

Appendix A. Environmental Analysis and Data

The methods used to assess the environmental impacts of alternatives for the I-70 PEIS are described in this appendix. The following sections describe the general methods for direct, indirect, and cumulative impact assessment, assumptions, and use of evaluation criteria to rank transportation elements and impacts on environmental receptors and community values. The involvement of agencies, interest groups, and the public has played a key role in shaping the scope of the issues and methods that have been applied.

A.1 Impact Analysis and Methods

CEQ regulations (40 CFR 1500–1508) define the impacts and effects that must be addressed by federal agencies in satisfying the requirements of the NEPA process. This includes direct, indirect, and cumulative impacts. Note the terms “effect” and “impact” are used synonymously in the regulations. Direct, indirect, and cumulative impacts are defined below:

Direct impacts (40 CFR 1508.8)

- Are caused by the action
- Occur at the same time
- Occur at the same place

Indirect impacts (40 CFR 1508.8)

- Are caused by the action
- Are later in time or farther removed in distance
- Are reasonably foreseeable
- May include growth-inducing effects, and other impacts related to induced changes in the pattern of land use, population density or growth rate, and related effects on air, water, wildlife, and other natural systems, including ecosystems

Cumulative impacts (40 CFR 1508.7)

- Result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions
- Occur regardless of what agency (federal or non-federal) or person undertakes such other actions
- Can result from individually minor but collectively significant actions taking place over a period of time

This appendix is organized into two main categories: environmental sensitivity and community values, as identified by a header above each table. The table lists the major issues identified for each category. A complete list of all issues and methods of analysis are documented in an April 2003 project handout titled “I-70 Mountain Corridor PEIS Environmental Impact Assessment Methods.” The tables in this appendix summarize the assessment approach, criteria and assumptions, applicable regulations, and data source. The fundamental methods used in the alternative analysis include 2025 Baseline projection (see Appendix B, Transportation Analysis and Data, for transportation-related methods and data), direct impacts, indirect impacts, and cumulative impacts, as discussed in the following sections of this appendix.

A.1.1 Direct Impacts

Direct impacts were evaluated using the following techniques:

- Project Baseline inventory
- GIS Resource Inventory mapping
- “Footprint” and construction GIS overlay process
- Alternative design interpretation (elevated structures, walls, power supply)
- Increased impervious surface area analysis
- Traffic volume analysis (for example, to estimate noise and air quality impacts)
- Monitoring/modeling techniques

A.1.2 Indirect Impacts

The focus of indirect impact assessment is related primarily to the change in mobility from project alternatives and their effect on the role of land use, growth, and tourism in the Corridor. The Baseline forecast against which the alternatives are compared represents a theoretical situation where projected increases in population, income, and employment are not constrained by inadequacies of infrastructure (notably I-70). The principal factors governing the growth of population in the Baseline scenario are land development capacity, local zoning, and other restrictions on housing development. The impacts include the following interrelationships:

- Socioeconomic conditions (historic growth patterns, census data and 2025 DOLA projections)
- Land use (existing land use, second homes studies, and worker commuting)
- Planned land use (county plans and zoning, second home studies, and worker commuting)
- Public services (primarily the availability of water)
- Transportation system characteristics (historic trends in average annual daily traffic, 2000 traffic volumes, 2025 projections)
- Travel demand effects on growth inducement and suppression

A.1.3 Cumulative Impacts

The timeframe for the cumulative impact analysis extends from before construction of I-70 to 2025, and the socioeconomic forecast extends to 2035. The geographic levels of analysis include area of viewshed (visual, historic properties, and 4(f) analysis), watershed (water quality and wetlands), species habitat (wildlife and threatened and endangered species), and jurisdictional boundary (land use, socioeconomics, developed lands, and air quality). The assessment of cumulative impacts also includes the application of the following methods:

- BASINS model (EPA water quality model) to assess relative contribution of phosphorus loads from point and nonpoint sources
- REMI (regional economic model) for the evaluation of economic growth trends and the degree of potential cumulative effects from alternatives
- MOBILE6 (EPA air quality model) for changes in CO and PM₁₀ emissions
- I-70 TransCAD travel demand model to forecast travel demand for 2025 Baseline and project alternatives
- GIS overlay process to indicate how alternatives would affect planned development

A. Environmental Analysis and Data

- Historical and current aerial and site photographs to identify lingering past and present impacts
- Trend analysis to determine population forecasts and development patterns that have occurred over time

A.2 Criteria and Assumptions

Evaluation criteria were established to measure relative differences in impacts. Criteria for transportation elements include measures for travel time, hours of congestion, person miles traveled, and accident rates. Implementation criteria include variables for capital construction cost, user cost, cost-effectiveness, and implication of construction timing and availability of funds.

Environmental criteria, primarily quantitative, were framed around the GIS overlay process and data output from modeling. Direct output from the GIS process included quantification in acres, linear feet, and number of elements encroached. Modeling provided unit measurements in terms of pounds per day for water quality, tons of particulate matter or carbon monoxide for air quality, and increase in decibels for noise. A percent change between existing conditions and 2025 projections could also be used to measure the relative difference in these resources.

Several of the community value resources are more subjective in their analysis and criteria were based on attributes assigned to the resource, such as level of contrast for visual impacts.

A.3 Relative Comparison of Direct Impacts

The results of the environmental assessment were used to compare the alternatives at a resource level. The evaluation criteria were divided into three categories from “least” to “greatest” to provide a relative measurement of the level of impact. Color-coding was used in the tables for easy recognition:

- Red for “greatest” environmental impact
- Yellow for “intermediate” environmental impact
- Green for “least” environmental impact.

In addition to the broad application of the thresholds listed above, alternatives were also assigned rankings to illustrate more discrete differences between alternatives. It is important to note that the ranking of impacts is independent of the application of threshold levels. Because impact rankings illustrate more discrete differences between alternatives than do the threshold levels rankings may fall either within, or between, the broader thresholds.

This page intentionally left blank.

