

5.13 Biological Resources

This section provides a summary of the biological resources in the study area and explains why they are important. The impacts of the project alternatives on the biological resources also are evaluated, then proposed mitigation measures are discussed to offset any potential adverse effects.

Since the Supplemental Draft EIS was published in August 2014, additional analyses and content review have been performed for many of the resources discussed in this document. These updates, along with changes resulting from the comments received on the Supplemental Draft EIS, have been incorporated into this Final EIS. In this section, the updates include the following items:

- Based on the revised construction limits, impacts were updated.
- Agency coordination required by law was updated.
- Impact calculation methodology was refined.
- Mitigation of impacts to biological resources was updated to reflect new guidance and standards.

5.13.1 What are biological resources and why are they important to this project?

Biological resources collectively define the types of animal and plant species that may be found within the study area. Animal species (wildlife)—both native and exotic—include mammals, birds, reptiles, amphibians, and fish. Plant or vegetation communities are classified as distinct groupings of individual species that occur in areas with similar physical environmental characteristics.

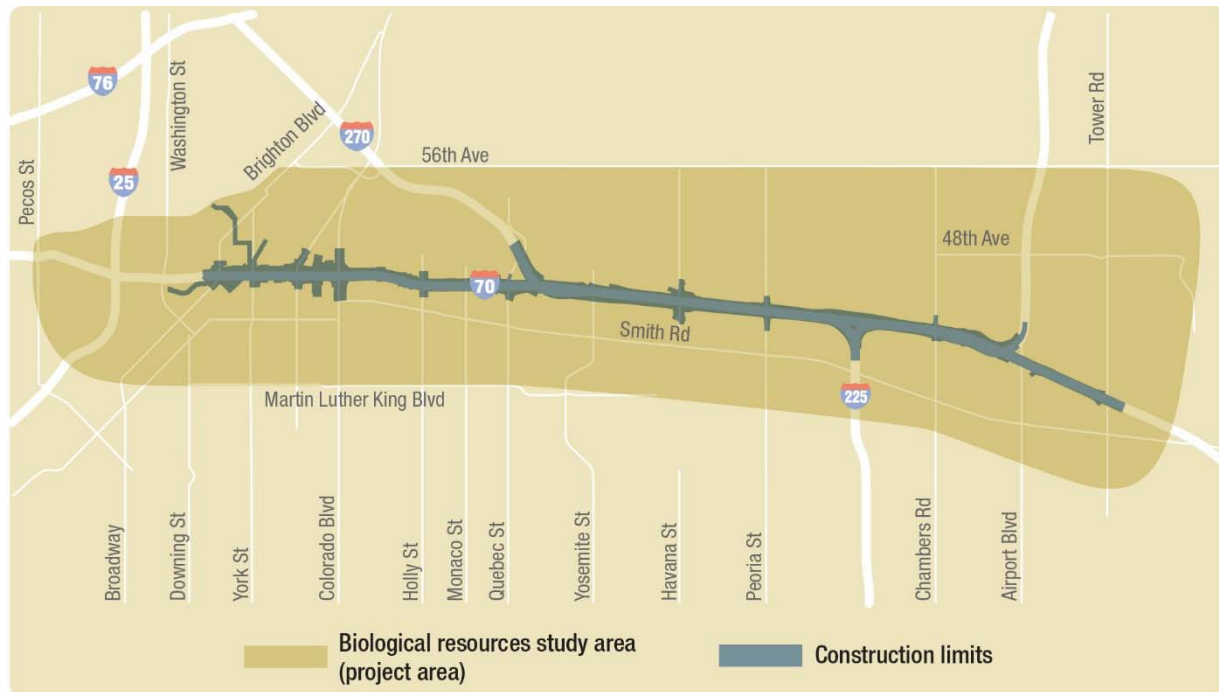
Special-status species (both wildlife and vegetation) are those that are listed or are candidates for listing as threatened or endangered under the federal Endangered Species Act of 1973 by the U.S. Fish and Wildlife Service (USFWS), and species in Colorado designated as endangered, threatened, or of special concern by CPW.

The existence and preservation of animals and plants are intrinsically valuable; these resources provide aesthetic, recreational, and economic value to the community. This analysis focuses on species that typically occupy the habitats of the study area, those that may be important to the function of the ecosystem, and those that are of special societal importance.

5.13.2 What study area and evaluation process were used to analyze biological resources?

Biologists from CDOT, CPW, USFWS, and various nonprofit agencies—including Sand Creek Regional Greenway, Bluff Lake Nature Center, and the Rocky Mountain Bird Observatory—were contacted to help describe wildlife resources in the study area (see **Exhibit 5.13-1**).

Exhibit 5.13-1 Biological Resources Study Area



Although no formal surveying or sampling for wildlife was conducted for this project, observations of wildlife and signs of wildlife use were noted during field visits. Field visits were conducted in August 2005, September 2012, November 2012, and April 2015. A literature and records review was conducted, including a review of the Natural Diversity Information Source (NDIS) (NDIS, 2012), to determine species habitat needs and records of species presence in Denver and Adams counties. Species activity maps from CPW also were used to document seasonal activity of deer, Bald Eagles, and black-tailed prairie dogs within the study area.

Impact calculations were tabulated by overlaying the construction limits of each alternative with the areas of the species analyzed. Some habitat areas intersect the existing I-70 roadway footprint. These locations were subtracted out of the total impact calculations.

Vegetation and cover types were identified within the study area from Gap Analysis Program data (USGS, 2011), riparian mapping data (CPW, 2012), and field visits. The method to calculate impacts to riparian areas used the construction limits of each alternative. Areas where the construction limits intersected the riparian areas were counted as permanent impacts. Riparian areas within a 10-foot buffer around the construction limits were counted as temporary impacts.

5.13.3 What are the existing conditions of biological resources analyzed in the study area?

Wildlife

The study area is primarily urban and contains little wildlife habitat. There is no known critical or essential wildlife habitat within the study area. Nevertheless, rivers and streams serve as movement corridors for urban wildlife. Also, there are several designated natural areas that occur adjacent to the study area, including the Sand Creek Regional Greenway, the Bluff Lake Nature Center, and Rocky Mountain Arsenal National Wildlife Refuge (Refuge).

The most natural segment in the study area is along Sand Creek, which contains upland, riparian, wetland, and aquatic habitats. While still highly impacted by the surrounding urban environment, it does provide habitat to a number of species. The Sand Creek Regional Greenway is a trail and nature area that spans 14 miles from the High Line Canal in Aurora to the Platte River Greenway in Commerce City and intersects the study area just east of Quebec Street. The executive director of the Sand Creek Regional Greenway was contacted to obtain updated information concerning special-status species and other general wildlife in the area. The Greenway facilitates urban wildlife, such as mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), muskrats (*Ondatra zibethicus*), coyotes (*Canis latrans*), beavers



Sand Creek immediately north of I-70

(*Castor canadensis*), King Fishers (*Alcedininae* spp.), Blue Heron (*Ardea herodias*), Wild Turkey (*Meleagris gallopavo*), red fox (*Vulpes vulpes*), along with many other species (Refuge, 2014).

