

3.5 Fisheries

Several species of fish inhabit the rivers, streams, and lakes (reservoirs) of the Corridor. Several of these species are considered important recreational species, and some are considered management indicator species by the US Forest Service (USFS). The Colorado Division of Wildlife (CDOW) has identified “high-value” and Gold Medal fisheries. Regional CDOW biologists identified “high-value” fisheries based on general observations of the quantity/quality of fish populations and recreational value. CDOW designates Gold Medal fisheries based on more formal studies of fish population and fish weight and on “exceptional” recreational value. Forest Plan standards and guidelines pertaining to the protection of aquatic resources on Arapaho and Roosevelt National Forests (ARNF) and White River National Forest (WRNF) lands are listed in Appendix K, Overview of Water Availability and Growth, and Forest Service Land Management.

3.5.1 Affected Environment

Table 3.5-1 identifies fish species that are known to inhabit or that may potentially inhabit the Corridor’s major watersheds. Fish communities depend on the overall aquatic habitat, which includes stream flow conditions, water temperature, dissolved-oxygen content, elevation, and food resources. The distribution and abundance of Corridor fish species vary in response to these site-specific environmental conditions or aquatic habitat (such as temperature and velocity gradients), as well as human-generated influences throughout the Corridor.

Temperature tolerances vary by species and depend on how quickly the temperature changes and the amount of time a species is exposed to specific temperatures. Slight increases in water temperature over long periods of time may not cause direct impact (mortality) but may stress the fish enough to become susceptible to disease, infection, and possibly result in death. Evaluation of the condition and structure of fish communities is enhanced by integrating fish data with indicators of stream quality such as nutrients, algae, and macroinvertebrates. The benthic invertebrate communities in Corridor streams are composed primarily of the major clean-water taxa, including *Ephemeroptera* (mayflies), *Plecoptera* (stoneflies), *Trichoptera* (caddisflies), and *Diptera* (midges). Existing I-70 roadway structures do not present obstructions or barriers to fish movement or disturb aquatic habitat connectivity.

Fisheries Issues

- Effect on Gold Medal fisheries and “high-value” fisheries as identified by CDOW
- Effect on fish and benthic invertebrate habitat, including impact on stream structure, seasonal and spawning habitat, and organic material supply
- Impact of water quality and quantity to riparian areas, aquatic habitat, and fisheries
- Impacts of sedimentation to aquatic organisms’ reproductive success, biodiversity, and biomass
- Effects of altered water temperature from construction and operation of roadway modifications on sensitive coldwater species

Table 3.5-1. Fish Species

Fish Species		Corridor Watershed				Corridor Reservoirs	
Common Name	Scientific Name	Colorado River	Eagle River	Blue River	Clear Creek	Dillon Reservoir	Georgetown Lake
Common Carp	<i>Cyprinus carpio</i>	X					
Speckled Dace	<i>Rhinichthys osculus</i>	X					
Roundtail Chub	<i>Gila robusta</i>	X					
Fathead Minnow	<i>Pimephales promelas</i>	X					
Sand Shiner	<i>Notropis stramineus</i>	X					
White Sucker	<i>Catostomus commersoni</i>	X		X		X	
Longnose Sucker	<i>C. catostomus</i>	X			X		
Bluehead Sucker ^e	<i>Catostomus discobolus</i>	X					

Fish Species		Corridor Watershed				Corridor Reservoirs	
Common Name	Scientific Name	Colorado River	Eagle River	Blue River	Clear Creek	Dillon Reservoir	Georgetown Lake
Flannelmouth Sucker ^e	<i>Catostomus latipinnis</i>	X					
Mottled Sculpin	<i>Cottus bairdi</i>	X	X	X		X	
Rainbow Trout ^b	<i>Oncorhynchus mykiss</i>	X	X	X	X	X	X
Cutthroat Trout	<i>O. clarki</i>	X	X	X	X	X	X
Colorado River Cutthroat Trout ^{d,e}	<i>O. clarki pleuriticus</i>	X	X	X			
Greenback Cutthroat Trout ^c	<i>O. clarki stomias</i>				X		
Brown Trout ^{a,b}	<i>Salmo trutta</i>	X	X	X	X	X	X
Kokanee	<i>O. nerka</i>					X	
Brook Trout ^{a,b}	<i>Salvelinus fontinalis</i>	X	X	X	X	X	X
Lake Trout	<i>S. namaycush</i>					X	X

^a Wildlife Management Indicator Species (WMIS) – White River National Forest

^b Wildlife Management Indicator Species (WMIS) – Arapaho and Roosevelt National Forest

^c Federally and State-listed Endangered

^d State Special Concern Species

^e Regional Forest Sensitive Species, Forest Service Region 2

3.5.1.1 Colorado River Headwaters Sub-Basin

The Colorado River supports a coldwater fisheries resource within the Corridor. Aquatic habitat within the downstream portion of this segment is contained in a narrow channel and is heavily influenced by extreme water-level fluctuations associated with the Shoshone pump-back storage facility. The upstream portion of this segment (within the Corridor) is characterized as a meandering channel with a wide floodplain.

3.5.1.2 Eagle River Sub-Basin

The Eagle River provides coldwater fisheries resources that have been or are currently affected by several influences (CDOW 1996). In general, the lower Eagle River experiences unusual low-flow conditions during “low-water” years, which, in turn, stress aquatic organisms, particularly fish. The increased water temperatures associated with late summer low flows and the lack of deep pools necessary for winter survival tend to stress fish in the lower Eagle River. Eagle River water temperatures, monitored by the CDOW downstream from the town of Avon from April through October 2001, approached 20 degrees C (68 degrees F) in early August. The stress has facilitated outbreaks of *furunculosis* (bacterial disease) within the fish populations of the Eagle River (CDOW 1996). Brook and rainbow trout are typically capable of tolerating temperatures only as high as 24 degrees C (75 degrees F) for limited periods of time (Hynes 1972).

Sedimentation also affects the Eagle River within the Corridor. Tributaries to the Eagle River (such as Milk Creek, Muddy Creek, Alkali Creek, and Ute Creek) experience “gully washers” during spring runoff and intense precipitation events. The suspended solids transported by these events settle on the substrate of the river. This sedimentation

Supporting Documentation

- Appendix A, Environmental Analysis and Data
- Appendix G, Water Resources
- Appendix H, Fisheries
- Appendix K, Overview of Water Availability and Growth, and Forest Service Land Management
- Resource Map 3.5-1, Highly Valued Fisheries and “Gold Medal” Rivers and Streams

3.5 Fisheries

can suffocate trout eggs, reduce fish spawning habitat, and adversely affect benthic invertebrate communities (forage for fish) in the river. Other influences such as nonpoint source pollutants resulting from urban development upstream in the vicinity of the towns of Avon and Vail and winter roadway maintenance needs (that is, use of sand/salt and chemical deicers) tend to affect the productivity and survival of aquatic communities within the Corridor.

CDOW (1996) indicated that effluent from existing wastewater treatment plants (WWTPs) discharge nitrogen and phosphorous to the Eagle River and that too much nutrient enrichment will result in degradation of the aquatic community and a gradual decline in the fishery value of the river. Other cumulative sources of Eagle River water quality impairment mentioned include railroads, urban development within or near the floodplain, golf courses, snow plowed or melted directly into the river, highway sand and gravel, and urban runoff.

