Martes americana*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), yellow-bellied marmot (*Marmota flaviventris*), small mammals, short-tailed weasel (*Mustela erminea*), and snowshoe hare (*Lepus americanus*). The minimum size for the locations under consideration should be six-foot diameter culvert or similar sized concrete box.

Additional conservation measures that will be implemented to fulfill responsibilities set forth in the ALIVE MOU to improve wildlife movement and reduce habitat fragmentation in the area include:

- Installing wildlife fencing from west of the bridge at milepost 181.0 east through the entire project corridor to prevent WVCs and to guide animals to all of the crossing structures.
- Installing wildlife escape ramps throughout project area at a minimum of every 0.25 miles. Ramps will be built following the most current design specifications to improve wildlife use.
- Installing small mammal shelves within drainage and stream crossing culverts wherever feasible to increase below grade crossing opportunities for smaller animals.

- Maintaining or installing woody vegetation at either side of crossings for cover and light attenuation.
- Including measures to minimize snow loading in front of crossing structures during crossing structure design.
- Placing coarse woody material and rocks at the entry and within each crossing structure to provide cover and promote use by smaller animals.
- Incorporate "wildlife lanes" where site conditions allow, within any crossing structure intended for or that may otherwise be used by people as shown in Figure 12 of the biological assessment. Such lanes will be separated by grade from crossing intended for people (i.e., trail) and will include coarse woody material and rocks at the entrances and within the crossing structure to provide cover and promote use by smaller animals.
- Placing retaining walls such that they do not impede wildlife movement or use of crossing structures and outside of lynx habitat, where possible.
- Directionally shielding temporary lighting used during construction to focus the lighting onto the driving surface. Permanent lighting will be "dark sky" compliant and shine only on the area(s) that need to be illuminated. Permanent lights will be on only when necessary (i.e., at chain stations only when chain-up or chain-down is necessary).
- Monitoring lighting to ensure that it does not exceed the approved lighted area and that lights are on only when necessary.

Conservation measures are thoroughly described on pages 36-43 of the biological assessment.

2. ACTION AREA

The action area is not only the immediate area involved in the action, but also includes all areas to be affected directly or indirectly by the federal action (50 CFR § 402.02). The action area contains the most far-reaching potential effects of the federal and non-federal actions on the species being discussed. The action area is defined by measurable or detectable changes in land, air, and water or to other measurable factors that will result from the proposed action. In other words, the action area is not limited to the "footprint" of the action, but rather encompasses the biotic, chemical, and physical impacts to the environment resulting directly or indirectly from the action.

For the purposes of this analysis, the action area is the 114,613-acre Cache Lynx Analysis Unit (LAU), the-82,870-acre Camp Hale LAU, and the 36,995-acre Ten Mile LAU.

3. STATUS OF THE CANADA LYNX

Status of the species is based on an analysis of appropriate information on the species' life history, habitat and distribution, and other data on factors related to its survival and recovery. This analysis considers the effects of past human and natural activities or events that have led to the current condition of the species. This information is usually presented in listing documents and refined in recovery plans (Endangered Species Consultation Handbook 1998).

The lynx was added to the list of threatened species on March 24, 2000 (65 FR 16052). We concluded that the single factor threatening the contiguous United States Distinct Population Segment (DPS) of lynx was the inadequacy of existing regulatory mechanisms, specifically the

lack of guidance for conservation of lynx in National Forest Land and Resource Management Plans and Bureau of Land Management (BLM) Land Use Plans. On July 3, 2003, we published a clarification of findings in the Federal Register (68 FR 40076) determining that threatened species designation was appropriate for the lynx. We published a final rule to designate critical habitat for the Canada lynx in the contiguous United States on November 9, 2006 (71 FR 66007); the critical habitat designation did not include Colorado. On February 25, 2009, the Service published its final rule designating critical habitat for lynx. Habitats within Colorado were not included in the final rule. Therefore, this biological opinion will not analyze effects to critical habitat as none will be affected.

3.1. Distribution

The historical and present range of the lynx north of the contiguous United States includes Alaska and that part of Canada that extends from the Yukon and Northwest Territories south across the United States border and east to New Brunswick and Nova Scotia. In the contiguous United States, lynx historically occurred in the Cascades Range of Washington and Oregon; the Rocky Mountain Range in Montana, Wyoming, Idaho, eastern Washington, eastern Oregon, northern Utah, and Colorado; the western Great Lakes Region; and the northeastern United States region from Maine southwest to New York (McCord and Cardoza 1982; Quinn and Parker 1987). A thorough discussion and interpretation of lynx records through time is found in the Service's final rule (March 24, 2000, 65 FR 16052) and clarification of our findings (July 2003; 68 FR 40076).

The distribution of lynx in North America is closely associated with the distribution of North American boreal forest (Agee 2000). In Canada and Alaska, lynx inhabit the classic boreal forest ecosystem known as the taiga (McCord and Cardoza 1982; Quinn and Parker 1987; Agee 2000; McKelvey et al. 2000b). The range of lynx extends south from the classic boreal forest zone into the subalpine forest of the western United States, and the boreal/hardwood forest ecotone in the eastern United States (Agee 2000; McKelvey et al. 2000b). Forests with boreal features (Agee 2000) extend south into the contiguous United States along the Cascade and Rocky Mountain Ranges in the west, the western Great Lakes Region, and along the Appalachian Mountain Range of the northeastern United States. Within these general forest types, lynx are most likely to persist in areas that receive deep snow (Ruggiero et al. 2000). Lynx are rare or absent from the wet coastal forests of Alaska and Canada (Mowat et al. 2000).

At its southern margins in the contiguous United States, forests with boreal features, or southern boreal forests, become naturally fragmented as they transition into other vegetation types. Southern boreal forest habitat patches are small relative to the extensive northern boreal forest of Canada and Alaska, which constitutes the majority of lynx range. Many southern boreal forest habitat patches within the contiguous United States cannot support resident populations of lynx and their primary prey species.

The complexities of lynx life-history and population dynamics, combined with a general lack of reliable population data for the contiguous United States, make it difficult to ascertain the past or present population status of lynx in the contiguous United States. It is difficult to determine with certainty whether reports of lynx in many States were (1) animals dispersing from northern populations that were effectively lost because they did not join or establish resident populations,

(2) animals that were a part of a resident population that persisted for many generations, or (3) a mixture of both resident and dispersing animals.