Bald Eagles are known to occupy the Sand Creek Regional Greenway during the winter months from November through March, especially near Morrison Nature Center on Star K Ranch in Aurora, Colorado, and the Bluff Lake Nature Area in Denver, Colorado. However, no Bald Eagle nesting sites have been documented within the study area near the greenway (Refuge, 2014).

The Bluff Lake Nature Center is a 123-acre natural area located along Sand Creek that includes a seasonal lake, emergent wetlands, short-grass prairie, mixed-grass prairie, a riparian zone, and forested wetland. Located approximately one-half mile south of the study area east of Havana Street, the Bluff Lake Nature Center is home to urban wildlife, including deer, fox, beaver, reptiles, amphibians, and more. Bluff Lake Nature Center provided a list of 158 bird species that have been recorded near the center. The list includes the Ferruginous Hawk, Bald Eagle, and Golden Eagle. Based on consultation with Bluff Lake Nature Center's executive director, Bald and Golden Eagles are known to occupy trees near the Bluff Lake Nature Center; however, no nesting activity has been documented (Bluff Lake Nature Center, 2014).

The Refuge, part of the USFWS National Wildlife Refuge System, is located approximately 1.25 miles north of I-70. Habitat at the Refuge includes small patches of relatively undisturbed native prairie, wooded areas, and wetlands. It is home to several species of bats and birds, various fish species, black-tailed prairie dogs (*Cynomys ludovicianus*), coyotes, mule deer, numerous species of reptiles, amphibians, and insects. Bald Eagles have been known to nest on the Refuge in the past and often utilize the area for winter roosting. Currently, there is one known active nesting site on the Refuge located approximately 1.5 miles north of the study area (CPW Public SAM Data, 2014).

The South Platte River also flows through the study area. It provides extremely limited habitat, and what is available is highly degraded. Both the South Platte River and Sand Creek provide movement corridors for wildlife and bird species, and are considered to contain appropriate numbers and diversity of fish species for metropolitan rivers.

Additional habitats, including stormwater detention basins, also provide some habitat to waterfowl and other wildlife, but are highly impacted by trash and poor water quality. Wetland habitats, Sand Creek, and the South Platte River are discussed in more detail in Section 5.15, Wetlands and Other Waters of the U.S., and Section 5.16, Water Quality.

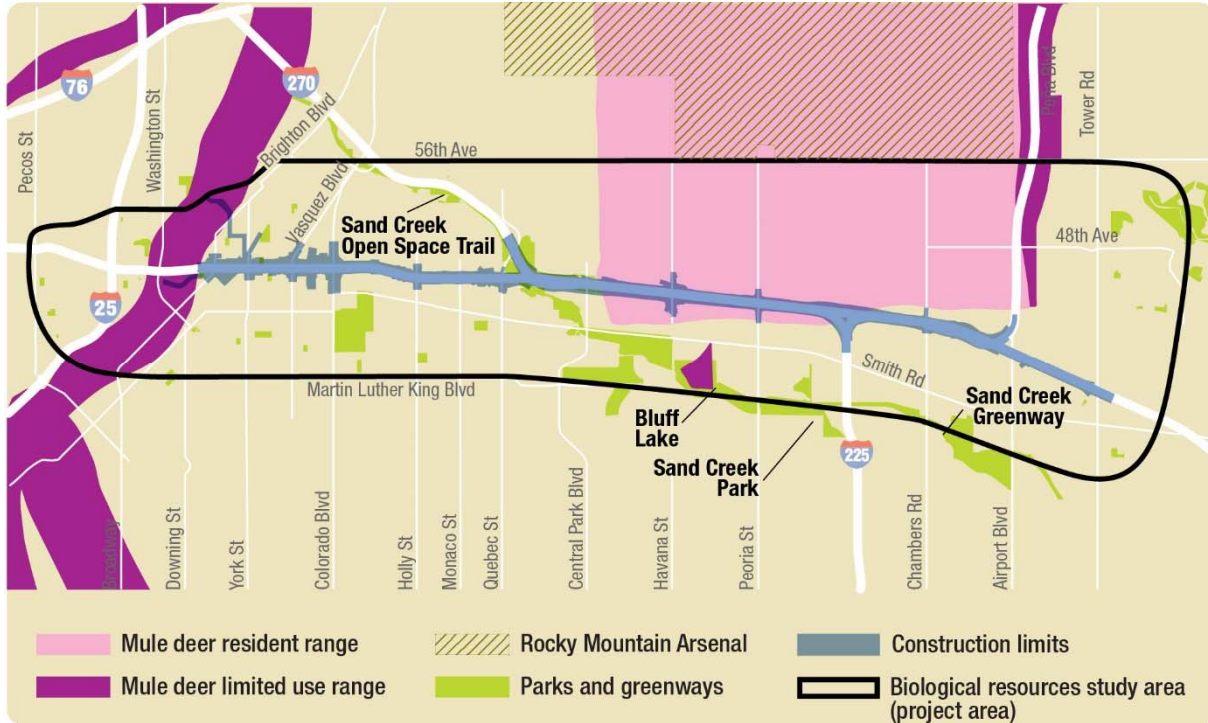
Raptors, Waterbirds, and Other Birds

According to NDIS, approximately 307 species of raptors, upland game birds, waterbirds, and other birds are known to occur or are likely to occur in Denver and Adams counties (NDIS, 2013). During preliminary field surveys, 10 raptor species, two upland game birds, 26 waterbirds, and 36 various other birds were detected.