Gore Creek

Gore Creek originates in the pristine alpine headwaters of the Gore Mountain Range and flows for approximately 15 miles through the town of Vail before its confluence with the Eagle River. Stream morphology of Gore Creek is characterized as riffle/pool streambed features, predominantly cobble with lesser amounts of gravel and sand with low sinuosity and a gradient of less than 2 percent. The Colorado Wildlife Commission has designated the lower 4 miles of Gore Creek (from Red Sandstone Creek downstream to the Eagle River) as a Gold Medal stream. Gold Medal streams provide outstanding opportunities for angling large trout. This designation is based primarily on the high recreational value of the brown trout community in that segment (Wynn et al. 2001). Water temperatures within the Gore Creek watershed are typically less than 11 degrees C (52 degrees F), providing favorable habitat for trout (Wynn et al. 2001).

Black Gore Creek

Black Gore Creek provides aquatic habitat both within the stream and within Black Lakes No. 1 and No. 2. Stream habitat within Black Gore Creek is characterized as steep cascade step/pool streambed features—predominantly cobble with a mixture of boulder, gravel, and sand—straight, with a gradient of 4 to 10 percent. The transport of sediment to Black Gore Creek from I-70 has been considered a primary water quality and aquatic resource (including fish habitat) concern for Black Gore Creek (Wynn et al. 2001). In September 2002, Black Gore Creek was placed on the Clean Water Act 303(d) list as a stream impaired by runoff (sediment) from I-70.

Black Gore Creek water temperatures monitored by CDOT upstream from Timber Creek from April through November 2001 indicated that the highest temperatures were during July and August. Water temperatures during these months were generally below 11 degrees C (52 degrees F) with occasional temperatures slightly above 12 degrees C (54 degrees F). Based on the tolerable water temperature limits (for limited time periods) of 20 to 25 degrees C (68 to 77 degrees F), the maximum late summer water temperatures within Black Gore Creek provide suitable conditions for trout inhabiting these waters.

3.5.1.3 Blue River Sub-Basin

West Tenmile Creek and Tenmile Creek

West Tenmile Creek flows entirely within the immediate vicinity of I-70 from its headwaters near Vail Pass to its confluence with Tenmile Creek, where it has been channelized by the development of the Copper Mountain Resort. Substrate is predominantly boulder/cobble in upper reaches and unconsolidated cobble and gravel downstream near its confluence with Tenmile Creek. In pristine areas, West Tenmile Creek is dominated by runs and small plunge pools behind boulders.

Tenmile Creek has been affected by the historic mining activities associated with the Climax mining operations upstream. The substrate within Tenmile Creek immediately downstream from the West Tenmile Creek confluence is described as hard-packed boulders and cobble. This section has been channelized to varying degrees by the construction of I-70, resulting in primarily run habitat (riffles and pools are uncommon). Also due to the channelization, the northwest bank has evidence of active erosion and is lacking streamside vegetation. Nearer Frisco, the stream becomes less disturbed with runs and pools becoming more prevalent (riffles, however, are rare). Tenmile Creek flows into Dillon Reservoir at Frisco.

North Tenmile Creek originates in the pristine areas of the Gore Mountain Range and flows east for 5 miles to its confluence with Tenmile Creek immediately upstream from the town of Frisco where I-70 crosses it. Surveys conducted in the spring of 1980 indicate that this stream is a steep-gradient “blowout” stream with limited pools and cover.

West Tenmile Creek water temperatures monitored by CDOT immediately upstream from the Copper Mountain Resort from August through November 2001 indicated that the highest temperatures occurred during late August. Water temperatures during this period reached 14.5 degrees C (58 degrees F). Based on the tolerable water temperature limits (limited exposure time) of 20 to 25 degrees C (68 to 77 degrees F), the maximum late summer water temperatures within West Tenmile Creek provide suitable conditions for trout inhabiting these waters.

The Water Quality Control Commission (WQCC) has established classifications and standards for segments of Tenmile Creek, one of which (segment 14) is located in the immediate vicinity of I-70, which includes West Tenmile Creek (see Appendix G, Water Resources). CDOT operates a wastewater treatment facility at the Vail Pass rest area under CDPS Permit No. CO-0042731 that discharges effluent to shallow groundwater in West Tenmile Creek. The original facility was constructed in 1980 and upgraded in 1991 and 1998 to mitigate surface discharges from a failed leach field. Both nitrates and phosphorus are a concern for the discharge from this facility (CDPHE 1998). The facility has recently been fitted with further mechanical treatment and a new leach field to comply with the phosphorus effluent limitations of 0.11 mg/L to meet Dillon Reservoir Control Regulations.

The Copper Mountain Consolidated Metropolitan District WWTP discharges to Tenmile Creek, just above the confluence with West Tenmile Creek. Elevated metal and sulfate levels in Tenmile Creek, partially sourced from the Climax Mine, are also a concern.

Straight Creek

Straight Creek is composed of riffle/pool and beaver dam affected reaches (Resource Consultants and Engineers, Inc. 1993). Construction of I-70 between the west portal of the Eisenhower-Johnson Memorial Tunnels (EJMT) and the town of Silverthorne in the early 1970s resulted in the formation of steep cut-and-fill slopes that have undergone more than 20 years of accelerated erosion. The accelerated erosion and the annual application of sand to the highway during the winter months have led to increases in sediment delivery to Straight Creek (Resource Consultants and Engineers, Inc. 1993) and the impairment of this Class 1 coldwater aquatic life stream. Straight Creek has been placed on the Clean Water Act 303(d) list as a stream impaired by runoff (sediment) from I-70.

Straight Creek water temperatures monitored by CDOT immediately upstream from Silverthorne from April through November 2001 indicated that the highest water temperatures were reached during July and August. Water temperatures during these months were generally below 10 degrees C (50 degrees F). During early August, water temperatures occasionally reached 11 degrees C (52 degrees F). Based on the tolerable water temperature limits (limited exposure time) of 20 to

25 degrees C (68 to 77 degrees F), the maximum late summer water temperatures within Straight Creek could provide suitable conditions for trout inhabiting these waters, although other critical factors may not be present to support a fishery (for example, spawning areas).

Straight Creek is a tributary to the Blue River in Silverthorne and is classified for drinking water supply and aquatic life uses (Segment 18 as shown in Appendix H, Fisheries). CDPHE listed Straight Creek on the Colorado 1998 303(d) list for aquatic life use impairment by sediment. Excess sediment in Straight Creek impairs coldwater aquatic life use, increases the maintenance necessary at the drinking water system's intakes and plants, and has the potential to affect the Gold Medal fishery of the Blue River.

Blue River

The Blue River within the Corridor begins at the tail waters of the Dillon Reservoir dam and flows north to Green Mountain Reservoir. I-70 crosses the Blue River 0.5 mile downstream from the reservoir. The Blue River is designated by the Colorado Wildlife Commission as a Gold Medal stream from the dam downstream for approximately 35 miles to the town of Kremmling. The Silverthorne/Dillon Joint Sewer Authority WWTP discharges to the lower Blue River at the north end of the town of Silverthorne. Ammonia toxicity from wastewater effluent is a concern along with maintenance of instream flow due to increased pressure for diversions due to growth. Downstream from the Dillon-Silverthorne WWTP discharge, concentrations of total cadmium, lead, and zinc have exceeded standards for aquatic life, and dissolved manganese has exceeded water supply stream standards (USGS 1979). Gravel mining operations adjacent to the Blue River have been sources of substantial suspended and dissolved solids.

