

## 3.2 Biological Resources

### 3.2.1 What are the biological resources in the Corridor and why are they important?

Biological resources in the I-70 Mountain Corridor include vegetation, wildlife, and aquatic resources, such as fish, amphibians, and macroinvertebrates. Federal and state regulations protect many of these biological resources and require evaluation of the effects of a proposed project on these resources. The following federal and state regulations are included:

- **Endangered Species Act** – Section 7 of the Endangered Species Act outlines the responsibilities of federal agencies to participate in the conservation and recovery of listed species and requires agencies to ensure that any action that is federally authorized, funded, or carried out is not likely to jeopardize the continued existence of listed species or modify their critical habitat.
- **Migratory Bird Treaty Act** – Protects raptors and other migratory birds and their active nest sites.
- **Bald and Golden Eagle Protection Act** – Provides for the protection of the Bald Eagle (*Haliaeetus leucocephalus*) and the Golden Eagle (*Aquila chrysaetos*).
- **Colorado Senate Bill 73-40** (§33-5-101-107, *Colorado Revised Statute 1973* as amended) – Requires any agency of the state to obtain wildlife certification from the Colorado Division of Wildlife when the agency plans construction in any stream or on any stream bank.

The United States Fish and Wildlife Service is responsible for consultations and clearances associated with the Endangered Species Act, Migratory Bird Treaty Act, and Bald and Golden Eagle Protection Act.

The United States Forest Service maintains lists of Forest Service Sensitive Species and Management Indicator Species, which were included in this study. The United States Forest Service requires that any project on National Forest System lands identify agency-listed sensitive species and ensure that the project does not cause species to decline and subsequently be listed under the Endangered Species Act.

#### What are the major concerns regarding biological resources in the Corridor?

Lead agencies worked with local, state, and federal agencies to determine the following major concerns:

- Habitat loss due to vegetation impacts
- Increased barrier effect of the I-70 Mountain Corridor to wildlife movement and subsequent increase in animal-vehicle collisions
- Impacts on aquatic species due to construction in and next to waterways
- Impacts associated with the increased use of traction sands and deicers in the winter
- Water depletions and subsequent effects to species downstream in the South Platte and Colorado River basins

The I-70 Mountain Corridor creates barriers to wildlife movement. Even where animals can cross the highway, traffic noise and vehicle lights can deter animals from approaching the highway and animal-vehicle collisions can result in their injury or death.

#### Which species are protected?

Based on information from the United States Fish and Wildlife Service, United States Forest Service, and Colorado Division of Wildlife, there are 68 individual protected species and two groups of protected species, consisting of trout and aquatic macroinvertebrates, in the Corridor. There are four species along the Corridor protected under the Endangered Species Act whose habitat will be directly impacted by the proposed project: Canada lynx (*Lynx canadensis*), Preble's meadow jumping mouse (*Zapus hudsonius*

## 3.2. Biological Resources

*preblei*), greenback cutthroat trout (*Oncorhynchus clarki stomias*), and Yellow-billed Cuckoo (*Coccyzus americanus*). Downstream effects, which occur beyond the immediate construction footprint, will impact the following ten species protected under the Endangered Species Act:

- Colorado pikeminnow (*Ptychocheilus lucius*)
- Humpback chub (*Gila cypha*)
- Razorback sucker (*Xyrauchen texanus*)
- Pallid sturgeon (*Scaphirhynchus albus*)
- Bonytail chub (*Gila elegans*)
- Least Tern (*Sternula antillarum*)
- Piping Plover (*Charadrius melodus*)
- Whooping Crane (*Grus americana*)
- Ute ladies'-tresses orchid (*Spiranthes diluvialis*)
- Western prairie fringed orchid (*Platanthera praeclara*)

For the detailed assessment of all evaluated species, including the methodology to determine a given species' occurrence or absence within the Corridor and additional detail regarding indirect impacts, see the *I-70 Mountain Corridor PEIS Biological Resources Technical Report* (Colorado Department of Transportation [CDOT], March 2011), which includes analysis of wildlife, vegetation, protected species, and aquatic resources in the I-70 Mountain Corridor.

### 3.2.2 What study area and process were used to analyze biological resources?

This document examines impacts along the entirety of the Corridor, and includes a 30-foot buffer around the physical footprint of the alternatives. In the case of federally protected species, the study area was increased in coordination with the United States Forest Service and United States Fish and Wildlife Service. For example, downstream impacts to protected aquatic species include discussion of downstream rivers outside of Colorado.

#### How were vegetation and wildlife habitat determined?

The 1999 Colorado Gap Analysis Project and 1997 United States Forest Service geographic information systems data were used to map vegetation communities in the Corridor. The United States Forest Service considers the vegetation mapping units and classification system to be suitable for the evaluation of general Corridorwide habitats. An analysis of rare and imperiled plant communities was based on the August 2008 Colorado Natural Heritage Program list, which was updated in July 2010. This update affected one vegetation community occurring in the Corridor and already included in the analysis, the Thinleaf Alder-Red-osier Dogwood Riparian Shrubland. An analysis of rare and imperiled plant communities is contingent upon state ranking, which in this case did not change between the 2008 and 2010 lists; therefore, the existing analysis is valid. The Colorado noxious weeds lists were obtained from the Colorado Department of Agriculture in July 2009 and updated again in August 2010. Individual county-based noxious weed programs were obtained and reviewed in July 2009. This information, as applicable, was placed into a geographic information system and displayed on maps with the project aerials to provide baseline information for existing conditions within the I-70 Mountain Corridor.

### How was wildlife habitat connectivity determined?

Lead agencies examined habitat connectivity and animal-vehicle collisions through an interagency committee known as “A Landscape Level Inventory of Valued Ecosystem Components” (ALIVE) Committee. The Committee identified 13 areas where the I-70 Mountain Corridor interferes with wildlife migration, including elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), bighorn sheep (*Ovis canadensis*), and Canada lynx (*Lynx canadensis*). These locations are referred to as linkage interference zones. By focusing on areas of known migration and wildlife use, and creating wildlife crossings, animal-vehicle collisions can be reduced and habitat connectivity can be increased. A Memorandum of Understanding, signed in April 2008, details the responsibilities of each agency in addressing animal-vehicle collisions (see **Appendix E, ALIVE Memorandum of Understanding**).

The ALIVE Committee is composed of the United States Fish and Wildlife Service, United States Forest Service, Colorado Division of Wildlife, Bureau of Land Management, CDOT, Federal Highway Administration, and county, city, and local representatives that work collaboratively to improve habitat connectivity at 13 locations (referred to as wildlife linkage interference zones) along the Corridor. (Locations are shown in **Figure 3.2-2**.)

### How were Gold Medal and “high-value” fisheries identified?

The Colorado Division of Wildlife, in 2009, identified important fisheries for recreational fishing purposes and fish species for state protection in the I-70 Mountain Corridor. All Gold Medal fisheries identified in the Corridor are located west of the Continental Divide, and “high-value” fisheries are located throughout the Corridor. **Figure 3.2-3** shows fishery locations.