Large Mammals

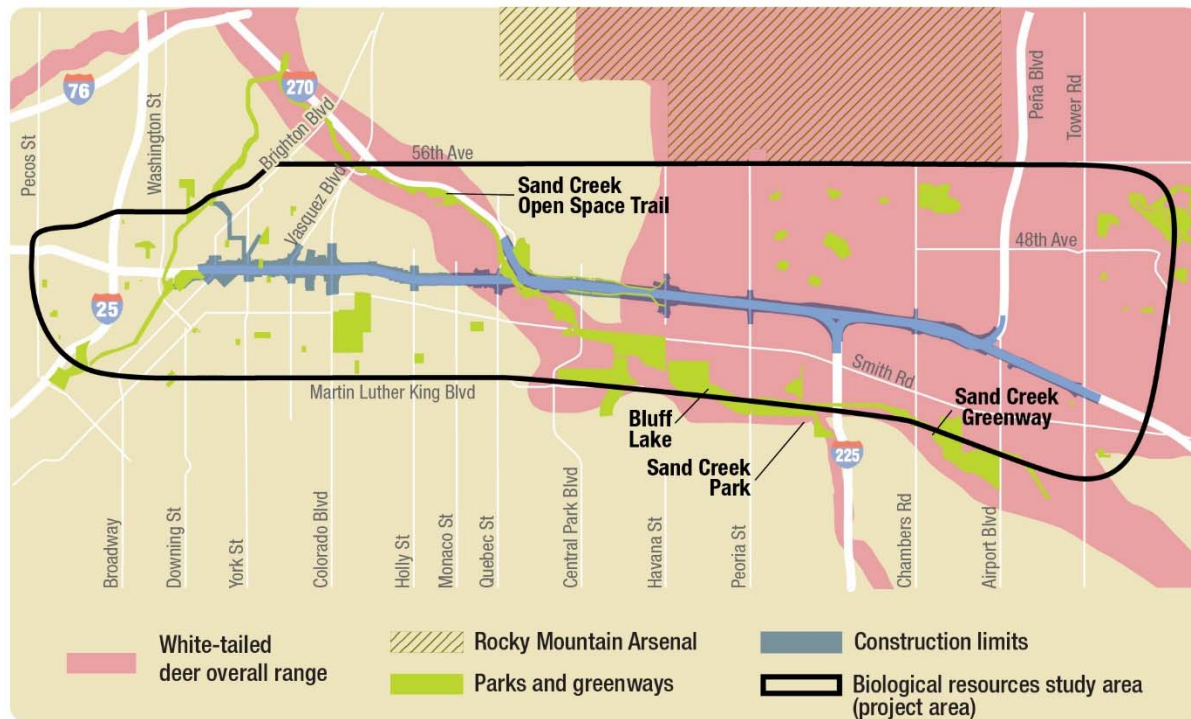
Large mammals within the study area are primarily restricted to linear river and creek corridors; however, their exact range and distribution are not well documented. According to NDIS, there are 10 large mammals known to occur or likely to occur in Denver and Adams counties, including various species of fox, mountain lion, bobcat, and coyote (NDIS, 2013). Four hoofed mammals are known to occur in Denver and Adams counties. Pronghorn (*Antilocapra americana*) and American elk (*Cervus elaphus*) are considered rare within the study area, while mule deer and white-tailed deer (*Odocoileus virginianus*) are considered to be fairly common. The overall range of the pronghorn and elk is well outside the study area. Species activity maps from CPW were used to document seasonal activity of mule deer and white-tailed deer within the study area. The various alignments intersect mapped mule deer and white-tailed deer activity areas, as shown in **Exhibit 5.13-2** and **Exhibit 5.13-3**.

Exhibit 5.13-2 Mule Deer Activity Areas



Source: CPW Public SAM Data, 2014

Exhibit 5.13-3 White-Tailed Deer Activity Areas



Source: CPW Public SAM Data, 2014

Small Mammals

According to NDIS, approximately 42 different species of small mammals are known to occur or are likely to occur within the study area, such as black-tailed prairie dogs, numerous other rodents, bats, rabbits, raccoon, skunk, badger, porcupine, and opossum (NDIS, 2013).

Reptiles and Amphibians

Based on data from the NDIS, 29 species of reptiles and amphibians may be present within the study area (NDIS, 2013). Species common within the study area include the tiger salamander (*Ambystoma tigrinum*), many-lined skink (*Eumeces multivirgatus*), numerous toads and frogs, and various snakes, lizards, and turtles.

Fish

The I-70 East study area crosses two linear water bodies; the South Platte River and Sand Creek. Fish inhabit the South Platte River, which is predominantly considered to be a warmwater fishery (P. Winkle, personal communication, January 3, 2013). Common fish species in the South Platte River in the vicinity of I-70 include common carp (*Cyprinus carpio*), white sucker (*Catostomus commersonii*), and fathead minnows (*Pimephales promelas*). Other species can include longnose dace (*Rhinichthys cataractae*), creek chub (*Semotilus atromaculatus*), Iowa darter (*Etheostoma exile*), Johnny darter (*Etheostoma nigrum*), sand shiners (*Notropis stramineus*), rainbow trout (*Oncorhynchus mykiss*), and brown trout (*Salmo trutta*) (P. Winkle, personal communication, January 3, 2013).

Vegetation

The entire study area falls within mapped urban/built cover type. Urban land cover represents landscaped areas associated with residential and commercial development. Included in this category are cities, towns, villages, strip developments along highways, transportation, power, communications facilities, shopping centers, and industrial and commercial complexes. Vegetation observed during field visits includes lambsquarter (*Chenopodium album*), perennial pepperweed (*Lepidium latifolium*), kochia (*Kochia scoparia*), giant ragweed (*Artemisia trifida*), pigweed (*Amaranthus albus*), curly dock (*Rumex crispus*), and several species of thistle. Riparian mapping data were collected by CPW using the National Aerial Photography Program aerial color infrared photographs. Photographs were analyzed based on the various landforms that were observed and the

vegetation that those landforms support. The vegetation communities then were classified into one of 40 categories. Riparian data are based solely on photography and were not field verified.

There were three riparian categories mapped within the study area: riparian herb, cottonwood, and riparian shrub. Riparian herb includes areas dominated by sedges (*Carex* spp.), rushes (*Juncus* spp.), mesic grasses, and waterlogged or moist soils. Cottonwood areas represent areas dominated by cottonwood trees. Riparian shrub includes areas dominated by Gambel oak (*Quercus gambelii*), sagebrush (*Phalaris arundinacea*), alder (*Alnus* spp.), and other shrubs.

Dominant species observed during field visits were Russian olive (*Elaeagnus angustifolia*), willow, curly dock, cottonwood, smooth brome (*Bromus inermis*), leafy spurge (*Euphorbia esula*), and reed canarygrass (*Phalaris arundinacea*). These areas were mapped primarily along Sand Creek. Riparian corridors provide food and shelter for many species and are particularly important to urban wildlife as transportation corridors.

A riparian mitigation area also exists west of Sand Creek, south of the I-270 and Quebec Street interchange. Species such as golden currant (*Ribes aureum*), skunkbrush (*Rhus trilobata*), chokecherry (*Padus virginiana*), American plum (*Prunus americana*), snowberry (*Symphoricarpos occidentalis*), rubber rabbitbrush (*Ericamerica nauseosa*), wood's rose (*Rosa woodsii*), cottonwood trees, and willows were observed to occur in the site.

Special-status species

Federal and state species of concern in the study area were identified through the USFWS Information, Planning, and Conservation System (USFWS, 2015) and the CPW Threatened and Endangered List (CPW, 2015). FHWA and CDOT have jointly prepared a Biological Assessment that addresses the following South Platte River species of concern: Least Tern (*Sternula antillarum*) (interior population), pallid sturgeon (*Scaphirhynchus albus*), Piping Plover (*Charadrius melodus*), western prairie fringed orchid (*Platanthera praeclara*), and the Whooping Crane (*Grus americana*), as well as designated critical habitat for the Whooping Crane. Therefore, these species are not discussed in this chapter. More information regarding these species and the *Biological Assessment* can be found in Attachment L

of the Supplemental Draft EIS. **Exhibit 5.13-4** shows the federal and state special-status species of concern addressed in this chapter.