A. Environmental Analysis and Data

Criteria and Assumptions: Environmental Sensitivity

Resources		Assessment Approach	Assumptions	Applicable Federal Regulations	Data Source	Scale of Source Data
Wildlife Movement	Linkage interference zones	<p>Direct Impacts: An interagency ALIVE Committee (A Landscape Level Inventory of Valued Ecosystem Components) recognized the barrier effect of the Corridor on wildlife movement and identified linkage interference zones, where wildlife movement is especially hampered. The potential for the alternatives to exacerbate this barrier effect was evaluated as part of the impact analysis. The study revealed that AGS made a relatively low impact because it would be elevated. However, Bus in Guideway, Rail with IMC, Highway, and Combinations alternatives would increase the impact because of the increased at-grade structures. Consequently, the means to decrease the barrier effect in each linkage interference zone were developed by the ALIVE committee and are incorporated into the impact assessment.</p> <p>Indirect Impacts: Induced commercial and residential growth along I-70 adds to the barrier effect on wildlife movement.</p> <p>Cumulative Impacts: Urban/rural growth and recreational development fragments or displaces sensitive wildlife populations and interrupts movement between traditional habitats.</p>	<ul style="list-style-type: none"> The ALIVE committee identified 15 wildlife-crossing areas (linkage interference zones) based on animal collision data and information from CDOW, CDOT, USFS, BLM, and USFWS representatives. AGS is elevated through the entire Corridor. Structure is elevated 16.5 feet above ground level on piers spaced approximately 80 feet apart. Rail and the guideway for buses are barrier-separated from other transportation lanes. Rail barrier is 3-foot high jersey-type barrier with 5-foot fence above. Guideway barrier is a minimum of 3 feet high with no fencing above. 	Fish and Wildlife Conservation Act of 1980, 16 USC 661-667d, provides for the conservation and management of fish and wildlife resources by encouraging coordination among USFWS and other federal, state, and local agencies.	<ul style="list-style-type: none"> Original data: findings from ALIVE program at three scales: local, regional, and watershed (GIS data layers: culvert and bridge crossings, migration corridors and wildlife crossings, animal-vehicle collisions, linkage interference zones) Data from USFS, BLM, CDOW, CDOT, local counties, and municipalities Color infrared aerial photography from 2000, covering 0.5 mile on each side of I-70 for mapping of barriers 	1:24,000
Wildlife Habitat	Key habitats of mule deer, elk, bighorn sheep, and songbirds	<p>Direct Impacts: Area of key habitats intersected by transportation alternatives. Selected habitats include mule deer (winter concentration and severe winter range), elk (winter concentration, severe winter range, and calving areas), bighorn sheep (winter and summer range and lambing areas), and songbird habitat along the Corridor. Sensitive ranges for these species are defined and delineated by Colorado Division of Wildlife (CDOW) Wildlife Resources Information System (WRIS) data. Comparison of alternatives is based on number of acres encroached on by an alternative footprint, construction disturbance zone, or sensitivity zone identified by GIS overlay.</p> <p>Indirect Impacts: Induced growth and development affects loss and fragmentation of sensitive wildlife habitat.</p> <p>Cumulative Impacts: Urban/rural growth results in habitat isolation, changes in edge effect, and decreased connectivity of big game habitat.</p>	<ul style="list-style-type: none"> WRIS data at 100,000 scale used to assess habitat impacts. WRIS data occurs at a small scale (1:100,000) and inaccuracies in calculating alternative impacts from footprint overlays are realized, but it is a valid way of comparing alternatives to identify which affect wildlife least. 	Fish and Wildlife Conservation Act of 1980, 16 USC 661-667d, provides for the conservation and management of fish and wildlife resources by encouraging coordination among USFWS and other federal, state, and local agencies.	<ul style="list-style-type: none"> Colorado Natural Heritage Program WRIS for species distribution data at watershed and regional level (GIS data layers: deer, elk, and bighorn sheep habitat) USFS provided additional datasets 	1:24,000

Thresholds: Environmental Sensitivity

Resources		Least Impact	Intermediate Impact	Greatest Impact
Wildlife Movement	Linkage interference zones	Greatest opportunity to mitigate barrier to wildlife movement Encounters the greatest number of priority linkage interference zones, for which existing barrier effect would be mitigated	Moderate opportunity to mitigate barriers to wildlife movement Encounters an intermediate number of priority linkage interference zones, for which existing barrier effect would be mitigated	Least opportunity to mitigate barriers to wildlife movement Encounters the fewest priority linkage interference zones, for which existing barrier effect would be mitigated
Wildlife Habitat <i>Note: Quantification represents results of GIS overlay process used to identify impacts to select resources. Thresholds are based on the sum of the footprint, construction disturbance, and sensitivity zone impacts.</i>	Deer (winter concentration, severe winter range)	Encroaches on the fewest acres of critical deer habitat 26 to 35 acres	Encroaches on an intermediate number of acres of critical deer habitat 35 to 44 acres	Encroaches on the greatest number of acres of critical deer habitat 44 to 53 acres
	Elk (winter concentration, severe winter range, calving areas)	Encroaches on the fewest acres of critical elk habitat 0 to 3 acres	Encroaches on an intermediate number of acres of critical elk habitat. 3 to 7 acres	Encroaches on the greatest number of acres of critical elk habitat 7 to 10 acres
	Bighorn sheep (winter range, summer range, lambing areas)	Encroaches on the fewest acres of critical bighorn sheep habitat 112 to 166 acres	Encroaches on an intermediate number of acres of bighorn sheep habitat 166 to 220 acres	Encroaches on the greatest number of acres of critical bighorn sheep habitat 220 to 274 acres
	Songbird habitat (aspen and riparian forest)	Encroaches on the fewest acres of songbird habitat 1 to 5 acres	Encroaches on an intermediate number of acres of songbird habitat 5 to 8 acres	Encroaches on the greatest number of acres of songbird habitat 8 to 12 acres
	Summary of key habitats	Affects the least number of key habitats 143 to 203 acres	Affects an intermediate number of key habitats 203 to 263 acres	Displaces the most affected key habitats 263 to 323 acres

A. Environmental Analysis and Data

Criteria and Assumptions: Environmental Sensitivity

Resources		Assessment Approach	Assumptions	Applicable Federal Regulations	Data Source	Scale of Source Data
Threatened and Endangered Species and Species of Special Concern	Boreal toad	<p>Direct Impacts: Encroachment on a 50-foot buffer around locations of confirmed sightings. The size of the buffer zone is based on a USFS study of boreal toad activity range.</p> <p>Indirect Impacts: Induced growth and recreation demand near habitat.</p> <p>Cumulative Impacts: Increased demand for recreational use of forest-managed lands.</p>	Impact based on alternative encroachment on boreal toad activity area.	<ul style="list-style-type: none"> Section 7 of the Endangered Species Act (ESA) and consultation with USFWS as appropriate, to assure protection of endangered or threatened species and their critical habitat Species as listed by CDOW as threatened, endangered, or as Species of Concern under the Wildlife Commission Regulations, Chapter 10 Species included on sensitive species lists developed by Region 2 of the USFS or by the BLM Species identified by the Colorado Natural Heritage Program (CNHP), which collects and maps rare and endangered species information in the state and has developed categories of imperilment for those species not appearing on federal or state lists 	<ul style="list-style-type: none"> USFWS, WRNF, ARNF, CDOT, BLM, CDOW, WRIS, and ALIVE committee identification (GIS data layers: TES species habitat, USFS status species habitat) Maps showing watersheds supporting boreal toad 	1:24,000
	Lynx	<p>Direct Impacts: Potential for conflict is based on the effect of structural barriers on lynx movement in identified linkage interference zones. Barriers include structural, operational, and behavioral impediments to wildlife crossing the Corridor. Only structural barriers are included in these criteria. Structural barriers include concrete jersey median barriers, headlight reflectors mounted on concrete median barriers, retaining walls, fences, and road or rail surfaces. Potential lynx habitat is based on data/input from CDOW, USFS, BLM, CDOT, and USFWS.</p> <p>Indirect Impacts: Induced growth and fragmentation of movement corridors.</p> <p>Cumulative Impacts: Increased demand for use of forest-managed lands for dispersed recreation, particularly during the winter for cross-country skiing and snowmobiling, and urban/rural growth encroaches on migration routes.</p>	The ALIVE Committee identified potential lynx crossing areas for linkage interference zones from Wolcott to Avon, West and East Vail Pass, Laskey Gulch, Hamilton Gulch, and Herman Gulch.	Same as above	USFWS, WRNF, ARNF, CDOT, BLM, CDOW, WRIS, and ALIVE committee identification (GIS data layers: TES species habitat, USFS status species habitat, lynx linkage areas)	1:24,000
	Colorado River and greenback cutthroat trout	<p>Direct Impacts: Potential conflict is based on linear feet of streams identified by CDOW as known or potentially inhabited by these species.</p> <p>Indirect Impacts: Induced growth and water quality impacts.</p> <p>Cumulative Impacts: Planned development and induced growth in Corridor communities, potential loss of fish habitat, and water quality impacts.</p>	<ul style="list-style-type: none"> GIS mapping of headwaters identified by CDOW. 200-foot sensitivity zone established along streams for analysis of impacts. 	Same as above	USFWS, WRNF, ARNF, CDOT, BLM, CDOW, WRIS, and ALIVE committee identification (GIS data layers: TES species habitat, USFS status species habitat, headwaters for greenback cutthroat trout, headwaters for Colorado River cutthroat trout).	1:24,000