### How were protected species analyzed?

Lead agencies sought input from the following agencies to determine protected species within the I-70 Mountain Corridor:

- **United States Fish and Wildlife Service** – Upon request, the United States Fish and Wildlife Service provided a list of threatened, endangered, proposed, and candidate species potentially occurring along the I-70 Mountain Corridor. As required by the United States Fish and Wildlife Service, a Programmatic Biological Assessment—a study prepared to determine the likely effects of a project on federally listed species, proposed species, or designated critical habitat—has been submitted to the United States Fish and Wildlife Service (CDOT, 2011a). Coordination with the United States Fish and Wildlife Service has been ongoing and all data have been updated as of 2010.
- **United States Forest Service** – Upon request, the Arapaho and Roosevelt and White River National Forests provided lists of threatened, endangered, proposed, and candidate species; Forest Service Sensitive Species, Management Indicator Species, and other species or habitats occurring on National Forest System lands to be analyzed for this project. As required by the United States Forest Service, a Programmatic Biological Report—a study prepared to determine the likely effects of a project on federally listed species, Forest Service Sensitive species, Management Indicator Species, and other species or habitats on National Forest System land—has been submitted to the United States Forest Service (CDOT, 2011b). Coordination with the United States Forest Service has been ongoing and all data have been updated as of 2009.
- **Bureau of Land Management** – Provided a list of sensitive species located on Bureau of Land Management properties along the I-70 Mountain Corridor. This list is valid, as it has not been updated by the Bureau of Land Management since 2000.
- **Colorado Division of Wildlife** – Provided input on state-listed and other special-status species, as well as wildlife habitat. State-listed and other special-status species have been updated for

## 3.2. Biological Resources

2010. The updated 2006 lynx habitat inventory and 2008 National Diversity Information Source GIS data were applied to wildlife habitat assessments.

The Colorado Department of Transportation determined the likely presence of protected species by the presence of suitable habitat and known distribution records. Many protected species are “unlikely to occur in the area,” and further consideration of these species was not included in the study. In addition to analysis of direct impacts on protected species within the I-70 Mountain Corridor, depletion to the Platte River or Colorado River basins constitutes an action that may affect, and is likely to adversely affect, threatened, endangered, proposed, and candidate species that depend on the river for their existence. These effects will be determined during Tier 2 processes as site-specific biological assessments are prepared per the *I-70 Mountain Corridor PEIS Programmatic Biological Assessment* (CDOT, 2011a) and Programmatic Biological Opinion, as agreed to with the United States Fish and Wildlife Service. The lists of threatened, endangered, proposed, and candidate species potentially occurring along the I-70 Mountain Corridor are subject to change. Ongoing coordination will occur to ensure that current lists are used in project analysis.

For detailed analysis of project effects on protected species, see the *I-70 Mountain Corridor PEIS Biological Resources Technical Report* (CDOT, March 2011).

Natural resource changes in the Corridor that occurred since the initiation of the study in 2000 are dominated by the substantial loss of timber and resulting effect to many other resources (such as vegetation, wildlife habitat, visual quality) associated with the mountain pine beetle epidemic. The United States Forest Service notes that the ongoing beetle infestation is changing conditions on the ground, but that the extent and breadth of change are not yet necessarily predictable, and that the most appropriate time to address these changing conditions is during Tier 2 processes.

### 3.2.3 What agencies have CDOT and FHWA coordinated with and what are their relevant issues?

Lead agencies coordinated, and will continue to coordinate, with the United States Fish and Wildlife Service, United States Forest Service, Colorado Division of Wildlife, and Bureau of Land Management. The comments received from these agencies are similar in nature and reflect the major concerns for biological resources in the I-70 Mountain Corridor discussed below. The United States Fish and Wildlife Service and United States Forest Service act as cooperating agencies for this document and are an integral part of the review process. Cooperating agencies are the federal agencies with jurisdiction by law or special expertise regarding environmental impact analysis.

Because listings of federally-protected and state-protected species have changed since 2004, the lead agencies updated the analysis to include currently (2009 and 2010) listed threatened, endangered, proposed, and candidate species; Forest Service Sensitive Species and Management Indicator Species; and state-protected species. Ongoing coordination with these agencies ensures that this document includes the latest information regarding protected species and habitat. The United States Fish and Wildlife Service has approved the *I-70 Mountain Corridor PEIS Programmatic Biological Assessment* (CDOT, 2011a). The Record of Decision will include the resulting Programmatic Biological Opinion. The United States Forest Service has approved the *I-70 Mountain Corridor PEIS Programmatic Biological Report* (CDOT, 2011b).

Habitat connectivity for species of importance, such as elk, deer, bighorn sheep, and Canada lynx, and animal-vehicle collisions are a common concern among stakeholders and agencies, and were addressed by the ALIVE Committee. The Memorandum of Understanding notes the long-term impact of the I-70 Mountain Corridor facilities on wildlife and makes recommendations for mitigating these impacts (see **Appendix E, ALIVE Memorandum of Understanding**).

One area of concern was stream and wetland health. Lead agencies formed the Stream and Wetland Ecological Enhancement Program (SWEEP) Committee to identify and address environmental issues related to wetlands, streams, aquatic species, and fisheries in the I-70 Mountain Corridor. The SWEEP Committee included representatives from federal and state agencies, watershed associations, Clear Creek County, and special interest groups. This program resulted in a Memorandum of Understanding, including an implementation matrix focused on improving stream and wetland health in the I-70 Mountain Corridor (see **Appendix D, SWEEP Memorandum of Understanding**).

Lead agencies received comments about winter maintenance activities, requesting additional information on the effects of the high salt content in deicers on vegetation and wildlife. The *I-70 Mountain Corridor PEIS Biological Resources Technical Report* (CDOT, March 2011) provides detailed information about the effects of winter maintenance activities.

### 3.2.4 What are the areas of biological resources interest identified in the Corridor?

#### Vegetation

##### What are the major vegetation types in the Corridor?

The I-70 Mountain Corridor crosses a wide range of elevations, and vegetation generally corresponds to changes in elevation and geographic variability (**Figure 3.2-1**). These changes in elevation create “life zones” that differentiate broad changes in plant communities and wildlife habitat. The elevations associated with life zones are general, and plant communities can exist at higher or lower elevations, depending on local climate.

**Life Zones** are typically defined by the following elevations (in feet above sea level):

- Foothills: 6,000 – 7,600
- Montane: 7,600 – 9,000
- Subalpine: 9,000 – 11,400
- Alpine: 11,400 and above

**Figure 3.2-1. Life Zones and Elevations**



## 3.2. Biological Resources

Table 3.2-1 lists the general plant communities associated with each life zone.

Table 3.2-1. Vegetation Communities and Associated Life Zone.

Vegetation Community	Life Zone
Alpine Meadows and Tundra	Alpine
Aspen Forest	Montane and Subalpine
Barren Land	All
Douglas-Fir Forest	Foothills and Montane
Grass/Forb Meadows	All
Lodgepole Pine Forest	Montane and Subalpine
Mountain Shrubland	Montane
Piñon-Juniper	Foothills and Montane
Sagebrush Shrubland	Foothills and Montane
Spruce-Fir Forest	Subalpine

### What are the protected plant species in the Corridor?

Previous disturbance and ongoing maintenance activities limit suitable habitat for most plant species in the I-70 Mountain Corridor right-of-way, but there is the potential for occurrence of protected plant species. Species that rely on ground disturbance can benefit from construction or maintenance activities. For a full list of all protected plant species potentially occurring in the I-70 Mountain Corridor, see the *I-70 Mountain Corridor PEIS Biological Resources Technical Report* (CDOT, March 2011).

### What other vegetation concerns are there?

Noxious weeds have increased in the I-70 Mountain Corridor as a result of human activity. All counties along the I-70 Mountain Corridor have implemented weed-control programs and have listed noxious weeds designated for management.

In addition to the vegetation communities described previously, wetlands are found along the I-70 Mountain Corridor (see **Section 3.3, Wetlands and Other Waters of the U.S.**). Wetland habitat types are composed of unique vegetation and serve important ecological functions. Riparian areas, which are found along the banks of water bodies, generally in the valleys along the Corridor, serve an important ecological function that correlates to other resources. These areas serve as buffer zones to rivers and streams and are home to unique wildlife species, including protected species.

**Noxious weeds** are invasive, non-native plants that were introduced to Colorado by accident or that spread after being planted for another purpose. Their presence results in lands with decreased economic and environmental value. Noxious weeds are regulated by the Colorado Department of Agriculture, and the extermination or removal of certain species is required.