3.2. Home Range and Dispersal

Individual lynx maintain large home ranges reported as generally ranging between 12 to 83 square miles (Koehler 1990; Aubry et al. 2000; Squires and Laurion 2000; Squires et al. 2004; Vashon et al. 2005). The size of lynx home ranges varies depending on abundance of prey, the animal's sex and age, season, and the density of lynx populations (Koehler 1990; Poole 1994; Slough and Mowat 1996; Aubry et al. 2000; Mowat et al. 2000; Vashon et al. 2005). When densities of snowshoe hares decline, for example, lynx enlarge their home ranges to obtain sufficient amounts of food to survive and reproduce. Preliminary research supports the hypothesis that lynx home ranges at the southern extent of the species' range are generally large compared to those in the core of the range in Canada (Koehler and Aubry 1994; Apps 2000; Squires and Laurion 2000). In the Southern Rockies, lynx home ranges include 15 to 50 square miles (Reudiger et al. 2000).

The primary factor driving lynx behavior and distribution is the distribution of snowshoe hare, their primary prey. Lynx are highly mobile and have a propensity to disperse long distances, particularly when prey becomes scarce (Mowat et al. 2000). Cover is important to lynx when searching for food (Brand et al. 1976). Lynx have been observed (via snow tracking) to avoid large openings (Koehler 1990; Staples 1995) during daily movements within the home range, seeming to prefer to move through continuous forest, using the highest terrain available such as ridges and saddles (Koehler 1990; Staples 1995). Lynx often hunt along edges (Mowat et al. 2000). Kesterson (1988) and Staples (1995) reported that lynx hunted along the edges of mature stands within a burned forest matrix, and Major (1989) found that lynx hunted along the edge of dense riparian willow stands. In Montana, lynx preferentially foraged in spruce-fir forests with high horizontal cover, abundant hares, and large diameter trees during the winter (Squires et al. 2006). Lynx tended to avoid sparse, open forest and forest stands dominated by small-diameter trees during the winter.

Lynx also make long distance exploratory movements outside their home ranges (Aubry et al. 2000; Moen et al. 2004). Areas or habitats used by lynx during dispersal or exploratory movements are poorly understood at this time. Evidently, lynx are able to traverse expanses of diverse habitat types and conditions during their movements. Dispersing lynx may colonize suitable but unoccupied habitats, augment existing resident populations, or disperse to unsuitable or marginal habitats where they cannot survive. Lynx are capable of dispersing extremely long distances (Mech 1977; Washington Department of Wildlife 1993); for example, a male was documented traveling 370 miles (Brainerd 1985). Lynx disperse primarily when snowshoe hare populations decline (Ward and Krebs 1985; Koehler and Aubry 1994; Poole 1997). Subadult lynx disperse even when prey is abundant (Poole 1997), presumably as an innate response to establish home ranges. During the early 1960s and 1970s, numerous lynx were documented in atypical habitat, such as in North Dakota. In those years, harvest returns indicated unprecedented cyclic lynx highs for the 20th century in Canada (Harger 1965; Mech 1973; Gunderson 1978; Thiel 1987; McKelvey et al. 2000b). Many of these unusual observations were probably dispersing animals that either were lost from the population or later returned to suitable habitat.

3.3. Diet

Snowshoe hares are the primary prey of lynx, comprising 35 to 97 percent of the diet throughout the range of the lynx (Koehler and Aubry 1994). Other prey species include red squirrel (*Tamiasciurus hudsonicus*), grouse (*Bonasa umbellus*, *Dendragopus* spp., *Lagopus* spp.), flying squirrel (*Glaucomys sabrinus*), ground squirrel (*Spermophilus parryii*, *S. Richardsonii*), porcupine (*Erethrizon dorsatum*), beaver (*Castor canadensis*), mice (*Peromyscus* spp.), voles (*Microtus* spp.), shrews (*Sorex* spp.), fish, and ungulates as carrion or occasionally as prey (Saunders 1963; van Zyll de Jong 1966; Nellis et al. 1972; Brand et al. 1976; Brand and Keith 1979; Koehler 1990; Staples 1995). Winter food items in Montana included snowshoe hare (96 percent), red squirrel, and grouse (Squires and Ruggiero 2007).

During the cycle when hares become scarce, the proportion and importance of other prey species, especially red squirrel, increases in the diet (Brand et al. 1976; Apps 2000; Mowat et al. 2000). However, a diet of red squirrels alone might not be adequate to ensure lynx reproduction and survival of kittens (Koehler 1990). In northern regions, when hare densities decline, the lower quality diet causes sudden decreases in the productivity of adult female lynx and decreased survival of kittens, which causes the numbers of breeding lynx to level off or decrease (Nellis et al. 1972; Brand et al. 1976; Brand and Keith 1979; Poole 1994; Slough and Mowat 1996). Relative densities of snowshoe hares at southern latitudes are generally lower than those in the north, and differing interpretations of the population dynamics of southern populations of snowshoe hare have been proposed (Hodges 2000b).

Snowshoe hares have evolved to survive in areas that receive deep snow (Bittner and Rongstad 1982). Primary forest types that support snowshoe hare are subalpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmannii*), Douglas-fir (*Pseudotsuga menziesii*), and lodgepole pine (*Pinus contorta*) in the western United States, and spruce/fir, pine, and deciduous forests in the eastern United States (Hodges 2000b). Snowshoe hares prefer boreal forest stands that have a dense horizontal understory to provide food, cover and security from predators (Wolfe et al. 1982; Monthey 1986; Koehler and Aubrey 1994). Snowshoe hares feed on conifers, deciduous trees and shrubs (Hodges 2000b). Snowshoe hare density is correlated to understory (horizontal) cover between approximately 3 to 10 feet above the ground or snow level (Hodges 2000b). Generally, earlier successional forest stages support a greater density of horizontal understory and more abundant snowshoe hares (Buehler and Keith 1982; Wolfe et al. 1982; Koehler 1990; Hodges 2000b; Homyack 2003; Griffin 2004). Mature, multistoried stands also can have adequate dense understory to support abundant snowshoe hares (Hodges 2000a; Hodges 2000b; Griffin 2004, Squires et al. 2006).