Thresholds: Environmental Sensitivity

Resources		Least Impact	Intermediate Impact	Greatest Impact
Threatened and Endangered Species and Species of Special Concern <i>Note: Quantification represents results of GIS overlay process used to identify impacts to select resources. Thresholds are based on the sum of the footprint, construction disturbance, and sensitivity zone impacts.</i>	Boreal toad	Not ranked separately; see summary below	Not ranked separately; see summary below	Not ranked separately; see summary below
	Lynx	Not ranked separately; see summary below	Not ranked separately; see summary below	Not ranked separately; see summary below
	Colorado River and greenback cutthroat trout	Not ranked separately; see summary below	Not ranked separately; see summary below	Not ranked separately; see summary below
	Summary	Affects the least number of key habitats 119 to 222 acres	Affects an intermediate number of key habitats 222 to 326 acres	Affects the largest number of key habitats 326 to 429 acres

A. Environmental Analysis and Data

Criteria and Assumptions: Environmental Sensitivity

Resources		Assessment Approach	Assumptions	Applicable Federal Regulations	Data Source	Scale of Source Data
Vegetation	Temporary and permanent loss of vegetation	Direct Impacts: Vegetation is described within four major life zones: Foothills, Montane, Subalpine, and Alpine. Sensitive vegetation types include riparian habitats, old-growth forests, and alpine and subalpine meadows. Comparison of alternatives is based on number of acres of vegetation type encroached upon by an alternative footprint, construction disturbance zone, or sensitivity zone identified by GIS overlay.	<ul style="list-style-type: none"> Vegetation types from the Arapaho and Roosevelt National Forests and White River National Forest were collated into 16 cover types to be consistent throughout the Corridor. Geographical Approach to Planning (GAP) for Biological Diversity data was used outside the USFS boundaries. 	N/A	<ul style="list-style-type: none"> GIS vegetation map layers from USFS, BLM, and CDOW Geographic Analysis Program (GAP) data and color infrared aerial photography 	1:100,000
	Effect of winter maintenance activities (sand, salt) on vegetation	Direct Impacts: Perform qualitative assessment of effects of winter maintenance activities on vegetation. Perform qualitative assessment of effects on vegetation due to proportional increase of sand and salt use related to increased roadway pavement associated with alternatives.	Application rates of sand and chemical deicers will remain the same per road surface area and the increase in use of winter maintenance materials is proportional to increase in travel lanes.	N/A	<ul style="list-style-type: none"> CDOT maintenance records of sand and salt application CDOT 1999 studies of environmental effects of magnesium chloride deicer in Colorado. 	N/A
	Introduction and spread of noxious weeds	Direct Impacts: Provide qualitative discussion of problems caused by weeds displacing native vegetation. Identify species of concern from each county and noxious weeds of statewide importance in Corridor.	Disturbance that reduces vegetation cover provides an opportunity for incursion of weed species.	<ul style="list-style-type: none"> Executive Order 13112 sets requirements for the control and management of invasive and noxious weeds. Colorado Noxious Weed Act provides for the management and control of potential noxious weed species. 	<ul style="list-style-type: none"> County list of noxious and undesirable plant species CDOT maintenance records for weed control 	N/A

Thresholds: Environmental Sensitivity

Resources	Least Impact	Intermediate Impact	Greatest Impact
<p>Vegetation</p> <p><i>Note: Quantification represents results of GIS overlay process used to identify impacts to select resources. Thresholds are based on the sum of the footprint, construction disturbance, and sensitivity zone impacts.</i></p>	<p>Least disturbance of vegetation 138 to 192 acres</p>	<p>Intermediate disturbance of vegetation 192 to 246 acres</p>	<p>Greatest disturbance of vegetation 246 to 300 acres</p>

A. Environmental Analysis and Data

Criteria and Assumptions: Environmental Sensitivity

Resources		Assessment Approach	Assumptions	Applicable Federal Regulations	Data Source	Scale of Source Data
Wetlands	Wetlands	<p>Direct Impacts: Loss or fragmentation of wetlands. A comparison of alternatives is based on measurement of the approximate acreage of wetlands directly affected by construction of the alternatives.</p> <p>Indirect Impacts: Effects of winter maintenance and sedimentation on wetland function and value, and changes in hydrology.</p> <p>Cumulative Impacts: Planned development and induced growth in Corridor communities, as well as potential loss and fragmentation of additional wetlands.</p>	<ul style="list-style-type: none"> The area of impact related to alternatives was divided into three zones: footprint-related, 15-foot construction disturbance zone, and 15-foot sensitivity zone. Comparison of alternatives is based on acres of wetlands, springs/fens, and other waters of the US affected in each zone. All wetlands will be included in the analysis regardless of Section 404 (Clean Water Act) jurisdiction per CDOT's policy that implements FHWA regulations (Technical Advisory T6640.8A). Quantity affected does not distinguish function and value. 	<ul style="list-style-type: none"> Executive Order 11990, Protection of Wetlands. Avoid direct or indirect impacts of new construction in wetlands wherever there is a practicable alternative. Clean Water Act, Section 404. Regulation administered by COE to regulate the discharge of dredged or fill material to waters of the US, including wetlands. 	Original data: Limited aerial interpretation and field investigations (GIS data layers: riverine/channel, wetlands, springs/fens, water bodies). CDOT 1999 wetland mapping from Floyd Hill to Genesee	1:1,200
	Springs/fens	<p>Direct Impacts: Loss or fragmentation of springs/fens. Alternatives comparison is based on measurement of the approximate acreage of springs/fens directly affected by construction of the alternatives.</p> <p>Indirect Impacts: Effects of winter maintenance and sedimentation on wetland function and value, and changes in hydrology.</p> <p>Cumulative Impacts: Planned development and induced growth in Corridor communities, as well as potential loss and fragmentation of additional wetlands.</p>	The springs/fens wetland unit is recognized as a critical wetland class, and wetlands contiguous to the fens are included in this category because of their hydrologic connection.	Clean Water Act, Section 404. Regulation administered by COE to regulate the discharge of dredged or fill material to waters of the US, including wetlands. Nationwide Permits not issued for springs or fens.	Original data: Limited aerial interpretation and field investigations (GIS data layers: riverine/channel, wetlands, springs/fens, water bodies)	1:1,200
Other Waters of the US		<p>Direct Impacts: Loss and channelization of open and flowing waters. Alternatives comparison is based on measurement of the approximate acreage of open and flowing waters, including streams directly affected by construction of the alternatives.</p> <p>Indirect Impacts: Sedimentation of adjoining streams and reservoirs.</p> <p>Cumulative Impacts: Planned development and induced growth in Corridor communities, as well as the discharge of sediments and channelization of streams.</p>	COE recommends specifying open and flowing water instead of waters of the US. However, intermittent streams are included in this category.	Clean Water Act, Section 404. Regulation administered by COE to regulate the discharge of dredged or fill material to waters of the US, including wetlands.	Original data: Limited aerial interpretation and field investigations (GIS data layers: riverine/channel, wetlands, springs/fens, water bodies)	1:1,200
Riparian Areas		<p>Direct Impacts: Encroachment on riparian habitat. Alternatives comparison is based on acres of encroachment on the riparian habitat in the Eagle River, Blue River, and Clear Creek basins in the study area.</p> <p>Indirect Impacts: Potential for induced growth and resulting loss of a functional riparian ecosystem, along with loss of fish and wildlife habitat.</p> <p>Cumulative Impacts: Planned development and induced growth in Corridor communities, potential loss of fish and wildlife habitat, flood attenuation, and water quality for downstream users and recreational uses.</p>	<ul style="list-style-type: none"> Riparian ecosystem is recognized as an important feature for both wildlife habitat and protection of aquatic resources. Riparian ecosystem constitutes the transition area between the aquatic ecosystem and the adjacent terrestrial system, and may often be within the floodplain. Mapping of riparian areas based on color infrared photography and mapping from USFS and CNHP. 	N/A	Original data: Limited aerial interpretation and field investigations (GIS data layers: riverine/channel, wetlands, springs/fens, water bodies)	1:1,200