Snake River

The Snake River begins near the Continental Divide at an elevation of 12,000 feet AMSL and flows for 13 miles north and northwest before entering Dillon Reservoir downstream from the town of Keystone. The Snake River is predominantly boulder/cobble substrate with occasional sand and gravel substrate. During the spring of 1985, an orange flocculant (probably ferric hydroxide from historic mining) was present on the substrate immediately downstream from the Peru Creek confluence, and its prevalence decreased downstream to Dillon Reservoir (Chadwick and Associates 1985). Peru Creek reaches its confluence with the Snake River 7 miles upstream from Dillon Reservoir. Riffles are predominant with pools up to 1 meter (3 feet) deep. Runs, undercut banks, and overhanging riparian willows are common in the upper segments with grasses, alders, and conifers present nearer the stream bank.

Dillon Reservoir

Dillon Reservoir is located on the Blue River immediately upstream from existing I-70 and the town of Silverthorne. This reservoir provides recreational opportunities such as fishing, boating, swimming, camping, and hiking. Dillon Reservoir receives inflow from the Blue River, Snake River, and Tenmile Creek. Owned by the Denver Water Board, Dillon Reservoir provides a water source for the city of Denver. Water is diverted from the reservoir to the South Platte River through the Harold Roberts tunnel built under the Continental Divide. Dillon Reservoir and its tributaries (Blue River Segment 3) have been classified for aquatic life, recreation, and water supply use. Phosphorus loads from WWTPs and nonpoint sources are cited as major problems affecting Dillon Reservoir, resulting in accelerated eutrophication conditions in the lake. Phosphorus wasteload allocations have been in place for the upper Blue River watershed since 1984 (WQCC Regulation No. 71). The control regulation established a phosphorus load allocation for the dischargers upstream of Dillon Reservoir.

WWTPs located upstream of Dillon Reservoir include the Snake River WWTP, the Frisco Sanitation District WWTP, and numerous facilities operated by the Breckenridge Sanitation District.

The WQCC has indicated that discharges to Dillon Reservoir will be evaluated for effluent limits for ammonia when permits are renewed. The concern with respect to ammonia is its un-ionized form, due to its toxicity to fish. Initial concentrations, temperature, pH, and mixing are the key elements in determining the amount of un-ionized ammonia that could be toxic to fish.

3.5.1.4 Clear Creek Sub-Basin

Within the Corridor, Clear Creek originates near the Continental Divide at an elevation of 11,100 feet AMSL flowing east for 30 miles to Floyd Hill (elevation 7,500 feet AMSL). Several major tributaries flow into Clear Creek within the project area. These tributaries include Herman Gulch, South Fork Clear Creek, West Fork Clear Creek, Mill Creek, Trail Creek, Chicago Creek, and Soda Creek.

The Clear Creek drainage has experienced extensive human activity (mining, roadway construction and operation, urban nonpoint storm runoff, point sources such as effluent from domestic WWTPs, accidental spills from vehicles using the roadways) over the past 100 years. Historically, sediment has entered Clear Creek as a result of state and local roadway construction and maintenance practices and from the establishment of facilities and infrastructures associated with ski area and urban development.

Georgetown Lake

Georgetown Lake is located on Clear Creek immediately downstream from the town of Georgetown. Georgetown Lake Dam was constructed in 1974 to provide a source of recreation, primarily shoreline fishing (Cuffin and Chafin 2000). Historically, sediment has entered Georgetown Lake as a result of state and local roadway construction and maintenance practices, erosion from nearby hillsides, and construction of residences and parking lots associated with the development of the town of Georgetown. The continual conveyance of these sediments to Georgetown Lake is reducing pool depth and associated fish habitat.

Clear Creek water temperature monitoring, performed by the Upper Clear Creek Watershed Association (UCCWA) and CDOT near Bakerville (Herman Gulch) (upstream from West Fork Clear Creek and downstream from the town of Idaho Springs from 1994 through 2000) indicated that the highest temperatures were during August and September. Water temperatures during these months were generally below 10 degrees C (50 degrees F) (one measurement approached 13 degrees C or 55 degrees F) at the Bakerville location. Temperatures upstream from West Fork Clear Creek during the late summer months were frequently above 10 degrees C (50 degrees F) with occasional temperatures near 12 degrees C (54 degrees F). Downstream from Idaho Springs, the high temperatures frequently exceeded 11 degrees C (52 degrees F) and occasionally approached 13 degrees C (55 degrees F). Based on the tolerable water temperature limits (over a limited exposure time) of 20 to 25 degrees C (68 to 77 degrees F), the maximum late summer water temperatures within Clear Creek provide suitable conditions for trout inhabiting these waters.

3.5.2 Environmental Consequences

This section describes the potential short- and long-term impacts on fisheries resulting from the development of each alternative and their respective options. Potential impacts associated with the No Action alternative and the Minimal Action alternative are presented qualitatively, while potential impacts resulting from action alternatives are presented more quantitatively and in more detail for each alternative throughout this section.

3.5 Fisheries

Direct impacts would include the removal, modification, or disturbance of existing aquatic habitat within rivers and streams adjacent to or crossed by a given alternative. Direct impacts would also include the effects of sedimentation and reduced water quality as a result of construction, operation, and maintenance of the alternative. Tier 2 studies will address more specific impacts/mitigation related to fisheries resources in the Corridor, including specific issues associated with hazardous spills, stormwater runoff, and wastewater treatment facility effluent.

Impacts on the aquatic resources were evaluated within a 200-foot buffer zone, and impacts associated with each alternative for footprint (fp), construction disturbance (cd) zone, and sensitivity zone (sz) in the Eagle River, Blue River, and Clear Creek sub-basins are shown in Appendix A, Environmental Analysis and Data. Impacts within the sensitivity zone could disturb additional riparian and wetland habitat that forms a protective buffer zone to aquatic habitat.

3.5.2.1 Direct Impacts

Common Impacts

All of the proposed alternatives would closely follow the existing I-70 alignment, and because no new alignments are proposed, the alternatives would not cut off any additional tributaries that would restrict fish movement.

Potential short-term and long-term impacts on fisheries common to all alternatives could generally be described as impacts on water quality, stream substrate, and benthic invertebrate communities. Short-term degradation of water quality, in particular suspended solids, would result from erosion of disturbed soils during construction. Impacts on fisheries resulting from the degradation of water quality may include the disturbance of benthic invertebrate habitat and trout spawning areas immediately downstream from construction activities.

Potential direct impacts associated with these actions would include erosion and transport of soils during construction of temporary access roads and eventual sedimentation within the receiving streams and stream substrate downstream from the project. In addition to the river and stream substrate, river and stream bank soils could be temporarily disturbed (riparian vegetation removed and soils either graded or covered with fill). During and immediately following construction, turbidity and sedimentation within the streams are anticipated as a result of both stream substrate disturbance and erosion of disturbed banks. Sedimentation of the interstitial spaces between coarser substrate particles in the receiving streams could affect small fish and benthic invertebrates that typically inhabit the substrate. Because this type of substrate is used for incubation of eggs, fish reproduction could also be affected. Acres of disturbance in a 200-foot sensitivity area, including footprint (fp), construction disturbance (cd) zone, and sensitivity zone (sz) of “high-value” fisheries, Gold Medal fisheries, and species of concern are shown in Appendix A.

The proposed actions are expected to require winter maintenance that may include the application of traction sand and chemical deicers. These substances may eventually enter receiving waters potentially affecting the water quality of the Eagle River, Gore Creek, Black Gore Creek, West Tenmile Creek, Tenmile Creek, Straight Creek, and Clear Creek downstream from each project.

No Action

The No Action alternative would consist of several planned or permitted projects, which are described in detail in Chapter 2, Description and Comparison of Alternatives. Impacts associated with these projects are addressed in other environmental documents including the *Eagle County Airport*

Interchange EA, the *SH 9 EIS*, the *Gaming Area Access EIS*, and the *Hogback Parking Facility EA*. No additional direct impacts on fisheries are anticipated to occur under the No Action alternative.