Most research has focused on the winter diet. Summer diets are poorly understood throughout the range of lynx. Mowat et al. (2000) reported through their review of the literature that summer diets have less snowshoe hare and more alternate prey species, possibly because of a greater availability of other species. In summer, lynx broaden their habitat use from older, multi-storied forest stands to include younger forest stands with an abundance of shrub cover (Squires et al. 2006). The researchers assumed “this shift in habitat use [by lynx] during summer is due to hares being abundant in young forest stands with deciduous vegetation providing high horizontal cover.” Mature forests also provide snowshoe hare habitat as openings are created in the canopy when

trees succumb to disease, fire, wind, ice, or insects, and the understory develops (Squires et al. 2006).

3.4. Den Site Selection

Lynx use a variety of types of large woody debris, such as downed logs, root wads, and windfalls, to provide denning sites with security and thermal cover for kittens (McCord and Cardoza 1982; Koehler 1990; Koehler and Brittell 1990; Mowat et al. 2000; Squires and Laurion 2000; Squires et al. 2006; Merrill and Shenk 2006). During the first few months of life, kittens are left alone at these sites when the female lynx hunts. Downed logs and overhead cover provide protection of kittens from predators, such as owls, hawks, and other carnivores during this period. Denning habitat that is in or near foraging habitat is likely to be most functional. The hunting range of females is restricted at the time of parturition, and their need to feed kittens requires an abundance of prey. Lynx, like other felids, frequently move their kittens until they are old enough to hunt with their mother. Multiple nursery sites are used that provide kittens with overhead cover and protection from predators and the elements.

The age of the forest stand does not seem as important for denning habitat as the amount of horizontal structure available, e.g., downed, woody debris (Mowat et al. 2000), which provides hiding cover and shelter for kittens. Den sites may be located within older regenerating stands (>20 years since disturbance) or in mature conifer or mixed conifer-deciduous (typically spruce/fir or spruce/birch) forests. Tip-up mounds (root wads) were the most common predictor of den sites (M. McCullough, pers. comm. 2007 *in* Service 2007). In Montana, lynx selected den sites with higher horizontal cover than elsewhere in the animal's home range (Squires et al. 2006). Seventy-three percent of lynx dens were found in mature, mesic forests. Dens were also located in regenerating mesic forests (18 percent) and boulder fields (7 percent). In Washington, lynx used lodgepole pine, spruce (*Picea* spp.), and subalpine fir forests older than 200 years with an abundance of downed woody debris for denning (Koehler 1990). A den site in Wyoming was located in a mature subalpine fir/ lodgepole pine forest with abundant downed logs and a high amount of horizontal cover (Squires and Laurion 2000). Den sites in Colorado were located on steep slopes (mean 30 degree slope) at high elevations (ranging between 10,226 and 11,765 feet) with a dense understory of coarse woody debris (Merrill and Shenk 2006).

3.5. Habitat Connectivity

As suggested in the Ecology and Conservation of Canada Lynx (Ruggiero et al. 2000), lynx in the contiguous United States may exist as several smaller, but effectively isolated, metapopulations. An example of this is the boreal forests in Colorado and Utah that are separated from the larger areas of boreal forest in northern Wyoming by at least 100 kilometers. Metapopulation stability depends not only on habitat quality, but also on successful dispersal between isolated habitat patches. The likelihood of subpopulation persistence declines with increasing fragmentation and isolation. That does not mean that more isolated, and therefore more vulnerable, subpopulations are unimportant. In addition, these subpopulations may contain valuable genetic, physiological or behavioral adaptations that allow them to persist (Hickenbottom et al. 1999). Lynx and snowshoe hare habitats are more prone to a metapopulation structure in the western forests due to fragmented landscapes and heterogeneous distribution of topographic, climatic, and vegetative conditions.

This condition is further exacerbated by the presumably greater human caused fragmentation of lynx habitat in the south (Buskirk et al. 2000).

Ruggiero et al. (2000) indicates that we know little about the degree of connectivity or its role in the viability of lynx, but assumes that connectivity plays an important role. Protecting, maintaining, and improving lynx habitat afforded by the various conservation measures contribute to the conservation of lynx and population viability. Maintaining habitats to provide for dispersal movements and interchange among individuals and subpopulations may be the most important provision for maintenance of population viability contained in the LCAS. An interconnected ecosystem can be essential to maintain the ability of subpopulations to expand and colonize new habitats, to recolonize areas where subpopulations have been locally extirpated, to provide population support to declining populations, to allow individuals to find mates among neighboring subpopulations, and to affect dispersal and genetic interchanges (Noss and Cooperrider 1994).

Highways and their continued expansion into mountain towns and resorts increase the amount of fragmentation occurring in these long, linear landscapes. This fragmentation effect further erodes the potential for lynx to effectively cross some of these potential barriers (Ruediger et al. 2000). High-speed, high-volume highways can result in lynx road-kills, fragment and restrict lynx habitat use, impair home range effectiveness, inhibit local and dispersing movements that may lead to reduced habitat connectivity, and the decline of some wildlife populations and species over time due to genetic isolation (Forman and Alexander 1998, Service 2000; Alexander et al. 2004; Clevenger et al. 2002; Forman et. al. 2003). When traffic volume increases, highways often evolve from gravel roads to paved two lane roads, and from two lane highways to more problematic four lane highways, and the interstate highways, which have the most adverse effects to wildlife movements. The result of this progression of upgrades in the transportation system is the mortality of individuals attempting to cross the highway and potential sub-population isolation, both of which result in a slow decline in the population and ultimately can affect viability for some of the low-density carnivores such as lynx and wolverine (*Gulo gulo*) (Ruediger et al. 2000). Critical points in development of highways occur when gravel forest or backcountry roads are paved, which results in higher speeds, higher traffic volumes and increased human developments.