Thresholds: Environmental Sensitivity

Resources		Least Impact	Intermediate Impact	Greatest Impact
Wetlands <i>Note: Quantification represents results of GIS overlay process used to identify impacts to select resources. Thresholds are based on the sum of the footprint, construction disturbance, and sensitivity zone impacts.</i>	Wetlands	Encroaches on the fewest acres of wetlands (quantity does not distinguish function, wetland type, or jurisdiction) 4.8 to 9.4 acres	Encroaches on an intermediate number of acres of wetlands (quantity does not distinguish function, wetland type, or jurisdiction) 9.4 to 14.1 acres	Encroaches on the greatest number of acres of wetlands (quantity does not distinguish function, wetland type, or jurisdiction) 14.1 to 18.7 acres
	Springs/fens	Encroaches on the fewest acres of springs/fens 0 to 0.2 acres	Encroaches on an intermediate number of springs/fens 0.2 to 0.4 acres	Encroaches on the greatest number of acres of springs/fens 0.4 to 0.6 acres
Other waters of the US <i>Note: Quantification represents results of GIS overlay process used to identify impacts to select resources. Thresholds are based on the sum of the footprint, construction disturbance, and sensitivity zone impacts.</i>	Open and flowing waters	Encroaches on the fewest acres of other waters of the US 8.3 to 12.1 acres	Encroaches on an intermediate number of acres of other waters of the US 12.1 to 15.8 acres	Encroaches on the greatest number of acres of other waters of the US 15.8 to 19.6 acres
Riparian Areas <i>Note: Quantification represents results of GIS overlay process used to identify impacts to select resources. Thresholds are based on the sum of the footprint, construction disturbance, and sensitivity zone impacts.</i>	Riparian areas along stream	Encroaches on the fewest acres of riparian habitat 13.1 to 19 acres	Encroaches on an intermediate number of acres of riparian habitat 19 to 24.9 acres	Encroaches on the greatest number of acres of riparian habitat 24.9 to 30.8 acres

A. Environmental Analysis and Data

Criteria and Assumptions: Environmental Sensitivity

Resources		Assessment Approach	Assumptions	Applicable Federal Regulations	Data Source	Scale of Source Data
Fishery Resources	Gold Medal fisheries High-value fisheries Species of special concern	Direct Impact: A comparison of alternatives measures relative encroachment (acres of disturbance) within a 200-foot sensitivity zone along streams identified as Gold Medal, "high-value," or habitat for species of special concern in the Eagle River, Blue River, and Clear Creek basins in the study area. Indirect Impacts: Winter maintenance and growth pressure. Cumulative Impacts: Urban/rural growth and planned development on stream encroachment, water quality, as well as increased population and the corresponding recreational demand on fisheries.	<ul style="list-style-type: none"> • Direct impacts would affect the fishery resource if the alignment (including catch points and toe of slope) encroaches within 200 feet of the fishery resource. • CDOW has not officially designated stream reaches as "high-value" fisheries; however, discussions with CDOW personnel have resulted in the identification of reaches considered by these individuals as valued fisheries. As described by CDOW personnel, "high-value" fisheries are resources with any of the following attributes: support public recreation and the local economy, support abundant and diverse fish populations, and/or support naturally reproducing trout populations. • The extent of potential fisheries resource impacts or losses will be calculated using existing GIS data and identification of valued fisheries resources provided by CDOW fisheries biologists. • Although mitigation measures may be implemented to reduce or eliminate the potential for impacts on the fisheries resources, for screening purposes these measures have not been considered. 	Fish and Wildlife Conservation Act of 1940 provides for the conservation and management of fish and wildlife resources by encouraging coordination among USFWS and other federal, state, and local agencies.	CDOW (GIS data layers: Gold Medal fisheries, "high-value" fisheries, and species of special concern)	Varies 1:12,000 to 24,000
Streams		Direct Impacts: Alternative proximity to streams that would result in channelization or impacts on hydrologic function, stream health, and riparian system. Identify stream channelization from initial construction of I-70 using historic aerial photographs. Indirect Impacts: Land use changes, induced urban/rural growth, encroachment on streams resulting in stream channelization, as well as changes in stream hydrology, stream health, and fish habitat. Cumulative Impacts: Planned development and induced growth in Corridor communities, potential for stream channelization and impacts on hydrologic functions, stream health, as well as fish habitat.	<ul style="list-style-type: none"> • The area of impact related to alternatives was divided into three zones: footprint-related, 15-foot construction disturbance zone, and 15-foot sensitivity zone. Comparison of alternatives is based on linear feet of encroachment in these zones. • The changes in stream location on aerial photographs before and after construction of I-70 are due to construction of the highway. 	<ul style="list-style-type: none"> • Section 404(b)1 of the Clean Water Act provides guidelines applicable to evaluating and testing the impact of the discharge of dredged or fill material upon the chemical, physical, and biological integrity of the nation's waters. Requires identification of the least damaging alternative to the aquatic environment. • Section 10 Permit—Rivers and Harbors Act—is required for activities that obstruct or alter any navigable water of the US. Activities include dredging, filling, and the construction or placement of structures, such as piers, berms, and retaining walls. 	Historic aerial photographs from 1937, 1938, 1956, 1957, 1962 and 2000	See Wetlands
Winter Maintenance		Direct Impacts: Relative usage of sand and liquid deicers for winter maintenance activities and their effect on sedimentation and water quality. Alternatives comparison measures the relative increase in sand and liquid deicers based on current application rates and increased roadway surface for alternatives. Cumulative Impacts: Induced growth; development of roads and parking lots that use traction sand and liquid deicers for winter maintenance activities; and resulting sedimentation impacts on streams and water quality.	<ul style="list-style-type: none"> • Excessive road sand or salt is detrimental to water quality when transported or deposited in streams. Sand/salt application rates are positively correlated with highway width and elevation (that is, application rates increase with elevation). • The reference or baseline year for applications rate is 2000. Increase in sand and magnesium chloride for alternatives is based on increased roadway width multiplied by base year application rate. • AGS and Rail with IMC alternatives use a negligible amount of sand. 	Colorado Department of Public Health and Environment, Water Quality Control Commission, C.R.S. 1973, 25-8-101, as amended. Classifications and Numeric Standards for: South Platte River Basin – Region 3; Clear Creek Basin, Stream Segments 1, 2, 11, 12; Upper Colorado River Basin – Region 12; Blue River Basin, Stream Segments 3, 14; Eagle River Basin, Stream Segments 1, 8, 9.	CDOT maintenance records for application of sand, salt, and liquid deicer	N/A
Stormwater Runoff	Phosphorus Copper Zinc Total suspended solids (TSS) Chloride	Direct Impacts: Increased pollutant loading in streams from highway stormwater runoff. A comparison of alternatives measures the relative increase (lbs/day) of phosphorus, copper, and zinc from stormwater runoff based on approximate area of impermeable surface area associated with each alternative. Indirect Impacts: Induced growth and the protection of water supply reservoirs receiving runoff from streams draining I-70. Cumulative Impacts: Land use changes related to urban/rural and commercial growth. Additional roads and development will increase impervious surface and pollutant loading in streams from stormwater runoff.	<ul style="list-style-type: none"> • FHWA (Driscoll) model pollutant loadings and impacts from highway stormwater runoff will be used to predict pollutant loads for total phosphorus, total suspended solids, copper, and zinc for 2025. • Copper and zinc are the dominant toxic pollutants from highway runoff. Phosphorus is related to winter maintenance and stream eutrophication. • Pollutant concentrations are directly associated with impervious highway surface. • Model will examine the level of mitigation achieved by selected control measures. • EPA BASINS model was used to estimate the increase in phosphorus loading in streams from induced and cumulative impacts. 	<ul style="list-style-type: none"> • Section 402(p) of the Clean Water Act. Clarifies that stormwater associated with industrial activity discharged to waters of the US must be authorized by a National Pollutant Discharge Elimination System (NPDES) permit, including stormwater discharges associated with construction activity (40 CFR 122.26). • Colorado Department of Public Health and Environment, Water Quality Control Commission, C.R.S. 1973, 25-8-101, as amended. Classifications and Numeric Standards for: South Platte River Basin – Region 3; Clear Creek Basin, Stream Segments 1, 2, 11, 12; Upper Colorado River Basin – Region 12; Blue River Basin, Stream Segments 3, 14; Eagle River Basin, Stream Segments 1, 8, 9. 	<ul style="list-style-type: none"> • CDOT (GIS data layers: existing impervious surface associated with I-70) • Original data: BASINS model (GIS data layers: impervious surface associated with existing development, and projected impervious surface associated with future development) • CDPHE, EPA, USGS, and CDPHE RI/FS studies, and I-70 water quality monitoring program (outstanding waters, intermediate-quality waters, use-protected waters) 	1:24,000