Exhibit 5.13-4 Special-Status Species of Concern

Species	Status
Raptors	
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	State species of special concern
Burrowing Owl (<i>Athene cunicularia</i>)	State threatened species
Ferruginous Hawk (<i>Buteo regalis</i>)	State species of special concern
Other Birds	
Mountain Plover (<i>Charadrius vociferous</i>)	State species of special concern
Large Mammals	
Swift fox (<i>Vulpes velox</i>)	State species of special concern
Small Mammals	
Black-tailed prairie dog (<i>Cynomys ludovicianus</i>)	State species of special concern
Reptiles	
Common garter snake (<i>Thamnopsis sirtalis</i>)	State species of special concern
Amphibians	
Northern leopard frog (<i>Rana pipiens</i>)	State species of special concern
Fish	
Iowa darter (<i>Etheostoma exile</i>)	State species of special concern
Plants	
Ute ladies'-tresses orchid (<i>Spiranthes diluvialis</i>)	Federal threatened species
Colorado butterfly plant (<i>Gaura neomexicana</i> ssp. <i>coloradensis</i>)	Federal threatened species

Source: USFWS, 2015; CPW, 2015

Bald and Golden Eagle

The Bald Eagle had been listed by the Endangered Species Act as a federally threatened species since February 1978. In 2007, it was determined that threats to the Bald Eagle have been removed or reduced enough that it has recovered and no longer meets the definition of a threatened species under the Endangered Species Act. The species was removed from the list in August 2007. Despite its delisting by USFWS, it was still listed as a state threatened species by CPW until 2009. Currently, the Bald Eagle is listed as a state species of special concern by CPW (CPW, 2015) and is still protected by the Bald and Golden Eagle Protection Act of 1940, as amended, and the Migratory Bird Treaty Act of 1918, as amended (USFWS, 2014), both of which prohibit “taking”

(killing, selling, or otherwise harming) of eagles, their nests, or eggs.

As previously mentioned, Bald and Golden Eagles are known to occupy areas within and adjacent to the study area during the winter months, from November to March. Bald Eagles have communal roosts, located roughly one mile north of the study area, at the Refuge. Also at the Refuge, there is one known nesting site approximately 1.5 miles north of the study area. They also roost at the Bluff Lake Nature Center, located within the study area. There is a long, narrow section of land designated as Bald Eagle winter range that extends southward from the Refuge, crosses I-70, and covers a portion of the Sand Creek Greenway (**Exhibit 5.13-5**).

Exhibit 5.13-5 Designated Bald Eagle Winter Range



Source: CPW Public SAM Data, 2014

Black-tailed prairie dog

The black-tailed prairie dog lives on grassy plains or prairies in communities called “towns,” which can vary greatly in size. Prairie dog towns are an integral part of the prairie ecosystem and many other wildlife species interact or are dependent on the prairie dog town. Black-footed ferrets, prairie rattlesnakes, eagles, badgers, weasels, and Burrowing Owls all may use the colonies for shelter and/or hunting. Grasses and occasionally insects, such as

grasshoppers, make up the diet of the black-tailed prairie dog (CPW, 2015).

Black-tailed prairie dogs are known to exist within the study area. During site visits, their towns have been spotted; however, no formal mapping has been completed.

Burrowing Owl

The Burrowing Owl is a small, ground-dwelling bird found in Colorado as a migratory species. They are primarily found in grasslands and mountain parks, usually in or near prairie dog colonies. The owl is also known to use steppes, deserts, prairies, and agriculture lands and is thought to favor well-grazed, early successional grasslands with soils having significant sand content. Burrowing Owl food includes rodents, small birds, eggs, nestlings, reptiles, and insects. They will hunt for food anytime, day or night (CPW, 2015).

Burrowing Owls have been observed migrating to and nesting in the prairie dog complexes found on the Refuge. Burrowing Owls also were observed nesting in the study area between I-70 and the Refuge before the development of the shopping mall in that area. If their nest burrow is destroyed, they will seek to build a nest at a nearby location (Hetrick, 2012). For this reason, and the high degree of fragmentation of existing prairie dog colonies, it is difficult to predict where Burrowing Owls may attempt to nest in the future. Due to the recent (2012) presence of active nests within the study area, fragmentation of prairie dog colonies, and limited early successional grassland habitat, the likelihood of occurrence of this species is moderate.

Ferruginous Hawk

The Ferruginous Hawk is a raptor whose diet consists primarily of hares, rabbits, ground squirrels, and prairie dogs. Its habitat during both summer and winter includes grasslands, deserts, and other open areas with isolated shrubs or trees where less than 50 percent of the land is under cultivation. During winter, Ferruginous Hawks often are found around colonies of prairie dogs, which make up much of their winter diet. The hawk begins nesting in early March (FerruginousHawk.org, 2007). The species can be found throughout most of Colorado, including the project study area; however, due to the urban nature of the corridor the likelihood is low.

Burrowing Owls in the project corridor

Burrowing Owl nests observed between I-70 and the Rocky Mountain Arsenal National Wildlife Refuge are relevant to improvements along the I-70 East project corridor because male Burrowing Owls have relatively high nest fidelity and return to their nest burrows year after year.

Mountain Plover

Mountain Plovers are birds that inhabit prairie grasslands, arid plains, and fields. Nesting plovers choose shortgrass prairies grazed by prairie dogs, bison, and cattle; tallgrass prairies; and fallow fields. The birds feed singly or in small flocks, mostly on insects. Southeastern Colorado is the primary breeding ground for the Mountain Plover, with more than half of the world's population nesting in the state. (CPW, 2015). The study area is within the Mountain Plover summer range, with known occurrences in Adams County. The species is most likely to be present in the study area east of I-225; however, due to urbanization in this area, the likelihood of occurrence is low.

Swift fox

The swift fox is one of the smallest wild dogs in North America. They live primarily in shortgrass prairies and deserts. They often form their dens in sandy soils on open prairies, along fences, or in plowed fields. Their diet includes small mammals, birds, reptiles, amphibians, fish, and insects. The fox typically will eat whatever live prey it can catch but it also will eat berries and grasses. The swift fox is mainly nocturnal, but its daytime activities vary seasonally (Animal Diversity Web, 2015). The current overall range in Colorado for the swift fox is throughout most of the Front Range on the eastern half of the state; however, they are not found within the project study area (CPW Public SAM Data, 2014).

Common garter snake

In Colorado, the common garter snake inhabits marshes, ponds, and edges of streams, and generally is restricted to aquatic, wetland, and riparian habitat. It feeds opportunistically on frogs, toads, amphibian larvae, fishes, earthworms, and rodents, obtained on land or in the water. Garter snakes are common throughout the metro area, often noted by Denver employees working in and around natural areas in close proximity to water. The species could potentially occur within the study area along the South Platte River and Sand Creek (CPW, 2015).

Northern leopard frog

The northern leopard frog inhabits wet meadows, marshes, ponds, lakes, reservoirs, streams, and irrigation ditches (CPW, 2015). The northern leopard frog has been (2013) found recently to inhabit the Parkfield Lake/Natural Area, which is within the study area. Due to the recent occurrence,

the northern leopard frog has the likelihood to occur throughout suitable habitat within the study area, most likely along the South Platte River and Sand Creek.