The Service (2000) found that lynx are impacted by high traffic volume on roads that bisect suitable lynx habitat and by associated suburban developments. The finding determined that the impact of high traffic volume was low except in the Southern Rockies Ecosystem. With respect to highway traffic volumes and wildlife impacts, Canadian studies suggest that 2,000-3,000 vehicles per day (vpd) are problematic and ≥ 4,000 vpd are more serious threats to mortality and habitat fragmentation (Ruediger et al. 2000). These conclusions were based upon the general observations and professional judgment of Clevenger (Parks Canada) and Alexander (Univ. Calgary; Nov. 15, 2004, pers. comm., T. Clevenger, Parks Canada, cited in Ruediger et al. 2000), who have conducted some of the most thorough studies (e.g., Clevenger et al. 2002, Alexander et al. 2004, 2005) of wildlife highway mortality and mitigation in North America. Alexander et al. (2005) concluded that movement was impaired for carnivores, including lynx, when traffic ranged from 300-500 vpd (winter traffic counts). However, the traffic data appear to be estimates of average annual daily traffic (AADT) for the road sections in their study, where year-long AADT may be 3000-5000 vpd AADT (assumes a ratio of 10:1 – AADT: winter traffic counts, as discussed in the study). Also, the Alexander et al. (2005) study measured carnivores in general and was not specific to lynx.

3.6. Mortality

Reported causes of lynx mortality vary between studies. The most commonly reported causes include starvation of kittens (Quinn and Parker 1987; Koehler 1990), and human-caused mortality. Significant lynx mortality due to starvation has been demonstrated in cyclic populations of the northern taiga, during the first 2 years of hare scarcity (Poole 1994; Slough and Mowat 1996). Various studies have shown that, during periods of low snowshoe hare numbers, starvation can account for up to two-thirds of all natural lynx deaths. Trapping mortality may be additive rather than compensatory during the low period of the snowshoe hare cycle (Brand and Keith 1979). Hunger-related stress, which induces dispersal, may increase the exposure of lynx to other forms of mortality such as trapping and highway collisions (Brand and Keith 1979; Carbyn and Patriquin 1983; Ward and Krebs 1985; Bailey et al. 1986).

Paved roads have been a mortality factor in lynx translocation efforts within historical lynx range. In New York, 18 translocated lynx were killed on highways (Brocke et al. 1990). Translocated animals may be more vulnerable to highway mortality than resident lynx (Brocke et al. 1990). Twelve lynx have been killed on 2- and 4-lane Colorado highways following their release as part of a reintroduction effort (K. Broderdorp, pers. comm. 2008). Twelve resident lynx were documented being killed on highways in Canada and Alaska (Staples 1995; Gibeau and Heur 1996; T. Clevenger, pers. comm. 1999 *in* Service 2007; Alexander, pers. comm. 1999 *in* Service 2007). Lynx were killed on graveled, high-speed Forest roads in flatter terrain in Maine (Mark McCollough, U.S. Fish and Wildlife Service, pers. comm. 2006 *in* Service 2007).

Predation on lynx by mountain lion, coyote, wolverine, gray wolf (*Canis lupus*), and other lynx has been confirmed (Berrie 1974; Koehler et al. 1979; Poole 1994; Slough and Mowat 1996; Apps 2000; Squires and Laurion 2000; Squires et al. 2006). Squires et al. (2006) reported 15 lynx mortalities in their Montana study area, greater than 90 percent of which were due to mountain lion predation. Observations of such events are rare, and the significance of predation on lynx populations is unknown.

3.7. Interspecific Relationships with Other Carnivores

The two major competition impacts to lynx are likely exploitation (competition for food) and interference (avoidance). Several predators (birds of prey, coyote, gray wolf, mountain lion, bobcat, and wolverine) consume snowshoe hares and therefore compete at some level with lynx for prey. Lynx have adaptations for surviving in areas that have cold winters with deep, soft snow for extended periods; these adaptations provide lynx a competitive advantage in hunting snowshoe hare over a number of potential competitors, such as bobcats or coyotes (McCord and Cardoza 1982; Buskirk et al. 2000; Ruediger et al. 2000; Ruggiero et al. 2000). In one paper, coyotes were theorized to most likely pose local or regionally important exploitation impacts to lynx, and coyotes and bobcats were deemed to possibly impart important interference competition effects on lynx (Buskirk et al. 2000). Mountain lions were described as interference competitors, possibly impacting lynx during summer and in areas lacking deep snow in winter, or when high elevation snow packs develop crust in the spring. Long-term snow conditions presumably limit the winter distribution of potential lynx competitors such as bobcats (McCord and Cardoza 1982) or coyotes. Further, bobcats and coyotes have a higher foot load (more weight per surface area of foot), which causes them to sink into the snow more than lynx.

Therefore, bobcats and coyotes cannot efficiently hunt in soft or deep snow and are at a competitive disadvantage to lynx. Exploitation competition may contribute to lynx starvation and reduced recruitment.

3.8. Population Dynamics

Lynx populations in the contiguous United States occur at the southern periphery of a widely-distributed metapopulation whose core is located in the northern boreal forest of central Canada (McCord and Cardoza 1982; Quinn and Parker 1987; McKelvey et al. 2000a). The boreal forest of central Canada is vast and extends into Alaska. Lynx in the contiguous United States are at the southern margins, or periphery, of its range. Here, the southernmost extent of the boreal forest that supports lynx occurs in the in the Northeast, western Great Lakes, northern and southern Rockies, and northern Cascades (Ruediger et al. 2000).

The center of North American lynx range is in north-central Canada. Lynx occur in mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare (Ruggiero et al. 2000). These forests are generally described as boreal forests. Boreal forests provide optimal habitat for snowshoe hares. In North America, the distribution of lynx is nearly coincident with that of snowshoe hares (Bittner and Rongstad 1982; McCord and Cardoza 1982). Lynx survivorship, productivity and population dynamics are closely related to snowshoe hare density in all parts of its range. In the extensive boreal forests of Canada, snowshoe hares reach peak densities of roughly four to six hares per hectare (or 1.6 to 2.4 per acre) and decline to about 0.1 to 1 per hectare (0.04 to 0.4 per acre) during cyclic lows (Krebs et al. 1995, Slough and Mowat 1996, Hodges 2000a). A minimum density of snowshoe hares (greater than 0.5 hares per hectare or 1.2 hares per acre) (Ruggiero et al. 2000) distributed across a large landscape is necessary to support survival of lynx kittens and recruitment into and maintenance of a lynx population.