Minimal Action

This section identifies Minimal Action components (including interchanges and auxiliary lanes) and the fisheries (river or stream) that would potentially be affected by construction or operation of the component.

Corridor-Wide Impacts

The Minimal Action alternative is anticipated to affect approximately 29 acres of “high-value” and Gold Medal fisheries and species of special concern within the Eagle River, Blue River, and Clear Creek sub-basins. (See Table 3.5-2.) Minimal Action would be intermediate among alternatives for impacts to fisheries Corridor-wide. See discussion below for direct impacts within individual sub-basins.

Table 3.5-2. Minimal Action Impacts in Acres

Resource	Eagle River			Blue River			Clear Creek								
	fp	cd	sz	fp	cd	sz	fp	cd	sz						
“High-value” fisheries	5.5	/	4.5	/	4.7	1	/	0.8	/	0.8	2.5	/	2.3	/	2.6
Gold Medal fisheries	1.5	/	0.6	/	0.7	0.2	/	0.2	/	0.2	0	/	0	/	0
Species of special concern	0	/	0	/	0	0	/	0	/	0	0.2	/	0.1	/	0.2

fp: footprint; cd: construction disturbance zone; sz: sensitivity zone

Colorado River Headwaters Sub-Basin

The East Glenwood Springs interchange would be a Minimal Action component (see Table 3.5-3) located in an urbanized area of Glenwood Springs adjacent to the Colorado River and immediately upstream from the Roaring Fork River. Because the conceptual design of this action has not been developed, short-term (construction-related) and long-term (operation and maintenance) impacts associated with this action cannot be identified at this time.

Table 3.5-3. Colorado River Sub-Basin Minimal Action Components

Minimal Action Component	Fisheries/Aquatic Habitat Potentially Affected
Colorado River Sub-Basin Glenwood Springs interchange	Eagle River

Eagle River Sub-Basin

Table 3.5-4 identifies Minimal Action components that may potentially affect fisheries within the Eagle River sub-basin. The Minimal Action alternative would be intermediate among alternatives for impacts on fisheries in this sub-basin. See Table 3.5-2 for impact details.

Table 3.5-4. Eagle River Sub-Basin Minimal Action Components

Minimal Action Component	Fisheries/Aquatic Habitat Potentially Affected
Eagle River Sub-Basin	
Gypsum interchange (mp 140)	Eagle River
Eagle and Spur Road interchange (mp 147)	Eagle River
Edwards and Spur Road interchange (mp 163)	No fisheries affected
Avon interchange (167)	Eagle River
Minturn interchange (mp 171)	Eagle River
Dowd Canyon curve safety modification (mp 170–173)	Gore Creek/Eagle River
Vail West interchange/Simba Run (mp 173)	No fisheries affected
West side of Vail Pass auxiliary lanes (mp 180–190)	Black Gore Creek

Table 3.5-6. Clear Creek and Upper South Platte River Sub-Basins Minimal Action Components

Minimal Action Component	Fisheries/Aquatic Habitat Potentially Affected
Clear Creek Sub-Basin	
Bakerville to EJMT Uphill (westbound) auxiliary lane (mp 215–221) Loveland Pass interchange (mp 216) EMJT to Herman Gulch Downhill (eastbound) auxiliary lane (mp 215–218) Georgetown to Silver Plume Uphill (westbound) auxiliary lane (mp 226–228) Silver Plume to Georgetown Downhill (eastbound) auxiliary lane (mp 226–228) Silver Plume interchange (mp 226) Georgetown interchange (mp 228) Empire interchange (mp 232) Downieville to Empire, Uphill (westbound) auxiliary lane (mp 232-234) Empire to Downieville, Downhill (eastbound) auxiliary lane (mp 232-234) Downieville interchange (mp 234) Fall River Road interchange (mp 238) Idaho Springs West interchange (mp 239) Idaho Springs/SH 103 interchange (mp 240) Idaho Springs East interchange (mp 241) Base of Floyd Hill/US 6 interchange (mp 244) Black Hawk Tunnel Off-ramp to Hidden Valley Off-ramp (westbound) (mp 244–243) Hyland Hills/Beaver Brook interchange (mp 247/mp 248)	Clear Creek
Upper South Platte River Sub-Basin	
Lookout Mountain interchange (mp 256) Morrison to Chief Hosa, Uphill (westbound) (mp 253–259)	Bear Creek Drainage
Clear Creek and Upper South Platte River Sub-Basins	
Morrison interchange (mp 259)	Clear Creek, Bear Creek Drainages

Blue River Sub-Basin

Minimal Action components potentially affecting fisheries and aquatic habitat within the Blue River sub-basin would be limited to the Copper Mountain, Frisco/Main Street, and Silverthorne interchanges (see Table 3.5-5). The Copper Mountain and Frisco/Main Street interchanges development could affect fisheries and aquatic habitat within Tenmile Creek, while the Silverthorne interchange could affect fisheries and aquatic habitat within the Blue River, which is designated by the Colorado Wildlife Commission as a Gold Medal stream. Minimal Action would have among the least impacts relative to other alternatives in the Blue River sub-basin. See Table 3.5-2 for impact details.

Table 3.5-5. Blue River Sub-Basin Minimal Action Components

Minimal Action Component	Fisheries/Aquatic Habitat Potentially Affected
Blue River Sub-Basin	
Copper Mountain interchange (mp 195) Frisco/Main Street interchange (mp 201) Frisco/SH 9 interchange (mp 203) Silverthorne interchange (mp 205)	Tenmile Creek Tenmile Creek No fisheries affected Blue River

Clear Creek Sub-Basin

Minimal Action projects potentially affecting fisheries and aquatic habitat within the Clear Creek sub-basin would be limited to interchange improvements and auxiliary lanes (see Table 3.5-6). Depending on proximity to Clear Creek and tributaries to Clear Creek, all Minimal Action projects could affect fisheries and aquatic habitat within the Clear Creek sub-basin. In particular, the Empire and Downieville interchanges and the Empire to Downieville (eastbound and westbound) auxiliary lanes could affect fisheries and aquatic habitat considered “high value” by the CDOW within Clear Creek. The Minimal Action alternative would result in among the least impacts relative to other alternatives for impacts on fisheries in this sub-basin. See Table 3.5-2 for impact details.

Rail with IMC

Corridor-Wide Impacts

The Rail with IMC alternative is anticipated to affect “high-value” fisheries within the Eagle River, Blue River, and Clear Creek sub-basins and Gold Medal fisheries within the Eagle River and Blue River sub-basins. The alternative would potentially have small impacts on species of special concern in the Blue River and Clear Creek sub-basins. The Rail with IMC alternative is anticipated to affect approximately 41 acres Corridor-wide (see Table 3.5-7), among the greatest impacts relative to other alternatives. These impacts would primarily occur within the Eagle River and Clear Creek sub-basins. See discussion below for direct impacts within individual sub-basins.