## Wildlife

### Why is the Corridor important for terrestrial species?

The I-70 Mountain Corridor bisects a wide range of species habitats, hindering movement of foraging species and creating a barrier for migration between winter and summer ranges and calving and breeding grounds. Much of this habitat is found on large blocks of federal land largely protected from development

(see **Section 3.7, Land Use and Right-of-Way**). Five additional properties in the I-70 Mountain Corridor may be subject to protection under federal regulations (see **Section 3.14, Section 4(f) Discussion**):

- The Sheep Keep property
- Vail Deer Underpass
- Twin Tunnels Wildlife Land Bridge
- Gypsum Ponds State Wildlife Area
- Whiskey Creek

### What wildlife species are found in the Corridor?

Numerous wildlife species inhabit or frequent the I-70 Mountain Corridor, including mammals such as elk, bighorn sheep and deer, squirrels, marmots, and bats; birds; fish; and a small number of reptiles and amphibians.

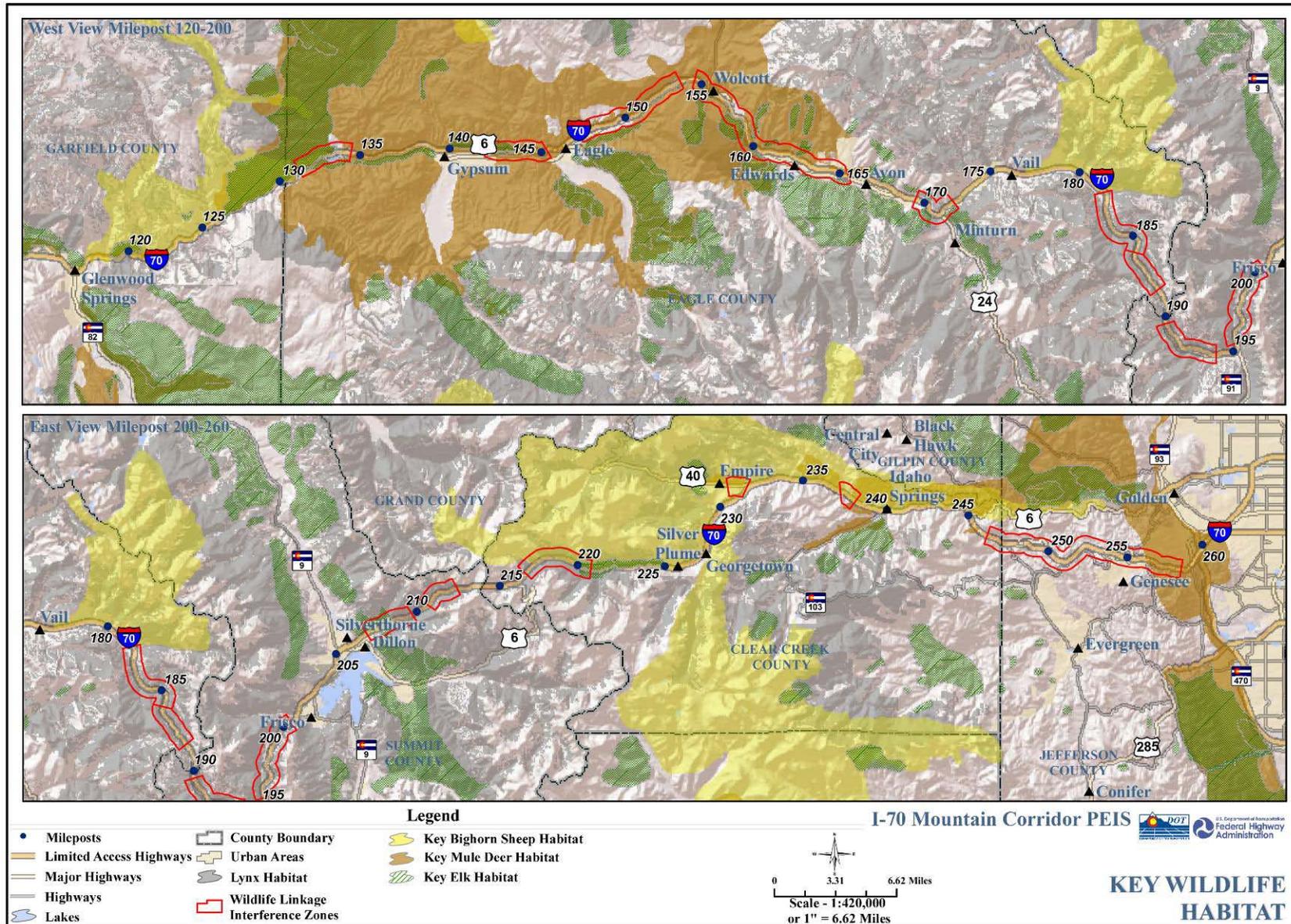
**Figure 3.2-2** shows key wildlife habitat. Descriptions of wildlife species and habitat throughout the I-70 Mountain Corridor can be found in the *I-70 Mountain Corridor PEIS Biological Resources Technical Report* (CDOT, March 2011).

### What are the protected terrestrial and bird species in the Corridor?

The I-70 Mountain Corridor is home to federally-listed species and species that are identified as protected by the United States Fish and Wildlife Service, United States Forest Service, and the Colorado Division of Wildlife. There are two terrestrial species and one bird species protected under the Endangered Species Act whose habitat will be directly impacted by the proposed project: Canada lynx, Preble's meadow jumping mouse, and the Yellow-billed Cuckoo. For a full list of all protected wildlife species potentially occurring in the I-70 Mountain Corridor, see the *I-70 Mountain Corridor PEIS Biological Resources Technical Report* (CDOT, March 2011).

### 3.2. Biological Resources

Figure 3.2-2. Key Wildlife Habitat



**Aquatic Resources**

**What are the major fisheries in the Corridor?**

Gold Medal and “high-value” fisheries are located in three watersheds in the I-70 Mountain Corridor (see **Table 3.2-2** and **Figure 3.2-3**):

- Eagle River
- Blue River
- Clear Creek

Per the Colorado Division of Wildlife observations, Gold Medal streams provide outstanding opportunities for angling large trout, and “high-value” fisheries provide a high quantity/quality of fish populations and recreational value. For additional information regarding recreation areas and stream access, see **Section 3.12, Recreation** and **Section 6(f) Evaluation**.

**Table 3.2-2. Gold Medal and “High-Value” Fisheries**

Eagle River Sub-basin	Blue River Sub-basin	Clear Creek Sub-basin
<b>Gold Medal Fisheries</b>		
• Gore Creek	• Blue River	• n/a
<b>“High-Value” Fisheries</b>		
<ul style="list-style-type: none"> <li>• Eagle River</li> <li>• Squaw Creek</li> <li>• Lake Creek</li> <li>• McCoy Creek</li> <li>• Miller Creek</li> <li>• Beaver Creek</li> </ul>	<ul style="list-style-type: none"> <li>• Booth Creek</li> <li>• Pitkin Creek</li> <li>• Polk Creek</li> <li>• Gore Creek</li> <li>• Black Gore Creek</li> </ul>	<ul style="list-style-type: none"> <li>• Tenmile Creek</li> <li>• Clear Creek</li> </ul>

N/A = Not Applicable

The original construction of the I-70 Mountain Corridor affected these fisheries. Effects included channelization, sedimentation, increased runoff and erosion, and increased salt concentrations due to winter maintenance operations.

**What fish and other aquatic species are in the Corridor?**

Numerous fish species, including protected species and species popular with anglers, are located in the rivers, streams, and lakes (reservoirs) in the I-70 Mountain Corridor. These include many species of trout, and other fish such as fathead minnows, common carp, speckled dace, sculpin, and multiple species of sucker. The greenback cutthroat trout is the only fish species listed as threatened or endangered under the Endangered Species Act whose habitat will be directly impacted by the proposed project.

Two protected species, the greenback cutthroat trout and Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*), are the focus of multi-agency conservation and recovery teams actively working to maintain and restore viable populations.

Amphibians in the I-70 Mountain Corridor include the boreal toad (*Bufo boreas boreas*) and the northern leopard frog (*Rana pipiens*), both of which are protected species.