In Canada and Alaska, lynx populations undergo extreme fluctuations in response to the cycling of snowshoe hare, enlarging or dispersing from their home ranges and ceasing the recruitment of young into the population after hare populations decline (Mowat et al. 2000). However, in the contiguous United States, the boreal forest transitions into other vegetation communities and becomes more patchily distributed. As a result, the southern boreal forests generally support lower snowshoe hare densities, hare populations do not appear to be as highly cyclic as snowshoe hares further north, and lynx densities are lower compared to the northern boreal forest. Although snowshoe hare populations in the southern portion of the range (i.e., in the contiguous United States) may fluctuate, they do not show strong, regular population cycles as in the north (Hodges 2000a). In the contiguous United States, the degree to which regional local lynx population fluctuations are influenced by local snowshoe hare population dynamics is unclear.

In the contiguous United States, the boreal forest transitions into other vegetation communities and becomes more naturally patchily distributed (fragmented) and provides much less productive hare habitat. Thus, lynx populations here are naturally limited by the low availability of snowshoe hares, as suggested by large home range size, high kitten mortality due to starvation, and greater reliance on alternate prey. These characteristics appear to be similar to those exhibited by lynx populations in Canada and Alaska during the low phase of the population cycle (Quinn and Parker 1987, Koehler 1990, Aubry et al. 2000). This similarity to the lynx

populations in Canada and Alaska during the low phase is likely due to the inherently patchy distribution of lynx and hare habitat in the contiguous United States and correspondingly lower densities of hares.

3.9. Southern Rocky Mountains Region (Colorado, southeastern Wyoming)

Colorado represents the extreme southern edge of the range of the lynx. A majority of the lynx occurrence records in Colorado and southeastern Wyoming were associated with the "Rocky Mountain Conifer Forest" type. The occurrences in the Southern Rockies were generally at higher elevations (8,000-12,000 feet) than were all other occurrences in the West (Ruediger et al. 2000).

The southern boreal forest of Colorado and southeastern Wyoming is isolated from boreal forest in Utah and northwestern Wyoming by the Green River Valley and the Wyoming basin (Findley and Anderson 1956 in McKelvey et al. 2000b). We believe that these areas likely reduce opportunities for genetic interchange with the Northern Rocky Mountains/Cascades Region and Canada (Halfpenny et al. 1982; Koehler and Aubry 1994). However, although habitats in the Southern Rockies are far from source populations and more isolated, it is still possible that dispersers could arrive in the Southern Rocky Mountains during highs in the population cycle. A number of lynx from the reintroduced population in Colorado have dispersed great distances, with occurrences located in Kansas, Nevada, South Dakota, Arizona, Idaho, Nebraska, Montana, Wyoming and New Mexico (T. Shenk, pers. comm. 2007 *in* Service 2007). Thirty-three different individuals were located in Wyoming, seven in Montana and six in Nebraska. Such information indicates that dispersing lynx are able to traverse long distances across extremely variable terrain.

The Forest Service manages the preponderance of lynx habitat in this region. The Forests in this region include the Medicine Bow, Routt, Arapaho-Roosevelt, Pike and San Isabel, Rio Grande, White River, Grand Mesa, Uncompahgre, Gunnison, and the San Juan National Forests. A resident lynx population likely occurred historically in the Southern Rocky Mountains Region, based on the records of lynx in Colorado and the persistence of contiguous habitat in southeastern Wyoming with the Colorado habitat. This resident population may have been extirpated, which led the Colorado Division of Wildlife (CDOW) (currently CPW) to undertake a reintroduction effort. Due to CDOW's efforts, 218 adult lynx were released between 1999 and 2006.

CPW continues to monitor the population to the extent possible. Highway mortality ranks as one of the highest human-caused mortality factors for the Colorado lynx reintroduction overall, and the highest human-caused mortality factor since release protocols were adjusted, which reduced the deaths caused by starvation after the first year of the reintroduction effort. Three release protocols were used during the initial releases of lynx. By adjusting the release protocol, CDOW observed a reduction in the number of starvation deaths (Shenk 2004). Shenk (2004) also observed that only two lynx have died of starvation under their current release protocol, one in 2000 and one in 2001. One hundred sixteen kittens have been born in Colorado (Shenk 2006), but survival of kittens is currently unknown. The primary winter prey species of lynx in Colorado are snowshoe hare and red squirrel, with other mammals and birds forming a minor part of the winter diet (Shenk 2004).

3.10. Recovery Outline

We developed a recovery outline for lynx in the contiguous United States (Service 2005). The outline serves as an interim strategy to guide recovery efforts until a final recovery plan is completed. The lynx recovery outline presents our current understandings of historical and current lynx distribution, ecology, and population dynamics.

The outline introduces concepts regarding the relative importance of different geographic areas to the persistence of lynx in the contiguous United States, identifying areas as either core, provisional core, secondary or peripheral based on lynx records over time and evidence of reproduction. The recovery outline provides four preliminary recovery objectives, which are accompanied by recovery actions needed to attain objectives. Recovery Action 6.2 states: "Identify the risk to lynx populations posed by forest management techniques and human-induced mortality from factors such as roads, trapping and hunting. These factors are to be addressed as necessary to ensure the long-term persistence of lynx populations in core areas."

In addition to determining whether an area is occupied by lynx, the Service examined lynx habitat and designated areas according to their known or projected quality and importance in lynx recovery. The areas with the strongest long-term evidence of the persistence of lynx populations within the contiguous United States are defined as "core areas." Core areas have both persistent verified records of lynx occurrence over time and recent evidence of reproduction. Six core areas along with a provisional core area within the Southern Rockies (Colorado and southern Wyoming) were identified within the contiguous United States. The provisional core area in the Southern Rockies was identified because it contains a reintroduced population. Reproduction has been documented in this introduced population; however, it is too early to determine whether a self-sustaining lynx population will result. "Focusing lynx conservation efforts on these core areas will ensure the continued persistence of lynx in the contiguous U.S by addressing fundamental principles of conservation biology."

4. ENVIRONMENTAL BASELINE

Environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

The project area is located within both the White River National Forest (WRNF) and the Town of Vail. WRNF System Lands exist throughout the project area and jurisdiction of adjacent lands alternates between private and public ownership. I-70 traverses National Forest System Lands for approximately 9.8 miles (85 percent) of the project area. The only private land is at the western end at East Vail.