Thresholds: Environmental Sensitivity

Resources		Least Impact	Intermediate Impact	Greatest Impact
<p>Fishery Resources</p> <p><i>Note: Quantification represents results of GIS overlay process used to identify impacts to select resources. Thresholds are based on the sum of the footprint, construction disturbance, and sensitivity zone impacts.</i></p>	<p>Gold Medal fisheries "High-value" fisheries Species of special concern</p>	<p>Disturbs the fewest acres within 200-foot sensitivity area 15.9 to 28.4 acres</p>	<p>Disturbs an intermediate number of acres within 200-foot sensitivity area 28.4 to 40.8 acres</p>	<p>Encroaches on the greatest number of acres within 200-foot sensitivity area 40.8 to 53.3 acres</p>
<p>Streams</p> <p><i>Note: Quantification represents results of GIS overlay process used to identify impacts to select resources. Thresholds are based on the sum of the footprint, construction disturbance, and sensitivity zone impacts.</i></p>		<p>Encroaches on the fewest linear feet of stream 21,089 to 28,645 linear feet</p>	<p>Encroaches on an intermediate number of linear feet of stream 28,645 to 36,202 linear feet</p>	<p>Encroaches on the greatest number of linear feet of stream 36,202 to 43,758 linear feet</p>
<p>Winter Maintenance</p> <p><i>Note: Quantification represents results of analysis existing sand and liquid deicer use, and extrapolating for future use at same rate relative to an increase transportation template.</i></p>		<p>Least percent increase in sanding and magnesium chloride used for winter maintenance activities <10% sand, <20% liquid deicer</p>	<p>Intermediate percent increase in sanding and magnesium chloride used for winter maintenance activities >10% to 30% sand, >10% to 30% liquid deicer</p>	<p>Greatest percent increase in winter sanding and magnesium chloride used for winter maintenance activities >30% sand, or >30% liquid deicer</p>
<p>Stormwater Runoff</p> <p><i>Note: Quantification represents results of Driscoll model, based on impervious surface for existing conditions relative to increased impervious surface associated with project alternatives.</i></p>	<p>Phosphorus Copper Zinc Total suspended solids (TSS) Chloride</p>	<p>Least percent increase in lbs/day loading of total phosphorus, TSS, copper, chloride, and zinc from stormwater runoff <10%</p>	<p>Intermediate percent increase in lbs/day loading of total phosphorus, TSS, copper, chloride, and zinc from stormwater runoff 10% to 30%</p>	<p>Greatest percent increase in lbs/day loading of total phosphorus, TSS, copper, chloride, and zinc from stormwater runoff >30%</p>

A. Environmental Analysis and Data

Criteria and Assumptions: Community Values

Resources	Assessment Approach	Assumptions	Applicable Federal Regulations	Data Source	Scale of Source Data
Currently Developed Lands and Land Use	<p>Direct Impacts: Potential for encroachment on, disruption of, or fragmentation of currently developed lands.</p> <p>Indirect Impacts: Potential for increased or reduced development based on induced/suppressed growth associated with alternatives.</p> <p>Cumulative Impacts: Planned growth in urban and rural development.</p>	<ul style="list-style-type: none"> Land use inventories are based on 2000 aerial photography, published sources, and county use plans. Possible induced growth from Transit alternatives is distributed to urban areas around transit centers. Induced growth from Highway alternatives is distributed to urban and rural areas based on existing trends. 	Federal Aviation Administration Northwest Mountain Region Planning Guidance, "Roads in runway protection zone," a notice to the FAA for the review and approval of activities near the Eagle County Airport will be required to address concerns and effects of the proposed project on the safe and efficient use of navigable air space.	<ul style="list-style-type: none"> Original data: Aerial photograph interpretation (GIS data layers: all existing developed lands within Corridor regardless of jurisdiction) Corridor counties and municipalities (GIS data layers: parcels and zoning classes) CDOT (GIS data layers: CDOT right-of-way) State of Colorado, WRNF/ARNF, county GIS databases (GIS data layers: jurisdictional boundaries) 	Varies 1:12,000 to 24,000
Right-of-Way	<p>Direct Impacts: Potential property acquisition, loss of structures, and effect on property function. A comparison of alternatives is based on acres of land required beyond existing right-of-way.</p> <p>Indirect and Cumulative Impacts: Right-of-way was not identified as a key resource for indirect and cumulative analysis.</p>	<ul style="list-style-type: none"> Right-of-way boundary based on recent survey and monumentation from C-470 to Dumont. Preliminary survey data only covers the Corridor from Dumont to Eisenhower-Johnson Memorial Tunnels (EJMT). Right-of-way west of EJMT to Avon is based on parcel data, not survey data on USFS easement. 	<ul style="list-style-type: none"> Uniform Relocation Assistance and Real Property Acquisition Act of 1970. Ensures that property owners of real property acquired for government projects and that persons displaced by projects are treated fairly, consistently, and equitably; and so they will not suffer disproportionate injuries. A Letter of Consent with the US Forest Service would be required for obtaining right-of-way easement on national forest land. Special Use Permits, US Forest Service: Special use permit would be required for obtaining temporary construction easement on national forest land. 	<ul style="list-style-type: none"> Original data: Aerial photograph interpretation (GIS data layers: all existing developed lands within Corridor regardless of jurisdiction) Corridor counties and municipalities (GIS data layers: parcels and zoning class) CDOT (GIS data layers: CDOT right-of-way) State of Colorado, WRNF/ARNF, county GIS databases (GIS data layers: jurisdictional boundaries) 	Varies 1:12,000 to 24,000
Growth Effects	<p>Direct Impacts: Growth effects are inherently indirect and cumulative. These effects could be triggered by transportation improvements and are not applicable to direct impact analysis.</p> <p>Indirect Impacts: Growth impacts are considered indirect effects. Indirect effects are induced/suppressed growth from induced/suppressed traffic associated with alternatives. A comparison of alternatives is based on the difference between predicted induced population from alternatives and Department of Local Affairs (DOLA) population projections.</p> <p>Cumulative Impacts: Increased growth associated with transportation alternatives in addition to projected and planned growth.</p>	<ul style="list-style-type: none"> I-70 traffic and population trends/relationships are used to predict potential future populations based on DOLA population projections and county planning information as well as traffic predictions from the travel demand model. Determinations of inducement/suppression are based on travel demand model inducement/suppression percentages. 	<ul style="list-style-type: none"> Economic, Social, and Environmental Effects 23 U.S.C. 109(H) and 128 assures that possible adverse economic, social, and environmental effects of proposed highway projects are fully considered and final decisions on highway projects are made in the overall best interest of the public. Federal-Aid Highway Act of 1970 identifies the type of adverse social and economic impacts that must be investigated and documented: noise, aesthetic values, community cohesion, availability of public facilities and services, employment effects, tax and property loss and displacement of people, businesses, and the disruption of desirable community and regional growth. 	<ul style="list-style-type: none"> DOLA data on employment, population, households, second homes, urbanization, commercial activity, and land absorption Corridor counties and municipalities: vision statements and quality of life issues defined in county and city master plans 	N/A