The benthic invertebrate communities, known to inhabit or potentially inhabit the I-70 Mountain Corridor’s major watersheds, are composed primarily of the major clean-water taxa, including mayflies, stoneflies, caddisflies, and midges. The distribution of these taxa and the number of organisms within

## 3.2. Biological Resources

each taxon vary in response to natural and human-generated influences throughout the I-70 Mountain Corridor.

For a full list of all protected aquatic species potentially occurring in the I-70 Mountain Corridor, see the *I-70 Mountain Corridor PEIS Biological Resources Technical Report* (CDOT, March 2011).

### What fish and other aquatic species could be affected by water depletions downstream?

Project-related water depletions from the upper Colorado River basin have the potential to affect four federally listed Colorado River watershed fish species in critical habitat outside the action area:

- Colorado pikeminnow
- Razorback sucker
- Humpback chub
- Bonytail chub

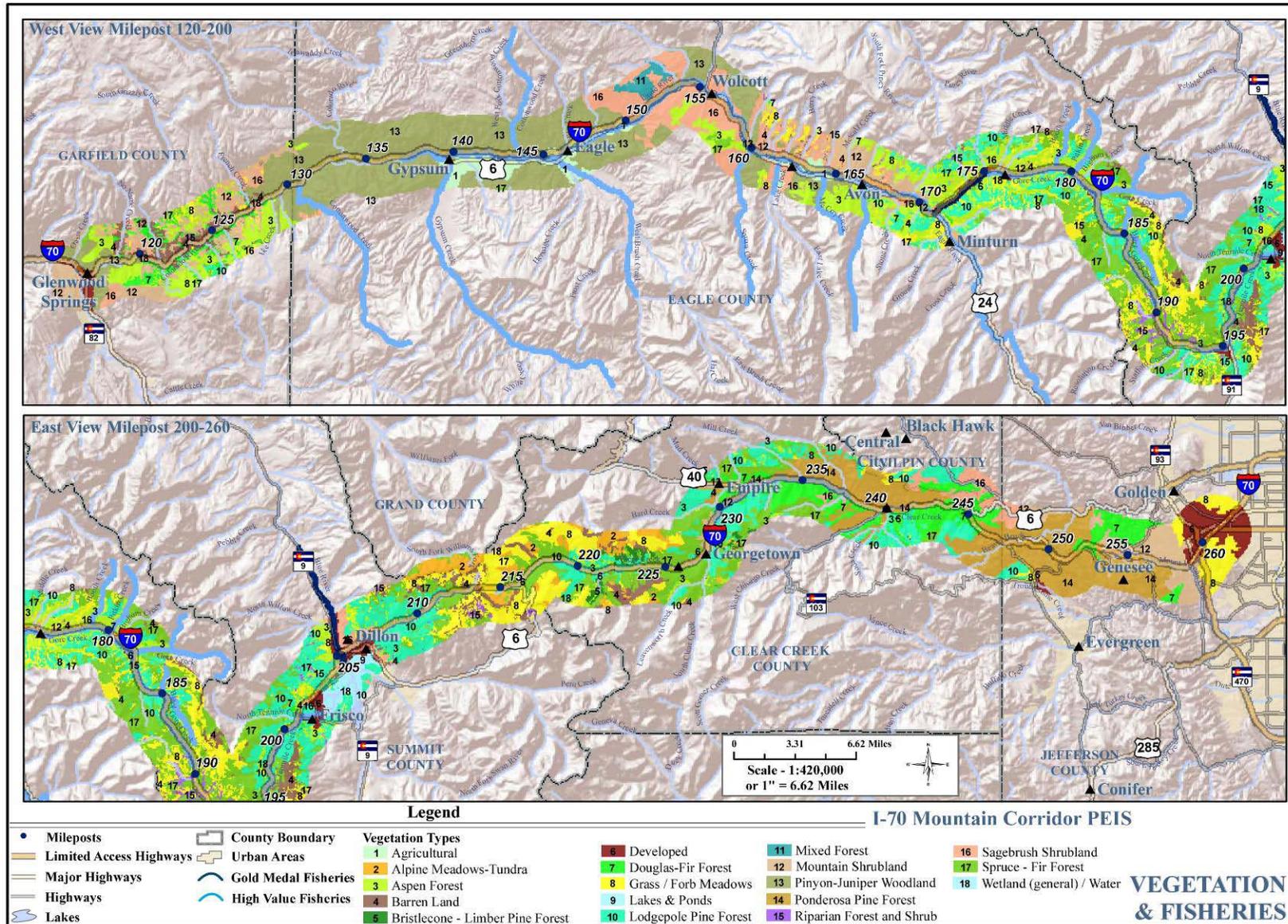
As a result, the lead agencies must consult with the United States Fish and Wildlife Service under Section 7 of the Endangered Species Act for actions that cause or authorize a water depletion in the basin.

According to the United States Fish and Wildlife Service, any depletion to the Platte River basin constitutes an action that may affect, and is likely to adversely affect, threatened, endangered, and special status species that depend on the river for their existence. Threatened, endangered, and special status species downstream along the central and lower Platte River and Missouri River include:

- Whooping Crane
- Interior population of the Least Tern
- Piping Plover
- Western prairie fringed orchid
- Pallid sturgeon

In Colorado, other federally listed species potentially affected by depletions include those that are dependent on riparian systems near the Corridor, such as the threatened Preble's meadow jumping mouse and the Ute ladies'-tresses orchid.

Figure 3.2-3. Fisheries and Vegetation



## 3.2. Biological Resources

### 3.2.5 How do the alternatives affect biological resources?

From an ecological standpoint, the I-70 Mountain Corridor presents several complex issues for transportation planning and impact assessment, as the Corridor passes through numerous life zones. Therefore, Action Alternatives may affect a wide variety of ecological resources, including, but not limited to, unique and rare plant communities; wildlife migration patterns; general wildlife habitat, including summer and winter ranges; and aquatic resources. Project construction may also cause the death of some birds, small mammals, invertebrates, and plants. Impacts on resources groupings are discussed in greater detail below.

#### How were impacts calculated?

The Colorado Department of Transportation determined effects on biological resources by overlaying a project footprint of each alternative into a geographic information system containing the locations of the specific resource, such as habitat or wildlife crossings. The project footprint includes the physical footprint of the alternatives plus an additional 30 feet on each side. The 30 feet includes a 15-foot construction disturbance zone and an additional 15-foot sensitivity zone. Direct impacts occur where resources are located directly beneath the project footprint. Indirect impacts, occurring either farther away or later in time, can occur beyond the Action Alternatives footprint.

This document examines impacts along the entirety of the Corridor, and includes a 30-foot buffer around the physical footprint of the alternatives. This document provides a summary of all impacts, including biological resources. For additional detail see the *I-70 Mountain Corridor PEIS Biological Resources Technical Report* (CDOT, March 2011), and the *I-70 Mountain Corridor PEIS Programmatic Biological Report* (CDOT, 2011b) and *I-70 Mountain Corridor PEIS Programmatic Biological Assessment* (CDOT, 2011a), which provide additional analysis for specific species as follows. The Programmatic Biological Report analyzes those species identified to exist on either the Arapaho and Roosevelt National Forests or the White River National Forest. The analysis of these species relates only to those impacts occurring on National Forest System lands. The Programmatic Biological Assessment examines species throughout the Corridor, whether or not they are on National Forest System lands. Due to the large presence of National Forest System lands along the Corridor, there is considerable overlap in the lists of protected species and the acreages of impacts appearing in the two documents; however, they are not always identical.

#### How do the alternatives affect vegetation?

Direct impacts on vegetation occur when construction of new roadway or transit infrastructure removes existing vegetation. This decreases the natural function of the landscape and removes wildlife habitat. Loss of habitat results in a loss of foraging, nesting, and resting and denning areas for wildlife, which includes protected species.