Elevation in the project area ranges from a low of approximately 8,400 feet at the western end to approximately 10,662 feet at the top of Vail Pass. Several life zones comprise the project area. The Western Slope Montane Zone extends from approximately 8,000 to 9,000 feet and is characterized by Douglas-fir , lodgepole pine , and quaking aspen (*Populus tremuloides*) with stands of Gambel oak (*Quercus gambelii*)-dominated mixed montane shrublands at lower elevations with southerly to westerly aspects. The Subalpine Zone occurs above 9,000 feet, extends to treeline, and is typified by a co-dominance of Engelmann spruce and subalpine fir. Lodgepole pine and quaking aspen occur within the Subalpine Zone as well. Other prominent natural features include rocky cliff areas, drainages, and draws that contain portions of intermittent and perennial streams and their associated riparian zones. Examples include Bighorn Creek, Black Gore Creek, Gore Creek, Miller Creek, Pitkin Creek, and Polk Creek.

In addition to the natural features described above, the project corridor and surrounding area contain various human-created features that influence the structure and function of the natural environment. Highways, roads, towns, single home sites, and recreational development within and adjacent to the project area influence which areas are available for wildlife. Current and historical human activities have been instrumental in creating the current distribution of habitats and wildlife species. Important anthropogenic factors include fire regime, agricultural development, livestock grazing, land development, road construction, and recreation development. Secondary or indirect impacts from these activities include non-native plant invasions, degraded water quality, and human intrusion into wildlife habitats. Although logging and grazing historically had the greatest influence, human settlements currently have the greatest influence on the natural systems in the project area. Because development tends to be concentrated in the valley bottoms, some of the most notable effects are loss of high-quality riparian, wetland, and floodplain habitats and habitat fragmentation that includes reduced access to these habitats.

Through the project area, I-70 is typically composed of two travel lanes in each direction with wide shoulders and periodic pull-outs. A pedestrian and bike path closely parallels the interstate over the entire length of the project area, crossing underneath the interstate once. In addition, Old Highway 6 parallels I-70 and crosses under the interstate near milepost 181.85. Depending on location, the eastbound and westbound lanes are separated by a vegetated median, by concrete median rail, or, in some locations, are grade-divided by retaining walls.

4.1. Existing Highway-Related Impacts

The I-70 PEIS identified interference with wildlife movement due to the barrier effects created by I-70 as one of the most serious issues affecting wildlife along the highway corridor. A series of bridge structures over drainages and rivers from approximately milepost 181.7 through 185 provide wildlife movement across the highway without the need for animals to cross over the roadway (see Table 4 on page 11 of the biological assessment). The higher elevation portion of the I-70 corridor from approximately milepost 186 through 191.5 however, does not have any structures that allow for unimpeded wildlife movement, and for animals to cross the interstate in this higher elevation portion of the highway corridor, they must cross the I-70 travel lanes. Additionally, there are multiple barriers along the roadway that wildlife must negotiate (e.g., guardrails, median barriers, and grade separation of the east and westbound lanes of I-70). WVCs occur throughout the project area, but given the existing structures along the lower half of

the project area and, perhaps, the elevation of the upper half, relatively low WVC rates have been documented along this stretch of highway.

Traffic volume on I-70 presents an additional barrier to wildlife movement. Traffic volumes on I-70 throughout the project area currently greatly exceed the 4,000 vehicles per day threshold identified as a serious threat for wildlife mortality and habitat fragmentation. The lowest traffic volumes recorded in 2018 by automated CDOT traffic counters occurred in the winter and were approximately four times higher than this threshold at 16,600 vehicles per day, and the highest average daily volume of 30,300 vehicles per day, more than 7.5 times higher than this threshold, occurred in the summer. We assume that this baseline level traffic volume likely results in some lynx avoidance of the I-70 corridor. This avoidance results in reduced use of habitat adjacent to the highway corridor, negatively influencing the ability of lynx to forage, den, travel, and maintain adjacent home ranges. Although lynx may generally avoid highways, we recognize that lynx will not completely avoid roads, and will cross highways regardless of the traffic volume, but may be more likely to attempt crossing when traffic volumes are lowest (i.e. dawn, dusk, or at night) (Baigas et al. 2017).

4.2. Status of Lynx Habitat

The project area includes lynx winter forage, denning, other habitat, and linkage areas. The high elevation mesic coniferous boreal, subalpine, and western montane forest habitats typically preferred by lynx are present and movement through the project corridor is likely. As previously mentioned, the project is located within the Cache, Camp Hale, and Ten Mile LAUs.

Table 1. Lynx Habitat Distribution in the Cache, Camp Hale and Ten Mile LAUs.

WRNF Mapped Lynx Habitat	Cache LAU	Camp Hale LAU	Ten Mile LAU	Total
Total LAU Acres	114,613	82,890	36,995	150,754
Primary Lynx Vegetation	43,631.7	36,466.3	15,516.5	95,619.8
Secondary Lynx Vegetation	26,786.9	15,670.5	6,095.9	48,553.3
Total Lynx Vegetation	70,424.0	52,136.9	21,612.4	144,173.2
Currently Unsuitable	3,760.1	2,613.7	206.5	6,580.4
% Currently Unsuitable	3.3	3.2	0.2	4.4

4.3. Lynx Use of the LAUs

Movement of lynx through the project area has been documented by CPW, USFS, and other research studies (Shenk 2009, Shenk and Kahn 2010, Ivan 2011, Squires et al. 2011, Theobald and Shenk 2011, Olson et al. 2017, Baigas et al. 2017, Olson et al. 2018). Telemetry data collected by these studies show that the easternmost lynx home range within the study area extends to approximately milepost 185 (Squires et al. 2011) and that although highway crossings occur on the west side of Vail Pass, these are rare in comparison to the east side of the pass (Ivan 2011, Squires et al. 2011, Baigas et al. 2017, Olson et al. 2018). Baigas et al. (2017) found that lynx have successfully located below-grade crossings and use them repeatedly. They also found that lynx are capable of crossing I-70 at road-grade during periods of low traffic volume. In addition, Baigas et al. (2017) found that lynx likely cross high-volume, four-lane highways

similar to other wildlife, in that they tend to use larger underpasses with dense native vegetation close to passage entrances (Cain et al. 2003) in favorable habitat with low human disturbance (Beier 1995, Ng et al. 2004).

Fourteen of the 218 lynx released to date in Colorado have been killed attempting to cross highways. At least four lynx have died as a result of vehicle collisions on I-70 since 2000; two in the West Vail Pass area and two outside the project area near Bakerville (milepost 217 – 220). No more recent lynx collisions are known in the project area.