Iowa darter

The Iowa darter is a fish species of special concern in Colorado. It occurs in the South Platte River and Sand Creek (Winkle, 2013); therefore, it has the potential to occur within the study area. Iowa darters prefer cool, clear water over a sand or vegetative substrate (NDIS, 2013). In streams, they are only found in areas with undercut banks (NDIS, 2013).

Colorado butterfly plant

The Colorado butterfly plant is a biennial member of the primrose family that flowers from June to September and fruits from July to October. It is found in subirrigated, alluvial soils on level or slightly sloping floodplains and drainage bottoms and in old, abandoned stream channels with a high water table at elevations between 5,000 feet and 6,400 feet. Colonies often are found in low depressions or along bends in wide, meandering stream channels. Most populations are found a short distance from the actual channel and may even occur at the base of low, alluvial ridges at the interface between riparian meadows and drier grasslands (Center for Plant Conservation, 2006). The Colorado butterfly plant has the potential to occur in the study area along the South Platte River and Sand Creek; however, the likelihood is low because the areas have been degraded and contain large communities of non-native and noxious species.

Ute ladies'-tresses orchid

Ute ladies'-tresses orchids bloom from late July through August; however, depending on location and climatic conditions, the orchids may bloom in early July or still be in flower as late as early October. The Ute ladies'-tresses orchid is endemic to moist soils near wetland meadows, springs, lakes, and perennial streams at elevations from 4,200 feet to 7,000 feet. The orchid colonizes early successional riparian habitats, such as point bars, sand bars, and low-lying gravelly, sandy, or rocky edges, persisting in those areas where the hydrology provides continual dampness in the root zone through the growing season. The species occurs primarily in areas where the vegetation is relatively open and not overly dense, overgrown, or overgrazed (USFWS, 2002). The largest known population

can be found in the City of Boulder near Boulder Creek. Two other documented populations are found along Clear Creek; one in the City of Golden and another in the City of Wheat Ridge. The orchid is also known to be present in Larimer and Moffat counties (USFWS, 1995). The Ute ladies'-tresses orchid has the potential to occur in the study area along the South Platte River and Sand Creek; however, the likelihood is low because the areas have been degraded and contain large communities of non-native and noxious species.

Noxious weeds

Introduced species are present throughout the study area, many of which were planted for agriculture, erosion control, and revegetation. Due to the prevalence of introduced species, most of these species do not affect the natural environment, but rather compete with other introduced species. Some non-native species are extremely hardy and competitive and are able to permanently alter the structure, composition, and function of native plant communities. These are identified by the Colorado Department of Agriculture's Noxious Weed Management Program.

A total of 38 noxious weeds of concern are listed for Colorado, of which 34 are listed for Denver and Adams and Denver counties and 16 of which have a greater potential to be encountered within the construction limits (CDOA, 2015a; CDOA, 2015b; CDOT, 2013) The list is summarized below in **Exhibit 5.13-6**.

**Colorado State
Noxious Weed
Management
Program
(Colorado
Department of
Agriculture)**

List A: Weed species designated for eradication

List B: Weed species of which the continued spread is to be stopped

List C: Weed species of which the continued spread is to be stopped and for which the state is to provide additional education, research, and biological control resources

Exhibit 5.13-6 Noxious Weed Species of Concern

Common Name	Scientific Name	State Listing	Construction Limits	Denver County	Adams County
Absinth wormwood	<i>Artemisia absinthium</i>	B		X	X
Black henbane	<i>Hyoscyamus niger</i>	B		X	X
Bouncingbet	<i>Saponaria officinalis</i>	B	X	X	X
Bull thistle	<i>Cirsium vulgare</i>	B		X	X
Canada thistle	<i>Cirsium arvense</i>	B	X	X	X
Corn chamomiles	<i>Anthemis arvensis</i>	B		X	X
Chinese clematis	<i>Clematis orientalis</i>	B		X	X
Common burdock	<i>Arctium minus</i>	C	X		
Common mullein	<i>Verbascum thapsus</i>	C	X		
Common tansy	<i>Tanacetum vulgare</i>	B		X	X
Common teasel	<i>Dipsacus fullonum</i>	B	X	X	X
Cutleaf teasel	<i>Dipsacus laciniatus</i>	B		X	X

Exhibit 5.13-6 Noxious Weed Species of Concern

Common Name	Scientific Name	State Listing	Construction Limits	Denver County	Adams County
Dalmation toadflax	<i>Linaria dalmatica</i>	B		X	X
Dames rocket	<i>Hesperis matronalis</i>	B	X	X	X
Diffuse knapweed	<i>Centaurea diffusa</i>	B	X	X	X
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	B		X	X
Field bindweed	<i>Convolvulus arvensis</i>	C	X		
Hoary cress	<i>Cardaria draba</i>	B	X	X	X
Houndstongue	<i>Cynoglossum officinale</i>	B		X	X
Jointed goatgrass	<i>Aegilops cylindrica</i>	B	X	X	X
Leafy spurge	<i>Euphorbia esula</i>	B	X	X	X
Moth mullein	<i>Verbascum blattaria</i>	B		X	X
Musk thistle	<i>Carduus nutans</i>	B		X	X
Orange hawkweed	<i>Hieracium aurantiacum</i>	A		X	
Perennial pepperweed	<i>Lepidium latifolium</i>	B	X	X	X
Plumeless thistle	<i>Carduus acanthoides</i>	B		X	X
Puncturevine	<i>Tribulus terrestris</i>	C	X		
Purple loosestrife	<i>Lythrum salicaria</i>	A		X	X
Russian knapweed	<i>Acroptilon repens</i>	B		X	X
Russian olive	<i>Elaeagnus angustifolia</i>	B	X	X	X
Salt cedar	<i>Tamarix chinensis</i>	B		X	X
Scotch thistle	<i>Onopordum acanthium</i>	B	X	X	X
Spotted knapweed	<i>Centaurea maculosa</i>	B		X	X
Sulfur cinquefoil	<i>Potentilla recta</i>	B		X	X
Wild caraway	<i>Carum carvi</i>	B		X	X
Yellow nutsedge	<i>Cyperus esculentus</i>	B		X	X
Yellow toadflax	<i>Linaria vulgaris</i>	B	X	X	X
Oxeye daisy	<i>Chrysanthemum leucanthemum</i>	B		X	X

Source: CDOA, 2015a; CDOA, 2015b; CDOT, 2013

5.13.4 How do the project alternatives potentially affect biological resources?

Effects to biological resources—including wildlife, vegetation, special-status species, and noxious weeds—are summarized in the following subsections.

Wildlife

No-Action Alternative

This alternative will replace the existing viaduct between Brighton Boulevard and Colorado Boulevard, which requires additional right of way. No improvements, aside from existing maintenance practices, are proposed between Colorado Boulevard and Tower Road. The alternative also will include construction of a drainage system to the South Platte River on the north side of I-70, which is proposed for all alternatives. Because of the lack of habitat where any project-related activities will take place, the No-Action Alternative will only have minimal direct impacts to the mule deer limited use range near the South Platte River.