Thresholds: Community Values

Resources		Least Impact	Intermediate Impact	Greatest Impact
<p>Currently Developed Lands and Land Use</p> <p><i>Note: Quantification represents results of GIS overlay process used to identify impacts to select resources. Thresholds are based on the sum of the footprint and construction disturbance.</i></p>	Encroachment on developed lands	<p>Least number of residential, commercial, public, and mixed use property impacts</p> <p>70 to 76 properties</p>	<p>Intermediate number of residential commercial, public, and mixed use property impacts</p> <p>76 to 81 properties</p>	<p>Greatest number of residential and commercial, public, and mixed use property impacts</p> <p>81 to 87 properties</p>
<p>Right-of-Way</p> <p><i>Note: Quantification represents results of GIS overlay process used to identify impacts to select resources. Thresholds are based on the sum of the footprint and construction disturbance.</i></p>	Additional land requirements beyond existing right-of-way	<p>Least right-of-way acquisitions</p> <p>25 to 30 acres</p>	<p>Intermediate right-of-way acquisitions</p> <p>30 to 35 acres</p>	<p>Greatest right-of-way acquisitions</p> <p>35 to 40 acres</p>
<p>Growth Effects</p> <p><i>Note: Comparison based on predicted potential for inducement or suppression of population growth. These estimates were based on extrapolations of the relationship between past I-70 traffic and historic population growth in the Corridor.</i></p>	Induced population	<p>Least potential to induce or suppress population</p> <p>Not indicated to induce or suppress county population</p> <p>Potential for slight induced population in one county</p>	<p>Intermediate potential to induce population</p> <p>Potential for induced population in one county</p>	<p>Greatest potential to induce population; potential to suppress population</p> <p>Potential for induced population in one or more counties; potential for suppressed population in two or more counties</p>

A. Environmental Analysis and Data

Criteria and Assumptions: Community Values

Resources		Assessment Approach	Assumptions	Applicable Federal Regulations	Data Source	Scale of Source Data
Economic Effects		<p>Direct Impacts: Economic effects are inherently indirect and cumulative. These effects could be triggered by transportation alternatives and are not applicable to direct impact analysis.</p> <p>Indirect Impacts: Tourism spending (associated with alternatives), construction of alternatives, and value of time factors (change in wages and production costs) are considered indirect impacts on economics. Potential impacts resulting from changes in tourism spending associated with increased/decreased peak travel. Potential for impacts on delivery of goods and services resulting from changes in travel time/value of time. Comparison of alternatives is based on the regional (9-county area) <i>Design Year +10</i> employment, GRP, and personal income (REMI model).</p> <p>Cumulative Impacts: Changes in tourism spending and travel time/value of time (in terms of wages and costs) as they relate to economic projections (REMI model).</p>	<ul style="list-style-type: none"> • Tourism spending during peak weekend congestion based on available winter/summer spending data and weekend recreational person-trips from travel demand model. • Future changes in tourism spending are based on recreational person trips and the potential for suppression/inducement associated with alternatives. • Tourism spending changes are used as input variables in the REMI model. • Values of Time (VoT) factors are used in the REMI model to reflect impacts on delivery of goods and services in terms of changes in wages/production costs. VoT factors used in the model are based on previous research studies and reflect a conservative approach. • Construction impacts are based on cost estimates for alternatives and potential traffic suppression due to construction delays. 	Economic, Social, and Environmental Effects 23 U.S.C. 109(H) and 128 assures that possible adverse economic, social, and environmental effects of proposed highway projects are fully considered and final decisions on highway projects are made in the overall best interest of the public.	<ul style="list-style-type: none"> • DOLA and NWCCOG survey and ownership study data on second home development in Corridor counties and communities • DOLA 2025 population and employment projections • Center for Business and Economic Forecasting, Inc.; State of Colorado; Office of Economic Development and International Trade; Longwoods International; Vail Valley Tourism Bureau data on visitation; visitor spending; and other visitor activities • Original data: JFSA and TransCAD Modeling predicted trips and congestion from traffic demand model 	N/A
Visual Resources		<p>Direct Impacts: Anticipated changes in landscape character and scenery. Visual impacts are based on level of anticipated visual contrast of project alternatives within the setting, sensitivity of viewers, and proximity of project alternatives to these sensitive views.</p> <p>Indirect Impacts: Changes in the Corridor setting from rural to urban associated with increased development induced by project alternatives.</p> <p>Cumulative Impacts: Changes in the visual setting related to projected growth in Corridor communities in addition to growth and landscape character changes anticipated in association with project alternatives.</p>	<ul style="list-style-type: none"> • Impacts associated with project alternatives can be described as ranging from low to high to indicate the level of project/setting contrast that would be visible from recreation sites and communities, and expected compatibility of project elements with the landscape settings. • Levels of visual contrast range from weak to strong, denoting the extent of change in the characteristic landscape and viewers. • Weak contrast is associated with changes that can be seen but do not attract attention and are subordinate to the setting. • Moderate contrast is associated with changes that are noticeable but still subordinate to the setting. • Moderate to strong contrast is associated with changes that attract attention and begin to dominate the setting. • Strong contrast is associated with changes that attract attention and dominate the setting. • Very strong contrast is associated with changes that demand attention, will not be overlooked by the average observer, and dominant the setting. • The assignment of visual impact levels took into consideration the compatibility of alternative elements with the various landscape settings encountered. For example, structural elements, such as elevated structures, retaining walls, and catenary systems are considered more compatible with developed urban settings than with undeveloped rural settings. 	N/A	<ul style="list-style-type: none"> • Original data: JFSA in conjunction with WRNF/ARNF; review of existing landform; vegetation; and land use characteristics GIS data layers for: <ul style="list-style-type: none"> (1) Scenery Analysis Units: areas of distinct landform character, vegetative appearance, and community values or place identity (2) Viewsheds (areas of visibility based on terrain) from recreation sites and communities were calculated in GIS, illustrating foreground, middleground, and background views (3) Project/setting contrast: levels of visual contrast range from weak to strong, denoting the extent of change to the characteristic landscape and viewers • WRNF, ARNF, BLM (GIS data layers: Scenic Attractiveness Classes and lands visual management classifications) 	Varies 1:12,000 to 24,000
Recreation Resources	Effects on parks, recreation areas, trails, and ski areas	Direct Impacts: Use GIS overlay analysis to identify encroachment of alternatives on recreation sites.	Study area focused on properties within 3 miles on either side of I-70 to evaluate alignment footprint and impacts related to forest visitation and visibility that extend to recreation sites not directly adjacent to I-70.	<ul style="list-style-type: none"> • National Trails Systems Act addresses national scenic or historic trails designated by Congress and lands through which such trails pass. • National Forest Management Act requires that national forest lands be managed for various uses on a sustained basis to ensure into perpetuity a continued supply of goods and services to the American people. 	BLM, USFS, counties, and towns	N/A
	Increased recreational use of national forest lands.	<p>Direct Impacts: Analyze potential changes in national forest visitation (resident, nonresident, recreational activity categories) associated with each alternative.</p> <p>Indirect Impacts: Analyze changes in national forest visitation using winter skier visits and summer recreation visitor days projected for WRNF and ARNF based on travel demand projections for 2025 and travel survey for each alternative.</p> <p>Cumulative Impacts: Analyze changes in national forest visitation using winter skier visits and summer recreation visitor days projected for WRNF and ARNF based on population projections for 2025 and increased population estimates for induced growth.</p>			<ul style="list-style-type: none"> • ARNF and WRNF information on existing and projected recreational use • Travel demand model 	N/A