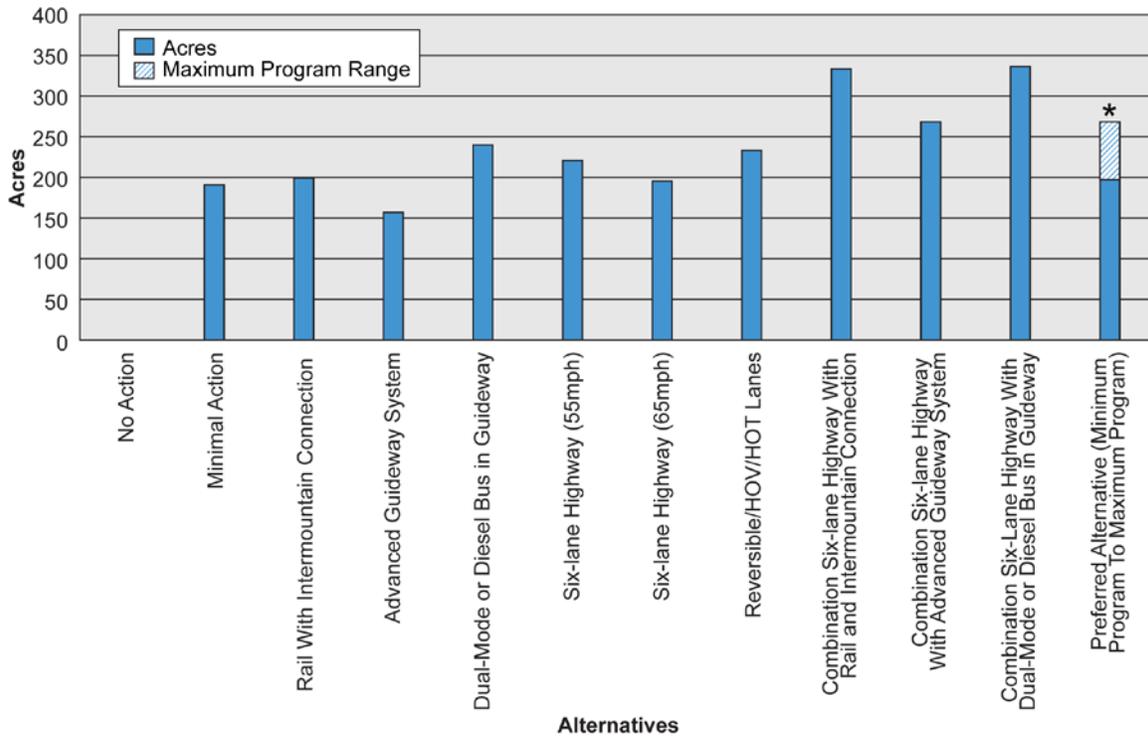
The Highway alternatives and the Combination alternatives have the greatest impact on vegetation. The Advanced Guideway System Alternative has the fewest direct impacts due to its smaller footprint. The Preferred Alternative has a range of potential impacts comparable to nearly all the Action Alternatives. **Chart 3.2-1** shows a comparison of direct impacts by alternative.

Indirect impacts on vegetation, including riparian habitat, include the effects of winter roadway maintenance associated with deicers. Impacts are greatest nearest the highway, but splash, runoff, and aerial drift can affect vegetation more than 300 feet from the highway. These salts can damage the needles and photosynthetic tissue of coniferous trees and result in lower germination rates. Also, land disturbance caused by construction and increased traffic within the Corridor create favorable conditions for the introduction and further spread of noxious weeds into adjacent lands. These lands include wildlife habitat located on public lands, such as National Forests and designated wilderness areas. Alternatives that add

more traffic lanes (such as the Highway and Bus in Guideway Alternatives) require additional winter maintenance leading to increased impacts compared to alternatives with less new roadway construction.

Additional temporary disturbance to vegetation is expected during construction. The temporary removal of vegetation may result in some small animal mortality and big game or bird species leaving the area. Forested lands will take the longest to return to their original state and grasslands will recover quickest. These impacts are offset by mitigation strategies discussed in **Section 3.2.7**.

**Chart 3.2-1. Vegetation, Direct Impacts (Acres)**



\* Impacts of the Preferred Alternative are presented as a range, with the solid and hatched bars together representing the full implementation of the Preferred Alternative. The solid bar represented implementation of the Minimum Program of Improvements only. The hatched area is presented as a range because the adaptive management component of the Preferred Alternative allows it to be implemented based on future needs and associated triggers for further action. Section 2.7.2 describes the triggers for implementing components of the Preferred Alternative. For NEPA documentation and analysis purposes and based on information available today, the Preferred Alternative must be fully implemented to meet the 2050 purpose and need. The Minimum Program of Improvements does not meet the 2050 purpose and need.

**Key to Abbreviations/Acronyms**

AGS = Advanced Guideway System      HOT = High Occupancy Toll      HOV = High Occupancy Vehicle  
 IMC = Intermountain Connection      mph = miles per hour

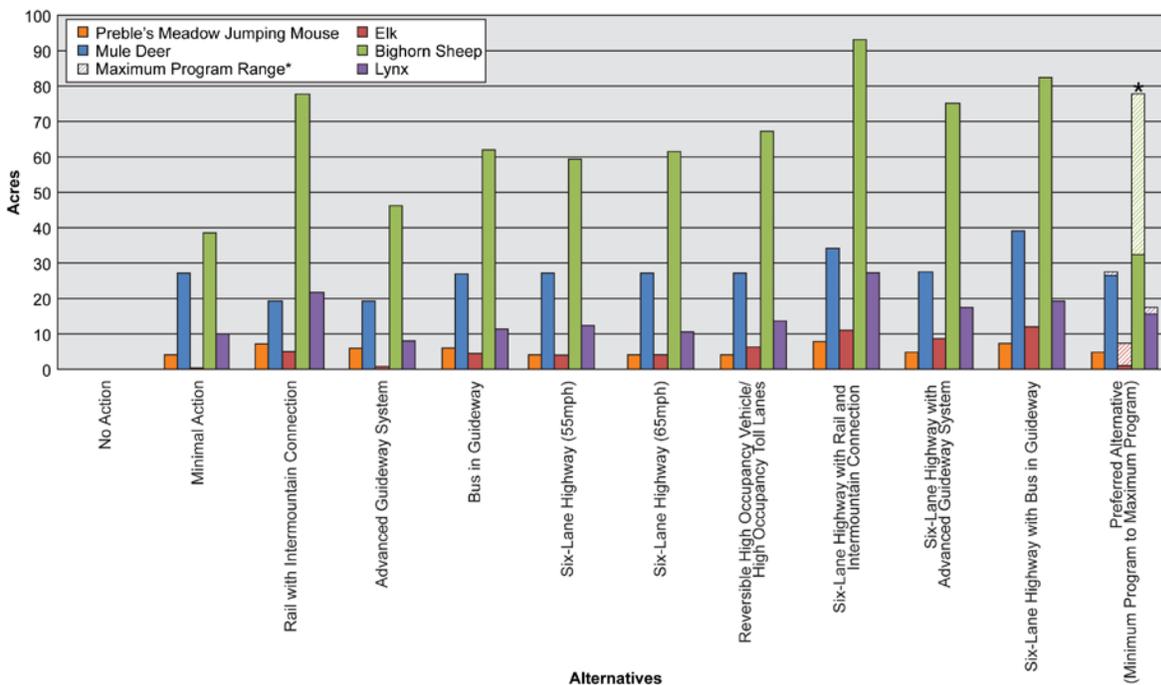
**How do the alternatives affect wildlife?**

Direct impacts on wildlife include loss of habitat due to construction and the increased barrier effect due to new roadway or transit improvements. The greatest impact is from the Highway and Combination alternatives. The Preferred Alternative has a range of potential impacts comparable to nearly all other Action Alternatives. **Chart 3.2-2** details direct Corridorwide habitat losses for Canada lynx and Preble’s meadow jumping mouse, which are protected under the Endangered Species Act. It also identifies impacts

## 3.2. Biological Resources

to elk, mule deer, and bighorn sheep habitat, which are Management Indicator Species for the United States Forest Service.