Table 3.5-7. Rail with IMC Impacts in Acres

Resource	Eagle River			Blue River			Clear Creek								
	fp	cd	sz	fp	cd	sz	fp	cd	sz						
“High-value” fisheries	8.5	/	6.6	/	5.4	1.1	/	0.9	/	1.1	4.5	/	3.2	/	3.8
Gold Medal fisheries	2.1	/	1.0	/	1.0	0.2	/	0.2	/	0.2	0	/	0	/	0
Species of special concern	0	/	0	/	0	0.4	/	0.3	/	0.2	0.3	/	0.2	/	0.2

fp: footprint; cd: construction disturbance zone; sz: sensitivity zone

3.5 Fisheries

Eagle River Sub-Basin

The Rail with IMC alternative could affect streams considered “high-value” by the CDOW within the Eagle River sub-basin. These streams would include Eagle River, Squaw Creek, Lake Creek, McCoy Creek, Beaver Creek, Booth Creek, Pitkin Creek, Gore Creek, Miller Creek, Polk Creek, and Black Gore Creek (see Map 3.5-1, Highly Valued Fisheries and “Gold Medal” Rivers and Streams, located in the Resource Map section). Based on the conceptual design of the Rail with IMC alternative, the anticipated area of disturbance (acres) was measured for the footprint, construction disturbance zone, and sensitivity zone in an area 200 feet from the stream. Some of the area has previously been disturbed as a result of the construction and operation of existing I-70. Long-term effects would be those activities affected by footprint, operation, and maintenance. Most of this disturbance would occur in the Black Gore Creek drainage, where the rail alignment would be between Black Gore Creek and the existing highway alignment. Short-term impacts would include the disturbance of areas previously disturbed by existing I-70 and any additional disturbance required for construction of the alternative, and generally would include the footprint and construction disturbance zone.

Because the Rail with IMC alternative would terminate at mid-Vail (milepost 176) and use the existing Union Pacific Railroad (UPRR) track from the Eagle County Airport to Minturn, impacts from construction of the rail line through Dowd Canyon are anticipated to the Gold Medal stream segment of Gore Creek (from Red Sandstone Creek to its confluence with the Eagle River). Where the activities associated with the Rail with IMC alternative would encroach on the streams identified above, impacts on fisheries and aquatic habitat could occur as described above for all alternatives. Sedimentation of the interstitial spaces between coarser substrate particles in Pitkin Creek, Gore Creek, Miller Creek, Polk Creek, and Black Gore Creek could affect small fish and benthic invertebrates that typically inhabit the substrate. Because this type of substrate is used for incubation of fish eggs, fish reproduction also could be affected. In comparison to other alternatives, the Rail with IMC alternative would result in among the greatest impacts on fisheries within the Eagle River sub-basin. See Table 3.5-7 for impact details.

The Rail with IMC alternative would not require additional application of traction sand and deicers. Other than short-term erosion and sedimentation impacts associated with construction, winter maintenance activities associated with this alternative are not expected to affect water quality within these streams.

Blue River Sub-Basin

The Rail with IMC alternative could affect streams considered “high-value” by the CDOW, including streams inhabited by Colorado River cutthroat trout, within the Blue River sub-basin. These streams would include Corral Creek (a tributary to West Tenmile Creek and inhabited by Colorado River cutthroat trout), West Tenmile Creek, Meadow Creek (a tributary to Tenmile Creek and inhabited by Colorado River cutthroat trout), and the Blue River (designated a Gold Medal stream downstream from Dillon Reservoir). Based on the conceptual design of the Rail with IMC alternative, the anticipated area of disturbance for short-term and long-term impacts on West Tenmile Creek and Tenmile Creek drainages is anticipated to be relatively low. The Rail with IMC alternative would be aligned on the cut side of the existing roadway opposite of West Tenmile Creek and Tenmile Creek. In comparison to other alternatives, the Rail with IMC alternative would result in among the greatest impacts on fisheries within the Blue River sub-basin. See Table 3.5-7 for impact details.

Sedimentation of the interstitial spaces between coarser substrate particles in West Tenmile Creek and the Blue River could affect small fish and benthic invertebrates that typically inhabit the substrate. Because this type of substrate is used for incubation of eggs, fish reproduction could also be affected. Other than short-term erosion and sedimentation impacts associated with construction, this alternative is not expected to affect water quality within these streams.

Clear Creek Sub-Basin

The Rail with IMC alternative could affect streams considered “high-value” by the CDOW within the Clear Creek sub-basin. Clear Creek would be the primary stream potentially affected by this alternative. Where the activities associated with the Rail with IMC alternative encroach on Clear Creek, impacts described above to fisheries and aquatic habitat could occur. In comparison to other alternatives, Rail with IMC would result in intermediate impacts on fisheries within this sub-basin. See Table 3.5-7 for impact details.

AGS

Corridor-Wide Impacts

The AGS alternative is anticipated to affect “high-value” fisheries within the Eagle River, Blue River, and Clear Creek sub-basins and Gold Medal fisheries only within the Eagle River and Blue River sub-basins. The AGS alternative is anticipated to affect approximately 31 acres Corridor-wide (see Table 3.5-8), which is intermediate relative to other alternatives. See discussion below for direct impacts within individual sub-basins.

Table 3.5-8. AGS Impacts in Acres

Resource	Eagle River			Blue River			Clear Creek								
	fp	cd	sz	fp	cd	sz	fp	cd	sz						
“High-value” fisheries	7.1	/	0.7	/	6.9	1.1	/	0.8	/	0.9	5	/	2.1	/	2.9
Gold Medal fisheries	0.9	/	0	/	1	0.2	/	0.2	/	0.2	0	/	0	/	0
Species of special concern	0	/	0	/	0	0.3	/	0	/	0.3	0.2	/	0.1	/	0.1

fp: footprint; cd: construction disturbance zone; sz: sensitivity zone

Eagle River Sub-Basin

The AGS alternative could affect streams considered “high-value” by the CDOW within the Eagle River sub-basin. These streams would include Eagle River, Squaw Creek, Lake Creek, McCoy Creek, Beaver Creek, Booth Creek, Pitkin Creek, Gore Creek, Miller Creek, Polk Creek, and Black Gore Creek. The AGS alternative would have a smaller footprint than that of the Rail with IMC alternative and the impact on Gold Medal streams would be less, but the impact on “high-value” fisheries would be greater due to the extension from Eagle County Airport to Vail. The potential impacts would be similar to those described for the Rail with IMC alternative. AGS would be intermediate among alternatives for impacts on fisheries within this sub-basin. See Table 3.5-8 for impact details.

The AGS alternative would not require additional application of traction sand and deicers. Other than short-term erosion and sedimentation impacts associated with construction, winter maintenance activities associated with this alternative are not expected to affect water quality within these streams.

Blue River Sub-Basin

The narrower footprint of the AGS alternative would reduce potential direct impacts related to the AGS footprint and construction disturbance zone. However, sedimentation transport from construction activities still could affect the stream substrate and benthic habitat of “high-value” fisheries as identified by 0.2 acre of disturbance within the 200-foot sensitivity zone. These impacts could be minimized if not avoided by proper use of CDOT best management practices (BMPs). Unmitigated, impacts to fisheries within the Blue River sub-basin would be intermediate among alternatives. See Table 3.5-8 for impact details.

Clear Creek Sub-Basin

The AGS alternative could affect streams considered “high-value” by CDOW within the Clear Creek sub-basin. The AGS alternative alignment would be the same as that of the Rail with IMC alternative; however, the narrower footprint would reduce the area of disturbance that would affect “high-value” fisheries. The AGS alternative would result in among the least impacts on fisheries relative to other alternatives within this sub-basin. See Table 3.5-8 for impact details.

Dual-Mode or Diesel Bus in Guideway

Corridor-Wide Impacts

The Bus in Guideway alternatives are anticipated to have relatively low impacts on “high-value” fisheries within the Eagle River, Blue River, and Clear Creek sub-basins. These alternatives are anticipated to have small impacts (0.6 acre) on Gold Medal fisheries only in the Blue River sub-basin and small impacts (0.6 acre) on species of special concern only in the Clear Creek sub-basin. The Bus in Guideway alternatives are anticipated to affect approximately 16 acres for each alternative (see Table 3.5-9), which are among the least impacts relative to other alternatives. See discussion below for direct impacts within individual sub-basins.