4.4. Habitat Connectivity

The SRLA identified 38 linkage areas in Colorado and southern Wyoming, and the Vail Pass lynx linkage area encompasses the project area south of milepost 182.1. USFS management direction for these areas is to maintain connectivity of habitat and facilitate lynx movements. Lynx linkage areas occur both within and between geographic areas where blocks of lynx habitat are separated by intervening areas of non-lynx habitat such as basins, valleys, agricultural lands, or where lynx habitat naturally narrows between blocks. Connectivity provided by linkage areas can be degraded or severed by human infrastructure such as high-use highways, subdivisions, or other developments. Any continuous forested corridor between and/or across mountain ranges that provides lynx habitat may provide such connectivity. Narrow forested mountain ridges or shrub-steppe plateaus may provide a linkage between more extensive areas of lynx habitat. Wooded riparian communities may provide travel cover across otherwise open valley floors between mountain ranges, or lower elevation ponderosa pine or pinyon-juniper woodlands may link high elevation spruce-fir forests.

The ALIVE Committee identified 13 linkage interference zones (LIZs) where the I-70 Mountain Corridor interferes with wildlife migration and wildlife use. LIZs were identified based largely on expert opinion and the location of existing barriers to at-grade crossings, including guardrails and fencing. WVC data were also considered. A high rate of WVCs in an area was assumed to indicate that that portion of the highway intersected an important animal movement corridor. Three LIZs have been identified within the project area: Vail (East) between mileposts 176.8 and 180.1; Gore Creek between mileposts 180.9 and182.1; and West Vail Pass between mileposts 182.9 and 188.1. Each of these LIZs identifies the Canada lynx as a primary target species.

5. EFFECTS OF THE ACTION

The effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR § 402.17).

To quantify potential impacts on lynx linkage areas, the project extent was overlaid onto the WRNF lynx habitat map, and area of direct impact (in acres) was calculated. Table 2 provides the estimated direct impacts on lynx habitat within the Cache, Camp Hale, and Ten Mile LAUs. Tables 3 and 4 break down the affected area by USFS lynx habitat categories and by LAU.

Impact acreages include temporary and permanent loss for roadway construction, trail realignment, spoil sites, staging areas, etc. Permanent habitat loss will primarily be the result of a wider roadway footprint from the additional lane and wider shoulders. In addition, the wildlife exclusion fences will remove less than 1.0 acre of primary or secondary habitat from potential use by lynx.

Table 2. Project Impacts by LAU (excluding non-habitat).

LAU	Affected Acres	Percent of LAU Affected
Cache	66.89	0.06
Camp Hale	44.83	0.05
Ten Mile	39.08	0.11
Total	**150.1**	**0.06**

Table 3. Project Impacts in acres on Canada Lynx Habitat by LAU (excluding non-habitat)

Habitat Type	Cache (affected acres)	Camp Hale (affected acres)	Ten Mile (affected acres)	Total (affected acres)
Primary	41.08	23.94	22.56	87.57
Secondary	25.82	20.05	16.53	62.40
Unsuitable	0.00	0.85	0.00	0.85

Table 4. Percent Project Impacts on Canada Lynx Habitat by LAU (excluding non-habitat).

Habitat Type	Cache (percent affected)	Camp Hale (percent affected)	Ten Mile (percent affected)	Total (percent affected)
Primary	0.04	0.03	0.06	0.07
Secondary	0.02	0.02	0.04	0.11
Unsuitable	0.00	0.00	0.00	0.005

The I-70 corridor at West Vail Pass, along with residential and recreational development and roads, constitutes a major source of habitat fragmentation, effectively dividing large home ranges and disrupting wildlife movements from north to south. The proposed action will increase the width of the road surface and the total width of the roadway, thus increasing the barrier effect of I-70. Additional barriers include jersey barriers, glare screens, lighting, and potentially increased traffic volumes. We anticipate that traffic increase generated by a larger population will elevate overall traffic volume on I-70 above documented levels to reduce habitat functionality and lynx use adjacent to the highway corridor within the LAUs adjacent to the highway.

A 2-mile portion of the bicycle/pedestrian trail that currently parallels eastbound I-70 on West Vail Pass will be re-routed. The new location will result in new habitat disturbance and segments of retaining walls will contribute to fragmentation, though it will still be within the influence of highway disturbances such as noise, lights, and dust. Use of the trail is expected to continue to be primarily, if not exclusively, diurnal. Given that lynx in Colorado have adapted to moving near

highways primarily at night, we do not expect that the realignment of use of the trail will result in a significant increase in barrier effect.

Permanent and temporary lighting may affect foraging and travel behaviors for the lynx and its prey both temporarily during construction and permanently where lights are in use along the highway. Lighting may also increase the barrier effect of the highway. Ensuring that lighting does not exceed the approved area and that lights are on only when necessary will reduce their effects on Canada lynx.

Construction of underpasses at key locations within linkage interference zones will allow animals, including the Canada lynx, to more easily cross I-70 than is currently possible. Further, installing and maintaining wildlife fencing will reduce contact with vehicles and help funnel wildlife to crossing structures.

Because of the short duration of the proposed project, we do not think that climate change will affect the species.

5.1. Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action will be subject to the consultation requirements established in section 7 of the ESA and, therefore, are not considered cumulative to the proposed action. Projects that have undergone prior consultation with the Service are considered in the Environmental Baseline section.

Traffic on I-70 is expected to increase as Colorado's population continues to grow and additional Front Range residents use I-70 to access summer and winter recreational opportunities in the mountains. The I-70 Mountain Corridor PEIS indicated that traffic volumes throughout the entire I-70 Mountain Corridor are expected to increase 29 to 43 percent by the year 2035. Residential and commercial development, adjacent roads and fencing, recreation trails, and increasing human activity are expected to occur throughout the project corridor.

6. CONCLUSION

The Service defines "jeopardize the continued existence of" as to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

Recovery calls for improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria identified in section 4(a)(1) of the ESA (50 CFR § 402.02).