**Chart 3.2-2. Habitat Loss, Direct Impacts (Acres)**



\* Impacts of the Preferred Alternative are presented as a range, with the solid and hatched bars together representing the full implementation of the Preferred Alternative. The solid bar represented implementation of the Minimum Program of Improvements only. The hatched area is presented as a range because the adaptive management component of the Preferred Alternative allows it to be implemented based on future needs and associated triggers for further action. Section 2.7.2 describes the triggers for implementing components of the Preferred Alternative. For NEPA documentation and analysis purposes and based on information available today, the Preferred Alternative must be fully implemented to meet the 2050 purpose and need. The Minimum Program of Improvements does not meet the 2050 purpose and need.

### Key to Abbreviations/Acronyms

mph = miles per hour

Lead agencies studied the barrier effect of the I-70 Mountain Corridor by considering the additional lanes, fencing, and retaining walls required for each Action Alternative. An increase in the barrier effect leads to increased animal-vehicle collisions, as wildlife attempting to cross the highway face additional travel lanes, walls, or fencing, slowing or blocking their passage.

Alternatives that extend through the greatest length of the Corridor (for example, Rail with Intermountain Connection, Advanced Guideway System, and the Combination alternatives) offer the greatest opportunities to mitigate the existing barrier effects in the linkage interference zones. Therefore, the longer the Action Alternative, the more existing barriers are mitigated. If an Action Alternative does not encounter an existing barrier, then the barrier is altered only through partnering opportunities with other stakeholders. The No Action Alternative has the greatest impacts on wildlife because the existing habitat connectivity issues are not addressed.

Rail with Intermountain Connection and Bus in Guideway Alternatives require more walls and fencing than the Advanced Guideway System Alternative, and have the greatest impact on wildlife movement of all the Transit alternatives. The Six-Lane Highway (55 and 65 miles per hour) and Reversible/High Occupancy Vehicle/High Occupancy Toll Lanes Alternatives result in two additional 12-foot-wide traffic lanes and require guardrails and barriers in select locations. The Combination alternatives increase the barrier effect, with the Combination Six-Lane Highway with Advanced Guideway System Alternative

having the least impact, as the Advanced Guideway System requires fencing only at piers and other select locations, as opposed to throughout its entire length. The Preferred Alternative has a range of potential impacts that could be comparable to the three Combination alternatives.

Through the implementation of the processes in the ALIVE Memorandum of Understanding (see **Appendix E, ALIVE Memorandum of Understanding**), the impacts of the barrier effect are reduced. **Section 3.2.7** further discusses mitigation strategies regarding animal-vehicle collisions.

Indirect impacts on wildlife include those associated with winter maintenance, noise, and habitat loss due to induced growth. Wildlife can be attracted to the salts from deicers. While no studies have been completed in Colorado, other studies have identified road salt attraction as a main reason for kills of bighorn sheep and a minor reason for kills of elk due to animal-vehicle collisions. Operational noise impacts can lead to changed migration and breeding habits. For additional information on indirect effects of salts and road noise, see the *I-70 Mountain Corridor PEIS Biological Resources Technical Report* (CDOT, March 2011).

Induced growth leads to habitat loss. Transit alternatives and Highway alternatives affect growth patterns differently and are discussed in **Chapter 4, Cumulative Impacts Analysis**.

Additional temporary disturbance to wildlife species is expected during construction. Noise, dust, erosion, and air pollution are all examples of stresses placed on wildlife during construction, which can lead to displacement or morbidity due to stress. These construction activities may result in vegetation being temporarily removed, some small animal mortality, and big game or bird species leaving the area. Specific construction-related mitigation will be implemented to minimize these impacts as much as possible. The area of impact will be minor compared to the area of habitat available.

### How do the alternatives affect fisheries and aquatic species?

The removal, modification, or disturbance of habitat has an impact on fisheries and aquatic species. Impacts include the effects of increased sedimentation and reduced water quality as a result of construction, operation, and maintenance of an alternative. **Chart 3.2-3** details the potential impacts on Gold Medal and “high-value” fisheries. For additional information regarding recreation areas and stream access, see **Section 3.12, Recreation** and **Section 6(f) Evaluation**. **Section 3.2.7** discusses mitigation strategies for aquatic habitat.

Impacts on Gold Medal and “high-value” fisheries are greatest for the Combination alternatives and Rail with Intermountain Connection Alternative. The Preferred Alternative has a range of impacts comparable to the range of impacts between the Combination alternatives and Rail with Intermountain Connection Alternative.

Additional temporary disturbance to aquatic resources is expected during construction. These impacts include increased erosion, sedimentation and runoff, and spilled fuels that potentially reduce the water quality in streams, rivers, lakes, and reservoirs.

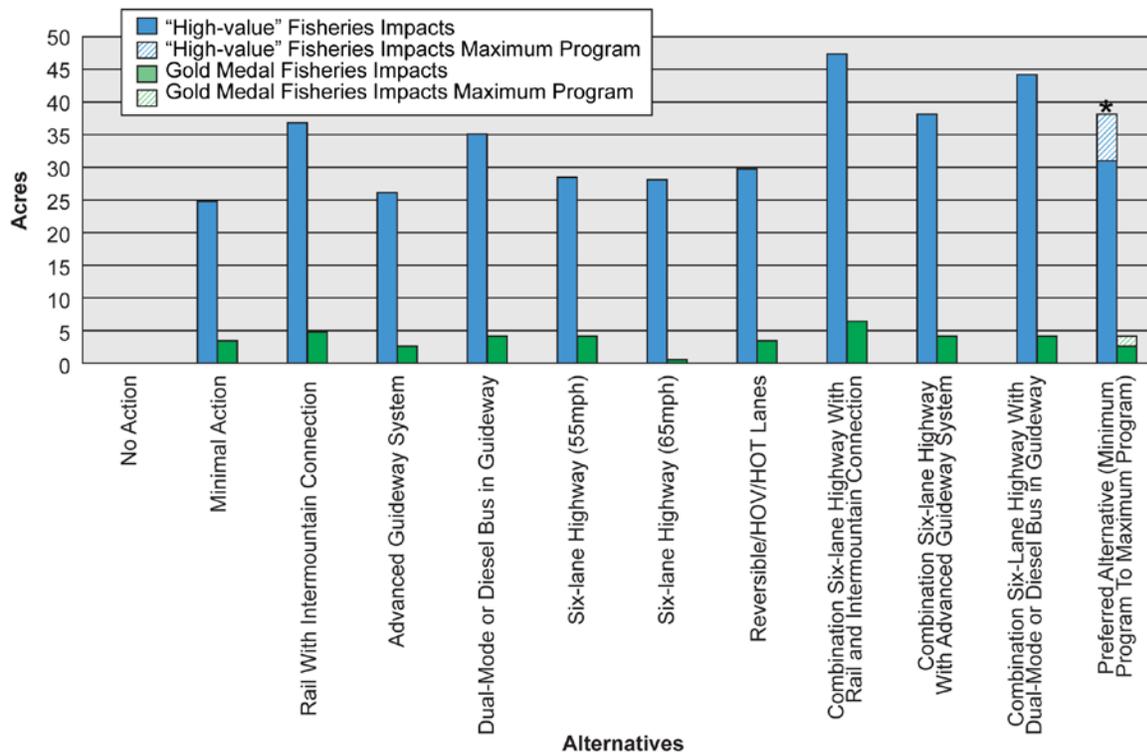
In addition to analysis of direct impacts on protected species within the I-70 Mountain Corridor, depletion to the Platte River or Colorado River basins constitutes an action that may affect, and is likely to adversely affect, threatened, endangered, proposed, and candidate species that depend on the river for their existence. Specific water depletions will be determined during Tier 2 processes as site-specific biological assessments per the Programmatic Biological Assessment and Biological Opinion are prepared as agreed to with the United States Fish and Wildlife Service.