Table 3.5-9. Dual-Mode or Diesel Bus in Guideway Impacts in Acres

Resource	Eagle River			Blue River			Clear Creek		
	fp	cd	sz	fp	cd	sz	fp	cd	sz
“High-value” fisheries	1.3	/ 0.8	/ 0.8	1	/ 0.8	/ 0.8	2.8	/ 2.8	/ 3.6
Gold Medal fisheries	0	/ 0	/ 0	0.2	/ 0.2	/ 0.2	0	/ 0	/ 0
Species of special concern	0	/ 0	/ 0	0	/ 0	/ 0	0.3	/ 0.1	/ 0.2

fp: footprint; cd: construction disturbance zone; sz: sensitivity zone

Eagle River Sub-Basin

While no bus guideway is located within the Eagle River sub-basin, the Minimal Action components of the Bus in Guideway alternatives would create 2.9 acres of impacts in the sub-basin, among the least impacts relative to other alternatives.

Blue River Sub-Basin

A single-lane bus guideway would be located in the median from Silverthorne to EJMT. Small impacts are expected on “high-value” fisheries (2.6 acres) and Gold Medal fisheries (0.6 acre). No impacts on species of special concern are expected to occur in the Blue River sub-basin from the Bus in Guideway alternatives. Bus in Guideway impacts on fisheries in this sub-basin would be among the least relative to other alternatives.

Clear Creek Sub-Basin

In comparison to other alternatives, the Bus in Guideway alternatives would have among the least impacts on fisheries in the Clear Creek sub-basin. The Bus in Guideway alternatives could affect segments of Clear Creek considered “high-value” by CDOW. Based on the conceptual design of the guideway and the anticipated area of disturbance required for construction activities, approximately 9 acres of “high-value” fisheries could be affected. See Table 3.5-9 for impact details. In some areas the highway would need to be expanded outward to provide space in the median for the bus in guideway. During and immediately following construction, turbidity and sedimentation within the streams are anticipated as a result of both stream substrate disturbance and erosion of disturbed banks. This sedimentation could affect benthic invertebrate populations and fish reproduction within Clear Creek.

This proposed action is expected to require winter maintenance that may include the application of traction sand and chemical deicers. These substances may eventually enter Clear Creek, potentially affecting its water quality. Control of applied deicers would be implemented to the extent practicable and would be addressed through BMPs by CDOT.

Six-Lane Highway 55 mph

Corridor-Wide Impacts

The Six-Lane Highway 55 mph alternative is anticipated to affect “high-value” fisheries within the Eagle River, Blue River, and Clear Creek sub-basins. This alternative is anticipated to affect Gold Medal fisheries only within the Eagle River and Blue River sub-basins. The Six-Lane Highway 55 mph alternative is anticipated to affect approximately 32 acres (see Table 3.5-10), which is intermediate among alternatives. See discussion below for direct impacts within individual sub-basins.

Table 3.5-10. Six-Lane Highway 55 mph Impacts in Acres

Resource	Eagle River			Blue River			Clear Creek		
	fp	cd	sz	fp	cd	sz	fp	cd	sz
“High-value” fisheries	5.5	/ 4.5	/ 4.7	1	/ 0.8	/ 0.8	2.8	/ 3.8	/ 4.5
Gold Medal fisheries	1.5	/ 0.6	/ 0.7	0.2	/ 0.2	/ 0.2	0	/ 0	/ 0
Species of special concern	0	/ 0	/ 0	0	/ 0	/ 0	0.2	/ 0.1	/ 0.1

fp: footprint; cd: construction disturbance zone; sz: sensitivity zone

Eagle River Sub-Basin

The highway widening at Dowd Canyon (mileposts 170 to 173) could affect “high-value” fisheries in the Eagle River and Gold Medal fisheries in Gore Creek east of the confluence with the Eagle River. Impacts on the fisheries by this alternative would be intermediate within this sub-basin compared to the other alternatives. See Table 3.5-10 for impact details.

Blue River Sub-Basin

While no highway widening is proposed within the Blue River sub-basin, Minimal Action components of the Six-Lane Highway 55 mph alternative would create 3.2 acres of impacts on “high-value” and Gold Medal fisheries within the sub-basin. Impacts on fisheries would be among the least relative to other alternatives within this sub-basin.

Clear Creek Sub-Basin

Within the Clear Creek sub-basin, the Six-Lane Highway 55 mph alternative from the east portal of the EJMT to the top of Floyd Hill could affect segments of Clear Creek that are considered “high-value” by the CDOW. Based on the conceptual design of the Six-Lane Highway 55 mph alternative, and the anticipated area of disturbance required for construction activities (approximately 200 feet from the stream), an estimated 11.1 acres of “high-value” fisheries are anticipated to be disturbed along Clear Creek as a result of the highway widening. The impacts are intermediate compared with other alternatives. No impacts on Gold Medal fisheries are expected within the sub-basin. See Table 3.5-10 for impact details.

All of the Highway alternatives in the Clear Creek sub-basin are expected to require winter maintenance, particularly above the 8,000-foot level, that would increase the application of traction sand and chemical deicers. These substances may eventually enter receiving waters, potentially

3.5 Fisheries

affecting the water quality of Clear Creek. Control of applied deicers would be implemented to the extent practicable and would be addressed through BMPs by CDOT.

Six-Lane Highway 65 mph

Corridor-Wide Impacts

The Six-Lane Highway 65 mph alternative would have intermediate impacts on fisheries in comparison to other alternatives and is anticipated to affect “high-value” fisheries within the Eagle River, Blue River, and Clear Creek sub-basins. This alternative is anticipated to have a small impact (0.6 acre) on Gold Medal fisheries only in the Blue River sub-basin. The Six-Lane Highway 65 mph alternative is anticipated to affect approximately 29 acres (see Table 3.5-11), which is intermediate among alternatives. See discussion below for direct impacts within individual sub-basins.

Table 3.5-11. Six-Lane Highway 65 mph Impacts in Acres

Resource	Eagle River			Blue River			Clear Creek								
	fp	cd	sz	fp	cd	sz	fp	cd	sz						
“High-value” fisheries	5.1	/	4.5	/	4.6	1	/	0.8	/	0.8	2.8	/	3.9	/	4.5
Gold Medal fisheries	0	/	0	/	0	0.2	/	0.2	/	0.2	0	/	0	/	0
Species of special concern	0	/	0	/	0	0	/	0	/	0	0.2	/	0.1	/	0

fp: footprint; cd: construction disturbance zone; sz: sensitivity zone

Eagle River Sub-Basin

Impacts on fisheries and aquatic habitat in the Eagle River basin would be similar to those of the Six-Lane Highway 55 mph alternative for “high-value” fisheries. The Six-Lane Highway 65 mph alternative at Dowd Canyon would include two new tunnels north of I-70 that would avoid impacts on Gold Medal fisheries in Gore Creek. Impacts for Six-Lane Highway 55 mph on fisheries within this sub-basin would be intermediate relative to other alternatives.

Blue River Sub-Basin

While no highway widening is proposed within the Blue River sub-basin, Minimal Action components of the Six-Lane Highway 65 mph alternative would create 3.2 acres of impacts on “high-value” and Gold Medal fisheries within the sub-basin, among the least impacts relative to other alternatives.