Build Alternatives

Between Brighton Boulevard and Colorado Boulevard, the Build Alternatives either consist of replacing the existing viaduct (Revised Viaduct Alternative) or removing the viaduct and lowering the highway (Partial Cover Lowered Alternative). Between Colorado Boulevard and Tower Road, the Build Alternatives will add two lanes in each direction, which increases the highway width and will result in some habitat loss (as discussed below). The I-70 bridge over Sand Creek also will be widened. Additionally, two drainage systems that will outfall to the South Platte River will be constructed on the north and south sides of I-70 for the Partial Cover Lowered Alternative. Only the north drainage will be constructed for the Revised Viaduct Alternative, as with the No-Action Alternative.

The improvements proposed under the Build Alternatives are anticipated to have minimal, direct impacts to large- or medium-sized mammals, water birds, reptiles, amphibians, or fish within the study area. This is mainly because of the species' mobility, avoidance of human activities, and the general degraded condition of the habitat in the potentially impacted areas. Impacts to wildlife can be expected through reductions in the habitat available to them. These types of impacts will occur to mule deer activity areas (**Exhibit 5.13-2**), white-tailed deer activity areas (**Exhibit 5.13-3**),

and Bald Eagle winter range (**Exhibit 5.13-5**). Direct impacts to deer and Bald Eagle winter range are included in **Exhibit 5.13-7**.

Because of the urban nature of the study area, and the location of the impacts adjacent to an established transportation corridor, these impacts to wildlife are considered minor to negligible. The Build Alternatives do not cause new habitat fragmentation, and existing connections along the South Platte River and Sand Creek will be maintained. Specifically, the proposed bridge structure at Sand Creek likely will not affect the wildlife crossing at this location because of its substantial height, which is more favorable for deer use than lower heights. Usage by other species—such as fox, coyotes, skunk, and raccoons—will not be impeded.

Exhibit 5.13-7 Projected Direct Impacts to Deer, Bald Eagle, and Black-Tailed Prairie Dog Habitats

Alternative	Mule deer limited-use area (acres) ¹	Mule deer resident population area (acres)	White-tailed deer overall range (acres)	Bald Eagle winter range (acres)	Total impacts to wildlife habitat (acres) ²
No-Action Alternative	3.5	—	—	—	3.5
Build Alternatives, General-Purpose Lanes Option					
Revised Viaduct Alternative	3.5	110.9	177.7	21.8	313.9
Partial Cover Lowered Alternative	6.6	110.9	177.7	21.8	317.0
Build Alternatives, Managed Lanes Option					
Revised Viaduct Alternative	3.5	117.0	222.9	21.8	365.2
Partial Cover Lowered Alternative	6.6	117.0	222.9	21.8	368.3

Source: CPW 2014

1. Direct mule deer limited-use area habitat impacts are due to the construction of the drainages to the South Platte River.
2. Total impact calculations do not account for overlapping wildlife areas.

Temporary effects from construction are anticipated for small mammals and other local wildlife. Wildlife that currently occupies the study area uses the area for foraging or as a source of prey. These species are likely accustomed to noise and movement due to the urban nature of the study area, so they will be minimally affected by impacts associated with construction.

Vegetation

No-Action Alternative

Due to the urbanized nature of the study area between Brighton Boulevard and Colorado Boulevard, replacement of

the existing viaduct and construction of a drainage system north of I-70 are expected to have negligible impacts to roadside vegetation. East of Colorado Boulevard, the No-Action Alternative consists of standard maintenance practices and also is expected to have negligible vegetation impacts. No wetland areas will be impacted by the No-Action Alternative; however, riparian areas will be impacted for the construction of a north drainage system that will outfall to the South Platte River.

Build Alternatives

Similar to the No-Action Alternative, the western end of the corridor (Brighton Boulevard to I-270) is more urbanized, so both Build Alternatives are expected to have negligible impacts to vegetation in this area. From I-270 to Tower Road, roadway widening will directly impact roadside vegetation. Impacts to roadside vegetation are expected to be greater under the Managed Lanes Option compared to the General-Purpose Lanes Option because the overall footprint is wider on the eastern portion of the project.

Riparian and wetland areas will be affected by construction of the Build Alternatives, as shown in **Exhibit 5.13-8**. Wetland areas are discussed in more detail in Section 5.15, Wetlands and Other Waters of the U.S. Total permanent impacts to riparian areas range from 0.977 acres to 1.298 acres, depending on the Build Alternative and associated options. The difference in impacts between the Build Alternatives is a result of the drainage system south of I-70, which will be constructed as part of the Partial Cover Lowered Alternative and result in an additional 0.048 acre of permanent impact and 0.012 acre of temporary impact to riparian habitat along the South Platte River.

The majority of the permanent impacts to riparian areas occurs along Sand Creek and will be caused by on/off ramps over Sand Creek and roadway widening. An additional 0.272 acre of permanent impact will occur to Sand Creek riparian areas with the Managed Lanes Option. Temporary riparian impacts in the Sand Creek area will be 0.020 acre more for the Managed Lanes Option than each of the General-Purpose Lanes options. Permanent impacts will occur from the addition of new bridge piers, as well as through direct shading of vegetation near Sand Creek. Direct fill-related impacts from bridge piers are minimal within Sand Creek. Permanent fill-related impacts from bridge piers will total roughly 0.001 acre of waters of the U.S., including wetlands, and 0.002 acre of riparian areas.

Exhibit 5.13-8 Projected Impacts to Riparian Areas Caused by the Build Alternatives

Alternative	Riparian Impacts (acres)	
	Permanent	Temporary
No-Action Alternative	0.014	0.011
Build Alternatives, General-Purpose Lanes Option		
Revised Viaduct Alternative	0.977	0.222
Partial Cover Lowered Alternative	1.025	0.234
Build Alternatives, Managed Lanes Option		
Revised Viaduct Alternative	1.249	0.241
Partial Cover Lowered Alternative	1.298	0.253

Note: Impacts were calculated based on conceptual design and are subject to change.

Indirect, permanent impacts at Sand Creek will result from interception of precipitation and shading, both of which affect vegetation growth. Temporary, construction-related impacts (such as site disturbance) to riparian areas from the No-Action Alternative and the Build Alternatives are similar.

Special-status species

As previously discussed, the No-Action Alternative is expected to have negligible impacts to vegetation and will have no direct or indirect effects to wildlife; therefore, the following discussion is focused on the Build Alternatives. Species considered are listed in **Exhibit 5.13-4**.

Bald Eagle

There is a long, narrow section of land designated as Bald Eagle winter range that extends southward from the Refuge, crossing I-70, covering a portion of Sand Creek (see **Exhibit 5.13-5**). Roughly 21.8 acres of this winter range will be directly impacted by the Build Alternatives from I-270 to I-225 (**Exhibit 5.13-7**). Indirect effects would primarily result from construction noise, human activity, and a slight decrease in their winter prey base. The closest active Bald Eagle nest to the study area is 1.5 miles; therefore, impacts to any nesting population are not anticipated.