## 3.2. Biological Resources

### How will winter maintenance activities affect fisheries and aquatic species?

Liquid deicer and traction sand are currently used in the I-70 Mountain Corridor. Liquid deicers are linked with increasing chloride levels in local streams. Traction sand causes sedimentation of streams, which can degrade habitat, impede spawning by blanketing the streambed, and reduce populations of macroinvertebrates on which fish feed. Alternatives that add more traffic lanes, the Highway and Bus in Guideway Alternatives, require additional winter maintenance, thereby leading to increased water quality impacts when compared to alternatives with less new roadway construction (see **Section 3.4, Water Resources**).

**Chart 3.2-3. Impacts on Gold Medal and “High-Value” Fisheries (Acres)**



\* Impacts of the Preferred Alternative are presented as a range, with the solid and hatched bars together representing the full implementation of the Preferred Alternative. The solid bar represented implementation of the Minimum Program of Improvements only. The hatched area is presented as a range because the adaptive management component of the Preferred Alternative allows it to be implemented based on future needs and associated triggers for further action. Section 2.7.2 describes the triggers for implementing components of the Preferred Alternative. For NEPA documentation and analysis purposes and based on information available today, the Preferred Alternative must be fully implemented to meet the 2050 purpose and need. The Minimum Program of Improvements does not meet the 2050 purpose and need.

#### Key to Abbreviations/Acronyms

HOT=High Occupancy Toll

HOV=High Occupancy Vehicle

mph = miles per hour

### How do the alternatives affect protected species?

Direct impacts to Canada lynx and Preble’s meadow jumping mouse are detailed in **Chart 3.2-2**, above. The Preferred Alternative has a range of impacts from 0.9-1.1 acres for greenback cutthroat trout habitat. This is comparable to all the Combination alternatives, the Rail with Intermountain Connection Alternative, and the Bus in Guideway Alternatives. The Preferred Alternative, Maximum Program, if implemented, will impact 37.6 acres of Yellow-billed Cuckoo habit. For the detailed assessment of all

evaluated species, including the methodology to determine a given species' occurrence or absence within the Corridor and additional detail regarding indirect impacts, see the *I-70 Mountain Corridor PEIS Biological Resources Technical Report* (CDOT, March 2011).

**Table 3.2-3** summarizes the effects of alternatives on protected species, as determined in coordination with the United States Fish and Wildlife Service and United States Forest Service. **Table 3.2-3** includes only those species determined to occur in the Corridor. See the *I-70 Mountain Corridor PEIS Biological Resources Technical Report* (CDOT, March 2011), which includes the following information:

- A complete list of all species considered for analysis
- Impact numbers
- History
- Distribution
- Environmental baseline information
- Effects and rationale for protected species

The analysis of protected species will be approached conservatively until site-specific needs are determined. For Tier 1 processes, all Action Alternatives, including the Preferred Alternative, had the same effects determination and were condensed into a single column in the table. Action Alternatives have greater impacts than the No Action Alternative. Impacts associated with Action Alternatives increase proportionally to the amount of occupied area disturbed from each Action Alternative and with increasing recreational visitor use. Aquatic species are determined to be affected until water requirements are known for specific projects.

### What are the project effects on biological resources in 2050?

By 2050, potential effects of climate change and the dynamic natural response to mountain pine beetle infestation could alter the existing terrestrial and aquatic habitat along the Corridor. These potential changes include, but are not limited to, alterations to existing vegetation communities, water quality concerns due to runoff from forests in early succession, and changes to the hydrologic cycle. The changes in habitat, and subsequent change in species present, alter the wildlife management efforts of the United States Fish and Wildlife Service, the United States Forest Service, and the Colorado Division of Wildlife, so the project could affect species currently not found in the Corridor but occurring there in the future. Continued habitat loss may occur due to commercial and residential development but may taper off by 2050 because of limited water resources and land use management. Benefits from the ALIVE and SWEEP Memoranda of Understanding could improve wildlife movement and protect aquatic resources, respectively.

For information on cumulative effects, see **Chapter 4, Cumulative Impacts Analysis**, of this document.

### 3.2. Biological Resources

**Table 3.2-3. Protected Species Impact Determinations**

Impact Determination <sup>b</sup>				
Common Name	Scientific Name	Status <sup>a</sup>	No Action	All Action Alternatives
<b>Federally Listed Species</b>				
Canada lynx	<i>Lynx canadensis</i>	FT	LAA, NCEL	LAA, PCEL
Preble's meadow jumping mouse	<i>Zapus hudsonius preblei</i>	FT	LAA	LAA
Least tern	<i>Sterna antillarum</i>	FE	NE	LAA
Piping plover	<i>Charadrius melodus</i>	FT	NE	LAA
Whooping crane	<i>Grus americana</i>	FE	NE	LAA
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	FC	NE	NE
Bonytail chub	<i>Gila elegans</i>	FE	NE	LAA
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	FE	NE	LAA
Humpback chub	<i>Gila cypha</i>	FE	NE	LAA
Razorback sucker	<i>Xyrauchen texanus</i>	FE	NE	LAA
Pallid sturgeon	<i>Scaphirhynchus albus</i>	FE	NE	LAA
Greenback cutthroat trout	<i>Oncorhynchus clarki stomias</i>	FT, FS-MIS	NE	LAA
Western prairie fringed orchid	<i>Platanthera praeclara</i>	FT	NE	LAA
Ute ladies'-tresses orchid	<i>Spiranthes diluvialis</i>	FT	NE	LAA
<b>State-Listed Species</b>				
Common garter snake	<i>Thamnophis sirtalis</i>	SSC		
Midget faded rattlesnake	<i>Crotalus oreganus concolor</i>	SSC		
<b>United States Forest Service-Sensitive Species</b>				
Pygmy shrew	<i>Sorex hoyi montanus</i>	FS	MAII, NCEL	MAII, NCEL
River otter	<i>Lontra canadensis</i>	FS	MAII, NCEL	MAII, NCEL
American marten	<i>Martes americana</i>	FS	MAII, NCEL	MAII, PCEL
North American wolverine	<i>Gulo gulo luscus</i>	FS	MAII, NCEL	MAII, PCEL
Fringed myotis	<i>Myotis thysanodes</i>	FS-S	MAII	MAII
Bighorn sheep	<i>Ovis canadensis</i>	FS	MAII, NCEL	MAII, PCEL
Bald eagle	<i>Haliaeetus leucocephalus</i>	FS	MAII	MAII
Northern goshawk	<i>Accipiter gentilis</i>	FS	MAII	MAII
American peregrine falcon	<i>Falco peregrinus anatum</i>	FS	MAII	MAII
White-tailed ptarmigan	<i>Lagopus leucurus</i>	FS	MAII	MAII
Boreal owl	<i>Aegolius funereus</i>	FS	MAII	MAII
Flammulated owl	<i>Otus flammeolus</i>	FS	MAII	MAII
Black swift	<i>Cypseloides niger</i>	FS	MAII	MAII
Brewer's sparrow	<i>Spizella breweri</i>	FS	MAII	MAII
American three-toed woodpecker	<i>Picoides tridactylus dorsalis</i>	FS	MAII	MAII
Olive-sided flycatcher	<i>Contopus cooperi</i>	FS	MAII	MAII

Status  
 FE = Federally listed as endangered  
 FT = Federally listed as threatened  
 FC = Federal candidate for listing  
 FS-S = Listed as Forest Service Sensitive species  
 FS-MIS = Management Indicator Species  
 SSC = State Species of Special Concern