Clear Creek Sub-Basin

Impacts on “high-value” fisheries in the Clear Creek sub-basin would be similar to those of the Six-Lane Highway 55 mph alternative, being intermediate relative to other alternatives. The tunnel options within the Six-Lane Highway 65 mph alternative would avoid impact on Gold Medal fisheries.

Reversible/HOV/HOT Lanes

Corridor-Wide Impacts

Impacts on fisheries for the Reversible/HOV/HOT Lanes alternative would be higher than those of the Six-Lane Highway 55 mph alternative, but would still be intermediate among the alternatives. The Reversible/HOV/HOT Lanes alternative is anticipated to affect “high-value” fisheries within the Eagle River, Blue River, and Clear Creek sub-basins and Gold Medal fisheries only within the Eagle River and Blue River sub-basins. It is expected to affect species of special concern only in the Clear Creek sub-basin. The Reversible/HOV/HOT Lanes alternative is anticipated to affect approximately 34 acres (see Table 3.5-12). See discussion below for direct impacts within individual sub-basins.

Table 3.5-12. Reversible/HOV/HOT Lanes Impacts in Acres

Resource	Eagle River			Blue River			Clear Creek								
	fp	cd	sz	fp	cd	sz	fp	cd	sz						
“High-value” fisheries	5.5	/	4.5	/	4.7	1	/	0.8	/	0.8	3.3	/	4.1	/	5
Gold Medal fisheries	1.5	/	0.6	/	0.7	0.2	/	0.2	/	0.2	0	/	0	/	0
Species of special concern	0	/	0	/	0	0	/	0	/	0	0.3	/	0.1	/	0.2

fp: footprint; cd: construction disturbance zone; sz: sensitivity zone

Eagle River Sub-Basin

Impacts on fisheries and aquatic resources in the Eagle River sub-basin would be the same as those of the Six-Lane Highway 55 mph alternative, that is, intermediate relative to other alternatives.

Blue River Sub-Basin

While no Highway alternatives are proposed within the Blue River sub-basin, Minimal Action components of the Reversible/HOV/HOT Lanes alternative would create 3.2 acres of impacts on “high-value” and Gold Medal fisheries within the sub-basin, which would be among the least impacts relative to other alternatives.

Clear Creek Sub-Basin

The Reversible/HOV/HOT Lanes alternative would have a wider roadway than does the Six-Lane Highway 55 mph alternative. This would result in a larger footprint and would extend the construction disturbance zone out a comparable distance. Impacts in the Clear Creek sub-basin would be comparably larger. Impacts on fisheries by this alternative would be intermediate in comparison to other alternatives.

Combination Six-Lane Highway with Rail and IMC or with AGS

Corridor-Wide Impacts

In comparison to other alternatives, these Combination alternatives would have among the greatest impacts on fisheries. Both alternatives are anticipated to affect “high-value” fisheries within the Eagle River, Blue River, and Clear Creek sub-basins and Gold Medal fisheries only within the Eagle River and Blue River sub-basins. The Combination Six-Lane Highway with Rail and IMC alternative is anticipated to affect approximately 53 acres of fisheries Corridor-wide. The Combination Six-Lane Highway with AGS alternative is anticipated to affect approximately 51 acres of fisheries. See discussion below for direct impacts within individual sub-basins.

Table 3.5-13. Combination Six-Lane Highway with Rail and IMC Impacts in Acres

Resource	Eagle River			Blue River			Clear Creek								
	fp	cd	sz	fp	cd	sz	fp	cd	sz						
“High-value” fisheries	12.4	/	7.8	/	6.6	1.1	/	0.8	/	1.0	4.5	/	5	/	5.9
Gold Medal fisheries	4.1	/	0.9	/	0.9	0.2	/	0.2	/	0.2	0	/	0	/	0
Species of special concern	0	/	0	/	0	0.4	/	0.3	/	0.2	0.4	/	0.2	/	0.2

fp: footprint; cd: construction disturbance zone; sz: sensitivity zone

Table 3.5-14. Combination Six-Lane Highway with AGS Impacts in Acres

Resource	Eagle River			Blue River			Clear Creek								
	fp	cd	sz	fp	cd	sz	fp	cd	sz						
"High-value" fisheries	11.2	/	7.2	/	7.9	1.1	/	0.8	/	0.9	4.3	/	4.8	/	5.7
Gold Medal fisheries	4.2	/	0.3	/	0.7	0.2	/	0.2	/	0.2	0	/	0	/	0
Species of special concern	0	/	0	/	0	0.3	/	0	/	0.3	0.3	/	0.2	/	0.2

fp: footprint; cd: construction disturbance zone; sz: sensitivity zone

Eagle River Sub-Basin

The Combination Six-Lane Highway with Rail and IMC or with AGS alternatives could affect streams considered "high-value" by CDOW within the Eagle River sub-basin. The streams potentially affected are described under the Rail with IMC alternative, page 3.5-5. For the Combination alternatives, both the Rail with IMC and AGS alternatives would be located in the median from Vail to C-470. The difference between the two alignments would be from Eagle County Airport to Vail. The Rail with IMC alternative would use the track along the existing UPRR, and the AGS alternative would be located in the median, except for a small segment north of Wolcott Junction. Both alternatives would be among the greatest for impacts on fisheries within the Eagle River sub-basin. See Table 3.5-13 and Table 3.5-14 for impact details.

Blue River Sub-Basin

The Combination Six-Lane Highway with Rail and IMC or with AGS alternatives could affect streams considered "high-value" by the CDOW within the Blue River sub-basin. The streams potentially affected are described under the Rail with IMC alternative, page 3.5-5. The impacts on "high-value" fisheries for the Combination Six-Lane Highway with Rail and IMC or with AGS alternatives would be similar to those of the Rail with IMC or AGS alternatives described individually. The Combination Six-Lane Highway with Rail and IMC alternative would be considered among the greatest for impacts on fisheries in this sub-basin. The Combination Six-Lane Highway with AGS would be intermediate among alternatives for impacts on fisheries in this sub-basin. See Table 3.5-13 and Table 3.5-14 for impact details.

Clear Creek Sub-Basin

The Combination Six-Lane Highway with Rail and IMC or with AGS alternatives could affect segments of Clear Creek considered "high-value" by the CDOW. Impacts on fisheries would be among the greatest in comparison to other alternatives because of the resulting roadway that would add two highway lanes and space in the median for the rail line or the AGS. See Table 3.5-13 and Table 3.5-14 for impact details.

The highway is expected to require winter maintenance, particularly above the 8,000-foot level, that would increase the application of traction sand and chemical deicers proportional to the increase in impermeable surface for two additional highway lanes. These substances may eventually enter receiving waters, potentially affecting the water quality of Clear Creek. Control of applied deicers would be implemented to the extent practicable and would be addressed through BMPs by CDOT.

Combination Six-Lane Highway with Dual-Mode or Diesel Bus in Guideway

Corridor-Wide Impacts

In comparison to other alternatives, the Combination Six-Lane Highway with Bus in Guideway alternatives would have intermediate impacts on fisheries. Both alternatives are anticipated to affect "high-value" fisheries within the Eagle River, Blue River, and Clear Creek sub-basins and Gold Medal fisheries only within the Eagle River and Blue River sub-basins. Combination Six-Lane

Highway with Bus in Guideway alternatives are anticipated to affect approximately 36 acres for each alternative (see Table 3.5-15). See discussion below for direct impacts within individual sub-basins.