Thresholds: Community Values

Resources		Least Impact	Intermediate Impact	Greatest Impact
Economic Effects	Regional economic values: gross regional product, personal income, and employment	Greatest potential to meet or exceed projected Baseline economic conditions Alternative is predicted to meet or exceed baseline economic conditions (based on DOLA population and employment projections) in Design Year +10.	No economic intermediate impacts N/A	Least potential to meet projected Baseline economic conditions Alternative is predicted to fall below Baseline economic conditions (based on DOLA population and employment projections) in Design Year +10.
Visual Resources	Landscape character	Defined by setting attributes, such as existing visual conditions and landscape scenic attractiveness Existing visual conditions = III, scenic attractiveness = C	Defined by setting attributes, such as existing visual conditions and landscape scenic attractiveness Existing visual conditions = II, scenic attractiveness = B	Defined by setting attributes, such as existing visual conditions and landscape scenic attractiveness Existing visual conditions = I, scenic attractiveness = A
	Project/setting contrast	Structures small in size and quantity, and/or little diversity in size and shape. Moderate-scale walls or large cut or fill slopes 25 to 40 feet Weak contrast.	Structures moderate in size and quantity, and/or moderate in diversity of size and shape; moderate scale walls or large cut or fill slopes 25 to 40 feet Moderate contrast	Structures (elevated platforms, piers/columns, bridges, catenary, fencing) large in size, numerous in quantity, and/or highly diverse in shape; large continuous, large-scale walls; major cut or fill slopes over 40 feet Very strong to strong contrast
	Visual impacts <i>Note: Quantification represents results of GIS overlay process used to identify impacts to select resources.</i>	Weak structure/landform contrast within foreground views from communities, recreation sites, and historic landmarks, districts, and sites listed on or eligible for the NRHP; moderate structure/landform contrast within middleground views from communities 12 to 45 miles	Moderate structure/landform contrast within foreground views from communities, recreation sites, and historic landmarks, districts, and sites listed on or eligible for the NRHP; strong structure/landform contrast within middleground views 45 to 77 miles	Very strong or strong structure/landform contrast within foreground views from communities, recreation sites, and historic landmarks, districts, and sites listed on or eligible for the NRHP; strong structure/landform contrast within foreground views from communities 77 to 110 miles
Recreation Resources	Effects on parks, recreation areas, trails, and ski areas	Least number of recreation resource impacts	Intermediate number of recreation resource impacts	Greatest number of recreation resource impacts

A. Environmental Analysis and Data

Criteria and Assumptions: Community Values

Resources	Assessment Approach	Assumptions	Applicable Federal Regulations	Data Source	Scale of Source Data
<p>Historic Properties</p> <ul style="list-style-type: none"> • Properties listed on or eligible for the National Register of Historic Places (NRHP) • National Historic Landmarks (NHL) • Properties on or eligible for the State Register of Historic Places (SRHP) • Local landmarks and sites of local interest • Traditional cultural properties of concern to Native Americans 	<p>Direct Impacts:</p> <ul style="list-style-type: none"> • Perform GIS overlay analysis of resources within 500 feet of outer edge of I-70 pavement, including: <ul style="list-style-type: none"> – Intersections of project alternative footprints with all NRHP listed or eligible properties – Intersections of project alternative footprints with all new historic resources identified from the Reconnaissance Survey (windshield survey and local input) <p>Indirect Impacts:</p> <ul style="list-style-type: none"> • Quantitative analysis of representative noise impacts on historic areas (landmarks, historic districts and potential historic areas) based on project level noise analyses • Quantitative description of visual impacts based on project level visual analyses, setting changes, and resulting project/setting contrasts associated with project alternatives for all NRHP listed or eligible properties and new historic resources identified from the Reconnaissance Survey (windshield survey and local input) within the APE (approximately 3 miles either side of I-70) 	<ul style="list-style-type: none"> • All known historic resources in the APE are listed. The Reconnaissance Survey file search identified many historic resources for which additional data, evaluations, eligibility determinations, and updates are needed. This will not be done during Tier 1. • All known NRHP and SRHP listed or eligible properties in the APE will be identified based on the file search. • Resources within National Historic Landmark and other Historic Districts will only be identified as per the results of the file search. It is acknowledged that additional resources exist within and may contribute to those districts. These will not be evaluated under Tier 1. • Additional resources identified by the Reconnaissance Survey (windshield survey and local input) are identified but will not be evaluated during Tier 1. <p>Effects on historic properties will be determined in consultation with SHPO and consulting parties</p>	<ul style="list-style-type: none"> • Antiquities Act of 1906 (P.L. 59-209; 16 USC 461-471). This was the federal enabling legislation for the setting aside and protection of "historic landmarks, historic and prehistoric structures and other objects of historic or scientific interest." • Historic Sites Act of 1935 (P.L. 74-292; 16 USC 461-471). This act expanded the role of the Department of the Interior in determination and protection of "historic and archaeological sites, buildings and objects." • National Historic Preservation Act of 1966 (NHPA), as amended (P.L. 89-665; 16 USC 470, as amended; 80 Stat.915). This act mandates that all federal agencies must consider the effects of their projects and programs on cultural resources listed or eligible for inclusion in the National Register of Historic Places (NRHP). • Archaeological and Historic Preservation Act of 1974. This act preserves significant historical and archaeological data from loss or destruction. • American Indian Religious Freedom Act of 1978. Consultation will be made with Native traditional religious leaders to protect and preserve Native American cultural and religious practices under this act. • Archaeological Resources Protection Act of 1979. This act supersedes the 1906 Antiquities Act and provides that prior to excavations on federal or Native American lands, permits for archaeological investigations must be obtained. • Native American Graves Protection and Repatriation Act of 1990. Consultation with appropriate Native American tribes for activities on federal lands before excavation or removal of cultural items is required under this act. This act also provides for repatriation of items from federal agencies and federally assisted museums and other repositories. • Section 4(f) of the US Department of Transportation Act 49 USC 303(c). This act offers protection to historic properties from transportation projects. • Colorado Register of Historic Places Act (CRS 24-80.1 as amended). • Historical, Prehistorical and Archeological Resources of Colorado Act (CRS 24-80-401ff). 	<ul style="list-style-type: none"> • NRHP and CRHP site file search • GIS mapping • Reconnaissance Survey (windshield survey and local input) • I-70 noise monitoring and forecast data • I-70 visual Scenery Analysis Units data • Coordination with SHPO and National Park Service, USFS, and BLM • Coordination with CLGs and Consulting Parties 	<p>N/A</p>

Thresholds: Community Values

Resources		Least Impact	Intermediate Impact	Greatest Impact
Historic Properties	Effects on Historic Resources	Least number of historic property impacts	Intermediate number of historic property impacts	Greatest number of historic property impacts