Specifically, impacts to black-tailed prairie dogs represent a potential loss in winter prey base for Bald Eagles. The locations of the prairie dog towns are surrounded by development and human activity and typically are small in size and population. The degree to which eagles use these areas for foraging is unknown. Additionally, the colonies occur outside of the mapped winter range for Bald Eagles,

What is a "prey base"?

The term "prey base" refers to all of the animals that comprise a predator's diet.

making them marginal foraging habitat at best. Based on the aforementioned details, no impacts to Bald Eagles are anticipated. With the implementation of mitigation measures outlined in Section 5.13.5, potential indirect effects to the Bald Eagle can be prevented or minimized.

Black-tailed prairie dogs and Burrowing Owls

It is important to note that black-tailed prairie dog mapping has not been updated by CPW/NDIS since 2008, and that the size and distribution of active black-tailed prairie dogs may reduce dramatically if there is an outbreak of disease, such as plague, in the community. Other factors, such as predation and drought, may cause negligible fluctuations in prairie dog community growth and expansion. For these reasons, the projected impacts to black-tailed prairie dogs from the Build Alternatives provide an estimate of the relative amount of impact that can be expected, but actual impacts (location and extent) will vary because future population levels and distributions are unpredictable. With the implementation of mitigation measures outlined in Section 5.13.5, potential direct and indirect effects to the black-tailed prairie dog can be prevented or minimized.

Impacts to the Burrowing Owl are not anticipated, but cannot be completely excluded because of their occurrence at the nearby Refuge. These impacts will be minimized to the greatest extent practicable by following current CDOT and CPW guidance on Burrowing Owl nest surveys and seasonal restrictions and guidance if a nest is located. With the implementation of mitigation measures outlined in Section 5.13.5, potential direct and indirect effects to the Burrowing Owl can be prevented or minimized.

Ferruginous Hawk

There is very little to no open grassland and prairie habitat within the study area. Prairie dogs, which make up much of the Ferruginous Hawk's winter diet, generally are located adjacent to major roadways or residential areas. It is likely that the hawk would choose to hunt at the Refuge, Bluff Lake Nature Center, or open grassland east of the study area rather than in developed areas. Due to lack of suitable habitat and undesirable hunting conditions, effects to the Ferruginous Hawk are not anticipated.

Mountain Plover and swift fox

The swift fox overall range is not within the study area (CPW Public SAM Data, 2014). There is very little to no open grassland and prairie habitat within the study area,

where the Mountain Plover and swift fox typically are found. Due to lack of suitable habitat, impacts to the Mountain Plover and swift fox are not anticipated.

Common garter snake and northern leopard frog

Construction activities in riparian and wetland areas under the Build Alternatives may directly impact the common garter snake (*Thamnophis sirtalis*) and/or the northern leopard frog (*Rana pipiens*), which are species of special concern in Colorado. Both species have been documented as occurring in Denver and Adams Counties (NDIS, 2012) and the northern leopard frog was documented in the study area in the Parkfield Lake/Natural Area. These species may occur throughout suitable habitat within the study area, most likely along the South Platte River and Sand Creek.

Sand Creek offers habitat for these species, although the areas within the limits of construction are degraded. Direct impacts could result from the destruction of potentially suitable riparian and wetland habitat along Sand Creek as a result of the construction of ramps and bridge widening. Indirect impacts may occur to these species due to decreased local availability of prey during construction activities.

Iowa darter

Direct impacts to the Iowa darter (*Etheostoma exile*), which is a species of special concern in Colorado, are not expected from the Build Alternatives. Though unlikely, indirect impacts from increased turbidity and stormwater runoff may temporarily impact the Iowa darter near Sand Creek.

Colorado butterfly plant and Ute ladies'-tresses orchid

Within the study area, two federally threatened plant species may occur: (1) the Ute ladies'-tresses orchid (*Spiranthes diluvialis*), and (2) the Colorado butterfly plant (*Gaura neomexicana* ssp. *Coloradensis*). A review of potentially suitable habitat in the study area has resulted in a "may affect, but not likely to adversely affect" determination. The determination is based on a conservative interpretation of where these species can potentially occur. To further ensure that these plants are not adversely impacted by either of the Build Alternatives, botanical surveys of the study area along Sand Creek must be conducted during the summer months before starting construction. Depending on the findings during the surveys, CDOT will complete formal or informal consultation with the USFWS prior to construction.

Noxious weeds

Noxious weed infestation was observed to be moderate throughout the study area. However, during the most recent field visits conducted in April 2015, dense infestations within the study area near Sand Creek were observed. Patches of leafy spurge, hoary cress, and Russian olive were notable species identified.

During construction, any newly disturbed surface as part of the project would be susceptible to invasive/noxious weed infestations. In addition, seeds can be transported by construction equipment and vehicles.

From I-25 to I-270, the area is so highly urbanized that the overall risk of noxious weed infestation is relatively low because much of the area affected by the project is already paved or built upon. The area east of I-270 is still a highly urban environment, but is slightly less built up, and will be more susceptible to noxious weeds than the west. Within the area east of I-270, the Managed Lanes Option disturbs more land than the General-Purpose Lanes Option, so it is expected to pose a slightly higher risk for noxious weed establishment in the study area.

5.13.5 How are the negative effects from the project alternatives mitigated for biological resources?

There are no direct effects anticipated to hoofed and other large mammals, water birds, or fish within the study area due to the project alternatives, so no mitigation is currently planned for these resources. The reptile (garter snake) and amphibian (northern leopard frog) may be directly impacted; however, mitigation for impacts to riparian areas will offset potential impacts to these species. Impacts to riparian areas will be mitigated in accordance with Senate Bill 40, limited to the area necessary for construction, and replaced upon completion, per the *Guidelines for Senate Bill 40 Wildlife Certification Developed and Agreed Upon by Colorado Parks and Wildlife and the Colorado Department of Transportation (April 1, 2013)*.

Mitigation measures are outlined to prevent or minimize potential indirect effects to migrating birds, Bald Eagles, prairie dogs, and Burrowing Owls. Mitigation for effects to black-tailed prairie dogs will be conducted in accordance with the CDOT Impacted Black-Tailed Prairie Dog Policy (2005).