After reviewing the best available scientific and commercial information, current status of the Canada lynx, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed project to construct auxiliary lanes on I-70 at West Vail Pass is not likely to jeopardize the continued existence of the Canada lynx. We base our conclusion on the following:

- Although the proposed action will result in the permanent loss of habitat for lynx (150.1 acres), we do not anticipate that take will result from this activity, because of its low quality and proximity to the roadway. The action area constitutes a small portion of the species' distinct population segment. As described above, lynx maintain home ranges at a minimum average of approximately 9,600 acres (15 square miles); therefore, the impacts from the proposed action of approximately 150 non-contiguous acres would not approach the level of take representing one lynx home range. We expect the Cache, Camp Hale, and Ten Mile LAUs to continue to provide habitat.

- The proposed action will increase the width of the road surface, the total width of the roadway, and potential increased traffic growth thus increasing the barrier effect of I-70. While lynx habitat connectivity is already compromised due to the presence of and current traffic along I-70, the proposed action will have additive adverse effects on habitat connectivity by potentially increasing restrictions on movement within a home range and hindering or preventing dispersal of young and breeding lynx across the landscape. As a result, take is possible from the proposed action. Connectivity across I-70 may be improved, in the long-term, by implementation of the project and its accompanying conservation measures.

- The likelihood of the survival and recovery of the Canada lynx will not be precluded through implementation of the proposed action.

INCIDENTAL TAKE STATEMENT

1. INTRODUCTION

Section 9 of the ESA and Federal regulations pursuant to 4(d) of the ESA prohibit the take of endangered and threatened animals, respectively, without special exemption. Take is to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. The Service further defines "harm" to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. The Service defines "harass" as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns, which include but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by FHWA so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. FHWA has a continuing duty to regulate the activity covered by this incidental take statement. If FHWA (1) fails to assume and implement the terms and conditions, or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the applicant must report the progress of the action and its impact on the species or subspecies to the Service as specified in the incidental take statement. [50 CFR § 402.14(i)(3)]

2. AMOUNT OR EXTENT OF TAKE

The Service anticipates that take of Canada lynx will result from the proposed action. The anticipated take is perceived as harassment through the proposed action's contribution to the curtailment of freedom of movement (fragmentation) of lynx across the interstate for the purposes of feeding, breeding, and sheltering for lynx that may be using the I-70 corridor as part of their existing home range. An unknown number of lynx may have incorporated the I-70 corridor as part of their home range; therefore, an unknown number of home ranges may be affected as described. All lynx attempting to cross I-70 in the future are likely to be subject to harassment from the proposed action.

We have concluded above that the increased width of the road surface would result in adverse effects on lynx. Given that the baseline condition includes high traffic volume, noise, human disturbance, habitat disturbance, and habitat fragmentation, we believe that there is a pre-existing injury to lynx occupying home ranges within the action area. This pre-existing injury results in avoidance of suitable habitat due to the presence of I-70 and associated high traffic volumes. The proposed action would have an additive effect on this pre-existing injury; however, the Service is unable, at this time, to quantify the total number of lynx that may be killed or injured along this portion of I-70 resulting from the proposed action. We are not aware of any additional measures

to minimize take (beyond the conservation measures) where implementation is within the project proponent's jurisdiction or authority. As described above, the Service anticipates incidental take of lynx caused by the proposed action will be difficult to detect and minimize for the following reasons:

- We have no means to quantify the number of lynx affected by functional habitat loss affecting feeding, breeding, and sheltering, within the action area caused by the increased barrier width of the road surface and potential increased traffic.
- We have no means for determining when injury occurs, and do not have any means to determine individual responses to the injury.
- There is no established program that actively and regularly monitors lynx throughout the action area to detect injured or killed individuals.
- Discovery or detection of lynx injury or mortality attributed to a lynx-vehicle collision is very unlikely if the animal wanders away from the highway before it dies.

In the above biological opinion, we determined that the anticipated take is not likely to result in jeopardy to the species.

2.1. Reasonable and Prudent Measures

The reasonable and prudent measures, and implementing terms and conditions, minimize the effects of incidental take that might otherwise result from the action. The Service believes that all conservation measures necessary and appropriate to minimize take of lynx have been incorporated into the proposed action (see Section 1.1. Conservation Measures). The Service has given appropriate consideration to the beneficial actions proposed by CDOT and FHWA. Therefore, no reasonable and prudent measures are necessary for this Incidental Take Statement.

2.2. Terms and Conditions

No reasonable and prudent measures to minimize the impacts of incidental take caused by the action are provided in this Incidental Take Statement; therefore, no terms and conditions for carrying out such measures are necessary.

2.3. Monitoring and Reporting Requirements

In order to monitor the impacts of incidental take, FHWA must report to the Service the progress of the action and its impact on the species as specified in the incidental take statement. This section provides the specific instructions for such monitoring and reporting. As necessary and appropriate to fulfill this responsibility to monitor and report the progress of the action and its impact on the species, FHWA must require any permittee, contractor, or grantee to accomplish the monitoring and reporting requirements that apply to action components under its jurisdiction through terms that are added to the permit, contract, or grant document. Such terms must include a requirement to immediately notify the Service if the amount or extent of incidental take specified in this incidental take statement is exceeded during action implementation or if the action and its impact on the listed species has changed.

The monitoring and reporting requirements are as follows:

1. The FWHA shall provide an annual report documenting the amount or extent of the take.
2. In the event a Canada lynx, or any other federally listed species, is killed or injured during project activities, notify the Service's Colorado Field Office in Lakewood ((303) 236-4773) within ten (10) days.

2.4. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

We have no conservation recommendations at this time.

2.5. REINITIATION NOTICE

This concludes formal consultation on proposed federal actions related to construction of auxiliary lanes on I-70 on the west side of Vail Pass in Summit County, Colorado. Reinitiation of this consultation may be required if:

1. The amount or extent of incidental take is exceeded;
2. New information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion;
3. The agency action is subsequently modified in a manner that causes an adverse effect to the listed species or critical habitat that was not considered in this opinion; or
4. A new species is listed or critical habitat designated that may be affected by the action.

If, at any time, incidental take exceeds the take authorized by this biological opinion, any operations causing such take must cease pending reinitiation. If the Service can be of any additional assistance, please contact Kristin Salamack of the Colorado Field Office by telephone at (303) 236-4748 or by email to kristin_salamack@fws.gov.

Sincerely,

Liisa Schmoele
Colorado Ecological Services Office
Assistant Field Supervisor

cc: FHWA (Jeff Bellen)
CDOT, Region 3 (Cinnamon Levi-Flinn)
CDOT, HQ (Jeff Peterson)

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