<sup>b</sup> Impact Determinations  
**Federal Determinations**  
 NE = No Effect  
 LAA = Likely to Adversely Affect  
 NLAA = May Affect, Not Likely to Adversely Affect  
**Other PEIS Determinations**  
 PCEL = Positive Wildlife Crossing Effects Likely  
 NCEL = Negative Wildlife Crossing Effects Likely

Impact Determination <sup>b</sup>				
Common Name	Scientific Name	Status <sup>a</sup>	No Action	All Action Alternatives
<b>United States Forest Service-Sensitive Species, Continued</b>				
Boreal toad	<i>Bufo boreas boreas</i>	FS	MAII, NCEL	MAII, NCEL
Northern leopard frog	<i>Rana pipiens</i>	FS	MAII, NCEL	MAII, NCEL
Colorado River cutthroat trout	<i>Oncorhynchus clarki pleuriticus</i>	FS	MAII	MAII
Bluehead sucker	<i>Catostomus discobolus discobolus</i>	FS	MAII	MAII
Flannelmouth sucker	<i>Catostomus latipinnis</i>	FS	MAII	MAII
All FS-S plants analyzed except upswept moonwort	See Biological Report (Table BR-3)	FS	MAII*	MAII*
Upswept Moonwort	<i>Botrychium ascendens</i>	FS	MAII	MAII / LRLV
<b>United States Forest Service Management Indicator Species</b>				
<b>White River National Forest</b>				
Elk	<i>Cervus elaphus</i>	FS	PEU	PEU
Virginia's warbler	<i>Vermivora virginiae</i>	FS	PEU	PEU
All trout	All species	FS	PEU	PEU
Aquatic macroinvertebrates	All species	FS	PEU	PEU
<b>Arapaho and Roosevelt National Forests</b>				
Elk	<i>Cervus elaphus</i>	FS	PEU, HEU, NCEL	PEU
Mule deer	<i>Odocoileus hemionus</i>	FS	PEU, HEU, NCEL	PEU
Bighorn sheep	<i>Ovis canadensis</i>	FS	PEU, HEU, NCEL	PEU
Hairy woodpecker	<i>Picoides villosus</i>	FS	PEU, HEU	PEU
Pygmy nuthatch	<i>Sitta pygmaea</i>	FS	PEU, HEU	PEU
Mountain bluebird	<i>Sialia currucoides</i>	FS	PEU, HEU	PEU
Warbling vireo	<i>Vireo gilvus</i>	FS	PEU, HEU	PEU
Wilson's warbler	<i>Wilsonia pusilla</i>	FS	PEU, HEU	PEU
Trout species (brook, brown)	( <i>Salvelinus fontinalis</i> and <i>Salmo trutta</i> )	FS	PEU, HEU	PEU
Boreal toad	<i>Bufo boreas boreas</i>	FS	NCEL	PEU
Greenback cutthroat trout	<i>Oncorhynchus clarkii stomias</i>	FT, FS	HEL	PEU

\* Action Alternatives have relatively greater impacts on occupied habitats than the No Action Alternative. Impacts associated with Action Alternatives increase proportionally based on the extent occupied areas are disturbed and recreational visitor use increases under each Action Alternative.

**United States Forest Service Determinations**  
 NI = No Impact  
 MAII = May adversely impact individuals but not likely to result in a loss of viability in the Planning area nor cause a trend to federal listing.  
 LRLV = Likely to result in loss of species viability

**Management Indicator Species Determinations**  
 PEU = Population Effects Unlikely  
 HEU = Habitat Effects Unlikely  
 PEL = Population Effects Likely  
 HEL = Habitat Effects Likely

### 3.2.6 What will be addressed in Tier 2 processes?

Lead agencies will conduct further analysis of direct and indirect impacts on biological resources, including protected species, during future project-specific Tier 2 processes. The following actions are included:

- Lead agencies will perform surveys for protected species and their habitat. The United States Fish and Wildlife Service, United States Forest Service, and Colorado Division of Wildlife will provide relevant and updated species lists. This information will be incorporated into the project's design to avoid or minimize effects on such species. Lead agencies will complete a biological assessment and biological report, using the Tier 1 process as a foundation, to analyze impacts on protected species.
- Lead agencies will determine the effects on federally listed species that occur downstream from the I-70 Mountain Corridor in coordination with the United States Fish and Wildlife Service.
- Lead agencies will discuss the influence of the mountain pine beetle on the forested communities and its effects on wildlife habitat, in coordination with the United States Fish and Wildlife Service and United States Forest Service.
- Lead agencies will evaluate potential mitigation for winter maintenance and noise effects based on current research.
- Lead agencies will adhere to any new or revised laws or regulations pertaining to biological resources.
- Lead agencies will develop specific best management practices for each project.
- Lead agencies will develop specific and more detailed mitigation strategies and measures.
- Lead agencies will consider opportunities for enhancement on a project-by-project basis.
- Lead agencies will evaluate fisheries, including localized temperature concerns.
- Lead agencies will develop a Tier 2 Biological Impacts Plan to include analysis of sensitivity zones, terrestrial impacts, habitat connectivity, and cumulative impacts.
- Lead agencies will fulfill responsibilities set forth in the ALIVE and SWEEP Memoranda of Understanding.

### 3.2.7 What are the approaches to programmatic mitigation planning for biological resources?

A phased approach to construction provides the opportunity for adapting transportation solutions to the environmental sensitivity of the I-70 Mountain Corridor over time. The phased approach allows ongoing opportunities to avoid and minimize environmental impacts, establish effective mitigation, and employ I-70 Mountain Corridor Context Sensitive Solutions strategies. In summary, the overall mitigation strategies provide the opportunity to reduce impacts on wildlife habitats and enhance the compatibility of the I-70 Mountain Corridor with regional wildlife movement and habitat connectivity. **Section 3.19, Mitigation Summary**, also provides a discussion of mitigation strategies.

#### How will vegetation and habitat impacts be minimized?

The Colorado Department of Transportation will identify areas of potential habitat restoration, in coordination with the United States Forest Service 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. Also, mitigation of protected bird and fish species will comply with South Platte Water

## 3.2. Biological Resources

Related Activities Program, the Platte River Recovery Implementation Program, and the Colorado River Recovery Implementation Program.

### How will the spread of noxious weeds be minimized?

The Colorado Department of Transportation 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 best management practices 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. The Colorado Department of Transportation will prepare and implement Noxious Weed Management Plans for all projects, which are usually completed just 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 best management practices that will be used to eradicate or control weeds during and after construction. These best management practices 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 Supervisors.

### How will winter maintenance and deicer impacts be minimized?

The Colorado Department of Transportation will limit the effects of winter maintenance by controlling the runoff of contaminants and winter maintenance materials to the greatest extent possible. The Colorado Department of Transportation will continue to refine its approach to winter maintenance in an effort to decrease the use of deicers and traction sand. Mitigation strategies will be designed to be complementary to the existing Sediment Control Action Plans on Straight Creek, Black Gore Creek, and Clear Creek.

### How will habitat connectivity be improved and animal-vehicle collisions reduced?

Lead agencies will follow the processes outlined in the ALIVE Memorandum of Understanding (see **Appendix E, ALIVE Memorandum of Understanding**) to reduce animal-vehicle collisions and increase habitat connectivity throughout the Corridor. This includes, but is not limited to, the use of underpasses or overpasses dedicated to wildlife movement, fencing, berms, and vegetation to guide wildlife to crossing structures and signage to alert motorists of wildlife presence. In addition, existing natural features that enhance habitat connectivity, such as the Twin Tunnels Wildlife Land Bridge, will be protected, if feasible.

### How will aquatic habitat be protected?

Lead agencies will incorporate the recommendations developed by the SWEEP Committee. In addition, CDOT will use best management practices and erosion control measures to reduce soil losses, soil inundation, and sedimentation in areas adjacent to the construction area and provide sufficient cross-slope drainage structures during new construction to allow natural hydrologic conditions to be maintained on both sides of the right-of-way. Fish habitat will be restored and replaced using photo documentation to help return these areas to previous conditions.