Table 3.5-15. Combination Six-Lane Highway with Bus in Guideway Impacts in Acres

Resource	Eagle River			Blue River			Clear Creek								
	fp	cd	sz	fp	cd	sz	fp	cd	sz						
"High-value" fisheries	5.5	/	4.5	/	4.7	1	/	0.8	/	0.8	4	/	4.6	/	5.6
Gold Medal fisheries	1.5	/	0.6	/	0.7	0.2	/	0.2	/	0.2	0	/	0	/	0
Species of special concern	0	/	0	/	0	0	/	0	/	0	0.3	/	0.2	/	0.2

fp: footprint; cd: construction disturbance zone; sz: sensitivity zone

Eagle River Sub-Basin

Impacts on fisheries from the Combination Six-Lane Highway with Bus in Guideway alternatives would be the same as those of the Six-Lane Highway 55 mph and the Reversible/HOV/HOT Lanes alternatives for both "high-value" fisheries and Gold Medal fisheries. Impacts on fisheries by the Combination Six-Lane Highway with Dual-Mode or Diesel Bus in Guideway alternatives would be intermediate among alternatives. See Table 3.5-15 for impact details.

Blue River Sub-Basin

Impacts for the Combination Six-Lane Highway with Bus in Guideway alternatives would be the same as those of the Bus in Guideway alternatives and the Highway alternatives (page 3.5-7). Impacts on fisheries by the Combination Six-Lane Highway with Dual-Mode or Diesel Bus in Guideway alternatives would be among the least relative to other alternatives. See Table 3.5-15 for impact details.

Clear Creek Sub-Basin

Combination Six-Lane Highway with Dual-Mode or Diesel Bus in Guideway alternatives could affect segments of Clear Creek considered "high-value" by the CDOW. In comparison to other alternatives, the Combination Six-Lane Highway with Dual-Mode or Diesel Bus in Guideway alternatives would have among the greatest impacts on fisheries because of the resulting roadway that would add two highway lanes and a paved guideway in the median for either a dual-mode or diesel bus. See Table 3.5-15 for impact details.

The Combination Six-Lane Highway with Dual-Mode or Diesel Bus in Guideway alternatives are expected to require winter maintenance, particularly above the 8,000-foot level, that would increase the application of traction sand and chemical deicers proportional to the increase in impermeable surface for two additional highway lanes and for bus traction in the guideway. These substances may eventually enter receiving waters, potentially affecting the water quality of Clear Creek. Control of applied deicers would be implemented to the extent practicable and would be addressed through BMPs by CDOT.

Direct Impact Summary

The Rail with IMC, Combination Six-Lane Highway with Rail and IMC, and Combination Six-Lane Highway with AGS alternatives would have among the greatest impact on fisheries compared to other alternatives. Intermediate impacts would be made by the Minimal Action, AGS, Six-Lane Highway (55 and 65 mph), Reversible/HOV/HOT Lanes, and Combination Six-Lane Highway with Bus in Guideway alternatives. The No Action and the Bus in Guideway alternatives would have among the

3.5 Fisheries

least impacts on fisheries. Impacts on “high-value” and Gold Medal fisheries would occur primarily in the Eagle River and Clear Creek sub-basins.

3.5.2.2 Indirect Impacts

Indirect impacts on fisheries and aquatic resources associated with the development of the alternatives could result from both short-term and long-term sedimentation of substrate and the resulting impacts on the fish and benthic invertebrate communities farther downstream than in the immediate construction or operational area. The loss of or reduction in numbers of these communities could negatively affect local fishing recreation and the health of the river system overall. Other indirect impacts would include increased angling pressure on the Gold Medal streams (Gore Creek and Blue River) as a result of the anticipated increase in recreational visits.

3.5.3 Mitigation Measures

Alternative footprints would be designed to avoid and minimize impacts on streams. All action alternatives would require effective drainage of the roadway surface to maintain the integrity of the roadbed and the safety of the traveling public. All water that is captured within the roadway template area must be discharged rapidly through an effective drainage system. Table 3.5-16 summarizes water quality, stream issues, and mitigation measures.

Table 3.5-16. Mitigation Summary

Issue	Mitigation
Winter Maintenance	CDOT Maintenance Procedures and construction BMPs; SCAPs for Black Gore Creek and Straight Creek; evaluation/implementation of “restoration” and water quality protection measures identified for the Clear Creek watershed (SWEEP); permanent structural controls identified during Tier 2; CDPHE Phase II stormwater requirements; research alternative traction materials and methods, and their potential impacts on the adjacent environment.
Stormwater Runoff	
Highway Construction	CDOT requirements for BMPs and a SWMP; CDPHE water quality regulations (dewatering and discharge)
Stream Disturbance	CDOT requirements for BMPs and a SWMP; permanent structural controls and bioengineering identified during Tier 2
Historic Mine Waste	CDOT requirements for BMPs and a SWMP; permanent mitigation of disturbed mine waste materials (including water discharge) identified during Tier 2 according to a memorandum of agreement between CDOT, EPA, and CDPHE
Transportation System Operations	CDOT Maintenance Procedures and BMPs; CDPHE Phase II stormwater requirements; CDPHE water quality regulations (such as tunnel discharge)

Local watershed initiatives would be incorporated into project alternative mitigation strategies, and mitigation would consider the goals of the local watershed planning entity. BMPs implemented along the Corridor, for example, could be designed to address individual watershed entity concerns. In some cases, a monitoring program might be implemented to provide timely information needed for ongoing management of the watershed. Any required control regulations, total maximum daily loads, National Pollutant Discharge Elimination System (NPDES) permits, state standards, or other mandatory control measures, as well as voluntary measures, could then be included in the overall program. CDOT will coordinate with local watershed entities during I-70 Tier 2 studies and design/construction stages to achieve these goals and to ensure consistency in the process. In addition, CDOT will work closely with regulatory and resource agencies and the general public throughout this process to ensure adherence to water quality goals at the local, state, and federal levels.

Implementation of a project alternative would be done in conformity with Section 107.25 and Section 208 of the CDOT *Standard Specifications for Road and Bridge Construction*, and Senate Bill 40 (SB 40) certification. These specifications would also include measures that protect water quality

and streams. Tier 2 studies will evaluate and identify permanent mitigation measures for specific issues including structural controls (beyond the Black Gore Creek and Straight Creek SCAPs). The SB 40 application for certification must be completed at least 60 days before the start of construction, is based on final design, and is coordinated with, submitted to, and approved by CDOW’s Wildlife Commission. The Wildlife Commission can recommend that project plans be modified to avoid negatively affecting riparian and fishery resources. Recommended avoidance and mitigation measures are based on permanent and temporary impacts on wetlands, stream banks, sensitive species, and Gold Medal fishing waters.

Control of deicers, after their application, would be implemented to the extent practicable and would be addressed through BMPs by CDOT. Mitigation and avoidance of impacts on streams (including impacts on water quality and riparian habitat) are further discussed in section 3.4, Water Resources; section 3.6, Wetlands, Other Waters of the US, and Riparian Areas; and Chapter 4, Cumulative Impacts Analysis. Mitigation techniques for restoration/replacement of fish habitat generally include placement of boulder cloisters, rock vortex structures, root wads, and protection/transplanting/replacement of vegetation. Other requirements for mitigation plans would include photo documentation and surveys of “fish holes” so that they can be replaced or cleaned to previous conditions. Additional evaluation of fisheries, including localized temperature concerns, will be performed during Tier 2 studies. The design of project alternative structures would include measures that ensure continued aquatic habitat connectivity and that do not cause any obstruction to fish movement. Specific mitigation plans for the protection/restoration of fisheries are beyond the scope of the PEIS and will be addressed during Tier 2 studies.