- In the case of prairie dog colonies less than two acres, CDOT will avoid and minimize effects to the greatest extent possible. This includes relocating prairie dogs, as long as the relocation will not affect other resources—such as wetlands or historic properties—and is not cost prohibitive. Relocation of colonies larger than two acres will be conducted in accordance with CRS 35-7-203. If an adequate site cannot be located for colonies larger than two acres, the prairie dogs will be captured and donated to a raptor rehabilitation facility or black-footed ferret reintroduction program. CDOT will not, at any time, authorize any earth-moving activities that result in the burying of living prairie dogs. If necessary, CDOT will coordinate with CPW to facilitate the humane killing of prairie dogs within a town less than two acres in size. On January 15, 2009, the Impacted Black-Tailed Prairie Dog Policy was amended, eliminating the requirement to notify and receive approval from the Food and Drug Administration (FDA) prior to the relocation of prairie dogs (CDOT, 2009). However, CDOT will still coordinate with CPW before the manipulation of prairie dogs or their colonies.
- If construction in prairie dog colonies occurs during Burrowing Owl nesting season (February 1 to August 31), a survey following CPW protocols will be conducted no more than 30 days prior to construction. If a nesting pair is discovered, no construction activity will occur within 150 feet of the nest, between March 15 and October 31.

Mitigation for Bald Eagles and all migratory birds will be conducted in accordance with the Migratory Bird Treaty Act of 1918. Measures will be taken to ensure that effects are minimized.

The following mitigation measures for the protection of migratory birds also will be adhered to (see CDOT Standard Specifications, Section 240):

- A qualified wildlife biologist will be retained for the project.
- Vegetation removal or trimming activities will be timed to avoid the migratory bird-breeding season, which begins on April 1 and runs to August 31.

- All areas scheduled for clearing and grubbing, and within 50 feet of such areas, between April 1 and August 31, will first be surveyed for active migratory bird nests within seven days of the work being performed. The contractor's wildlife biologist also will survey for active migratory bird nests within 50 feet outside construction limits.
- CPW must be contacted if any nests must be moved or are inadvertently destroyed.
- The contractor will avoid all active migratory bird nests. The contractor will avoid the area within 50 feet of the active nests or the area within the distance recommended by the biologist until all nests within that area have become inactive.
- On structures, the contractor will remove existing nests after August 31 and prior to April 1.
- During the time that the birds are trying to build or occupy their nests, between April 1 and August 31, the contractor will monitor the structures at least once every three days for any nesting activity.
- If the birds have started to build any nests, they will be removed before the nest is completed. Water will not be used to remove the nests if nests are located within 50 feet of any surface waters.
- The taking of a migratory bird will be reported to the engineer. The contractor will be responsible for all penalties levied by the USFWS for the taking of a migratory bird.

To manage and minimize the proliferation of noxious weeds and preserve existing vegetation within the study area, the following measures will be taken:

- An Integrated Noxious Weeds Management Plan will be prepared and implemented prior to construction activities.
- Monitoring of disturbed sites will be required during the construction periods to identify and treat any noxious weed invasion.
- Contractor's vehicles and equipment will be inspected before they are used for construction to ensure that they are free of soil and debris capable of transporting noxious weeds, seeds, or roots.

- Equipment will be cleaned prior to entering the construction site to prevent the spread of noxious weeds by wind, water, or accidental transport on construction vehicles.
- Topsoil will consist of loose, friable loam free of subsoil, refuse, stumps, roots, rocks, brush, noxious weed seed, and reproductive vegetative plant parts, such as, but not limited to, knapweed, purple loosestrife, Canadian thistle, heavy clay, hard clods, toxic substances, or other material that will be detrimental to its use on the project.
- Disturbed areas will be reclaimed in phases throughout construction with native grasses and forbs.
- In accordance with the Colorado Weed Free Forage Crop Certification Act, mulches or straw bales used for erosion control purposes will be certified weed free.
- All seed mixes, soil, and nursery material used for reclamation will be free of noxious weed seeds, roots, and rhizomes.
- No fertilizer will be used onsite.
- Herbicides will be applied by use of wicks or sponges and spot spraying to avoid off-target injury.
- Broadcast herbicide spraying will only be approved through written consent of the engineer.
- In compliance with Senate Bill 40, each riparian tree removed during construction will be replaced at a 1:1 ratio. All riparian shrubs removed during construction will be replaced at a 1:1 square foot ratio.

Botanical surveys of riparian and wetland habitat in projected impact areas at Sand Creek will be conducted by a qualified biologist during the appropriate summer months (when the plants are blooming) prior to construction initiation for the Ute ladies'-tresses orchid and the Colorado butterfly plant. If either species is identified, formal consultation will be completed with the USFWS prior to construction.

Exhibit 5.13-9 lists the impacts and mitigation measures associated with biological resources.

Exhibit 5.13-9 Summary of Biological Resources Impacts and Mitigation Measures

Alternative/ Option	Impacts and/or Benefits	Mitigation Measures Applicable to All Alternatives
No-Action Alternative	<ul style="list-style-type: none"> • 3.5 acres of permanent, direct impact to wildlife habitat • 0.014 acre of permanent impacts and 0.011 acre of temporary impacts to riparian areas 	<ul style="list-style-type: none"> • Comply with Senate Bill 40, CDOT Impacted Black-Tailed Prairie Dog Policy, and CDOT Standard Specifications for protection of migratory birds • Monitor disturbed sites during construction to identify and treat any noxious weed invasion • Reclaim disturbed areas in phases throughout construction with native grasses and forbs
Revised Viaduct Alternative, General-Purpose Lanes Option	<ul style="list-style-type: none"> • 313.9 acres of permanent, direct impact to wildlife habitat • 0.977 acres of permanent impacts and 0.222 acre of temporary impacts to riparian areas 	<ul style="list-style-type: none"> • Replace riparian trees at a 1:1 ratio and riparian shrubs at a 1:1 square foot ratio • Conduct a Burrowing Owl survey following CPW protocols no more than 30 days prior to construction if construction will occur in prairie dog colonies between February 1 and August 31; if a nesting pair is discovered, no construction activity will occur within 150 feet of the nest between March 15 and October 31
Revised Viaduct Alternative, Managed Lanes Option	<ul style="list-style-type: none"> • 365.2 acres of permanent, direct impact to wildlife habitat • 1.249 acres of permanent impacts and 0.241 acre of temporary impacts to riparian areas 	<ul style="list-style-type: none"> • Remove or trim vegetation outside of the April 1 to August 31 migratory bird-breeding season • Survey areas to be cleared and grubbed, as well as areas within 50 feet of these areas, between April 1 and August 31 for active migratory bird nests within seven days of the work being performed
Partial Cover Lowered Alternative, General-Purpose Lanes Option	<ul style="list-style-type: none"> • 317.0 acres of permanent, direct impact to wildlife habitat • 1.025 acres of permanent impacts and 0.234 acre of temporary impacts to riparian areas 	<ul style="list-style-type: none"> • Remove existing nests from structures after August 31 and prior to April 1 • Monitor structures at least once every three days for any nesting activity between April 1 and August 31
Partial Cover Lowered Alternative, Managed Lanes Option	<ul style="list-style-type: none"> • 368.3 acres of permanent, direct impact to wildlife habitat • 1.298 acres of permanent impacts and 0.253 acre of temporary impacts to riparian areas 	<ul style="list-style-type: none"> • Prepare and implement an Integrated Noxious Weeds Management Plan prior to construction activities • Perform botanical surveys for Ute ladies'-tresses orchid and Colorado butterfly plant prior to the start of construction activities