A. Environmental Analysis and Data

Criteria and Assumptions: Community Values

Resources		Assessment Approach	Assumptions	Applicable Federal Regulations	Data Source	Scale of Source Data
Air Quality	Carbon Monoxide (CO)	<p>Direct Impacts: Based on the change in emissions, in tons/day relative to Baseline conditions, and compliance with the federal 8-hour standard of 9 ppm. The relative change in mobile emissions for each Highway alternative will be determined using average vehicle speed, vehicle miles traveled, and MOBILE6 emissions factors for years 2000 and 2025.</p> <p>Indirect and Cumulative Impacts: Assessed for potential to meet federal Clean Air Act standards and requirements.</p>	<ul style="list-style-type: none"> The relative changes in CO in tons/day are directly related to the average annual daily traffic (AADT). The evaluation for Highway alternatives will examine the change in traffic volumes for each alternative and use this number to determine mobile emissions and particulate matter. These values will be compared to the baseline conditions by calculating CO using traffic volumes from the year 2000 and predicted traffic volumes for 2025. Vehicle speed is derived from TransCAD model and adjusted for congestion using VISSIM model. Calculations will use winter Saturday AADT traffic volumes for major highway segments between major interchanges from Eagle to C-470. MOBILE6 emission factors will be modeled for a fleet of cars, buses, light trucks, and heavy trucks in years 2000 and 2025. 	Clean Air Act 23 U.S.C.109 ensures that transportation plans, programs, and projects conform to the state's Air Quality Implementation Plan. NAAQS are not currently exceeded in the study area; therefore, the area is considered an attainment area. There is insufficient air quality monitoring in the five counties along I-70 to provide a baseline for analysis (no monitoring stations in Clear Creek County and incomplete monitoring data from stations further west). The team will use mobile emissions based on the travel demand model, and is working closely with CDPHE and EPA to create a customized approach that accounts for topography, weather, and travel characteristics for air quality modeling in the Corridor.	<ul style="list-style-type: none"> Original data: CDOT, CDPHE, EPA; MOBILE6 modeling CO emissions Vehicle miles traveled, speed and fleet mix from TransCAD model 	N/A
	Particulate matter (PM ₁₀) and re-entrained dust	<p>Direct Impacts: Based on the change in PM₁₀ in tons/day relative to current (baseline) conditions, and compliance with the 24-hour standard of 150 µg/m³. The relative change in mobile emissions for each Highway alternative will be determined using average vehicle speed, vehicle miles traveled, and MOBILE6 emissions constants for years 2000 and 2025.</p> <p>Indirect and Cumulative Impacts: Assessed for potential to meet federal Clean Air Act standards and requirements.</p>	<ul style="list-style-type: none"> PM₁₀ concentrations for 2000 and 2025 are predicted from a "roll-forward" method; that is, 1997 concentrations are multiplied by the ratio of future traffic. Re-entrained dust from winter maintenance operations will be determined using a dust factor of 0.02 lbs/vehicle mile. 	<ul style="list-style-type: none"> Same as above. Colorado Revised statute 25-7-112, 1973. Notice of fugitive dust must be given and application made for a fugitive dust permit. 	<ul style="list-style-type: none"> Original data: CDOT, CDPHE, EPA; MOBILE6 modeling emissions, PM₁₀, and PM_{2.5} re-entrained dust Vehicle miles traveled, speed and fleet mix from TransCAD model 	N/A
Noise		<p>Direct Impacts: For Highway and Bus in Guideway alternatives the potential for conflict can be gauged by using the increase in peak-hour noise levels. For the Rail with IMC alternative, the potential for conflict is best gauged using maximum pass-by noise levels for individual trains in conjunction with the number of passes-by per day and at night.</p> <p>Indirect and Cumulative Impacts: Noise was not identified as a key resource for indirect and cumulative impact analysis.</p>	<ul style="list-style-type: none"> FHWA policy considers a noise impact to occur if predicted loudest hour noise levels in the design year equal or exceed the Noise Abatement Criteria (NAC), and where design year peak hour noise levels are predicted to exceed existing noise levels by 10 dB(A) or more. CDOT and FHWA regulate highway noise based on the peak hour noise level. FTA regulates noise on a 24-hour basis. However, because the highway is the primary and most consistent noise source in the Corridor, only FHWA impact criteria will be applied in the PEIS analysis. The analysis of noise impact was conducted only in the following six major population centers in the Corridor: Dowd Canyon, Vail, Dillon Valley, Silver Plume, Georgetown, and Idaho Springs. 	FHWA, FTA, and FRA regulate highway, light rail, and heavy rail noise, respectively. The policies of these agencies mandate that noise impacts be mitigated when feasible. FHWA defines noise impact as noise levels exceeding standards [66 dB(A)] for residences) and design year noise levels exceeding existing levels by 10 dB(A) or more. FTA and FRA impact criteria define impact by comparing existing and future noise levels.	<ul style="list-style-type: none"> Original data: GIS data layers: map of existing 66 dB(A) noise levels at five municipal locations 2001 and 2003 noise monitoring at five populations centers and "jake brake" noise monitoring in Idaho Springs 	1:12,000

Thresholds: Community Values

Resources		Least Impact	Intermediate Impact	Greatest Impact
Air Quality	Carbon Monoxide (CO)	Least predicted change in emissions from Baseline conditions 65 to 73 tons/day	Intermediate predicted change in emissions from Baseline conditions 73 to 81 tons/day	Greatest predicted change in emissions from Baseline conditions 81 to 89 tons/day
	Re-entrained (PM ₁₀) dust from Roadway Sanding	Least predicted change in PM ₁₀ from winter maintenance 61 to 66 tons/day	Intermediate predicted change in PM ₁₀ from winter maintenance 66 to 70 tons/day	Greatest predicted change in PM ₁₀ from winter maintenance 70 to 75 tons/day
Noise	Decibels (dB)	Noise level increases between 1 and 2 dB 1 to 2 dB	Noise level increases between 3 and 4 dB 3 to 4 dB	Noise level increases more than 5 dB > 5 dB

A. Environmental Analysis and Data

Criteria and Assumptions: Environmental Sensitivity

Resources		Assessment Approach	Assumptions	Applicable Federal Regulations	Data Source	Scale of Source Data
Geologic Hazards	Potential to exacerbate existing geologic hazards in the Corridor and affect safety, service, and mobility due to rockfalls, debris flows/mudflows, avalanches and landslides.	<p>Direct Impacts:</p> <ul style="list-style-type: none"> Identify geologic hazards by geologic domain and location along the highway using GIS spatial analysis. Rate geologic hazards by severity (aspect, failure, frequency, climate, disruption to transportation facilities). Perform qualitative assessment of potential for avoidance. 	Geologic severity rating provides a hazard index to determine severity of disturbance to an area.	House Bill 104. Development in designated hazard areas shall be engineered in a manner that will minimize significant hazards to public health and safety or to property.	<ul style="list-style-type: none"> Maps and publications from USGS, Colorado Geologic Survey, and Colorado School of Mines Geologic hazard information specific to I-70 from previous events and maintenance records 	1:24,000
Regulated Material and Mining Waste		<p>Direct Impacts: Alternatives' proximity to known areas of hazardous substances or petroleum products within the scope of Resource Conservation and Recovery Act (RCRA). Alternative proximity to and potential to disturb historic mill tailings and mine waste areas (includes sites designated on the National Priority List (NPL) that have been reclaimed under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as well as other sites).</p> <p>Indirect Impacts: Alternatives' potential to affect traffic-related spills and transport of hazardous materials, amount of hazardous materials sources in Corridor, and degree of construction contaminant sources.</p>	<ul style="list-style-type: none"> Mine wastes may be encountered anywhere within the mineral belt in Clear Creek County, and the boundaries of mine sites and mill areas are not well defined. The Colorado State Patrol regulates the transport of chemicals and other controlled substances in the Corridor and is responsible for the reporting of transportation-related hazardous spills. 	<ul style="list-style-type: none"> Historic mine wastes have been cleaned up in portions of Clear Creek County under the authority of CERCLA Act of 1980. Disturbance to these sites would be coordinated with EPA and CDPHE. The RCRA Act of 1976 governs the generation, storage, and disposal of hazardous substances and petroleum products. Colorado Revised Statute 34-32-100: limited impact, regular, or special mining and reclamation permit for riprap, sand, and gravel for projects. Colorado Recycling Guidance: historic mining waste material considered solid waste if disturbed and not reused. CDOT plans to manage this material onsite to the extent possible. CDOT will submit a materials reuse plan to EPA and CDPHE for approval and onsite management. 	<ul style="list-style-type: none"> Remedial Investigation/Feasibility studies of mine sites in Clear Creek County CDOT records of hazardous material transport through EJMT and over Loveland Pass NPL, CERCLIS, RCRA, Emergency Response Notification Systems (ERNS), and Underground and leaking storage tank (UST/LUST) lists 	N/A
Environmental Justice	<ul style="list-style-type: none"> Potential encroachment on and displacement of low-income and minority residents. Disruption of communities from dispersion of families to different areas. Availability of affordable and low-income housing. Public transportation options. Excessive noise levels for low-income and minority residents living adjacent to I-70. 	<p>Direct Impacts:</p> <ul style="list-style-type: none"> Characterize low-income and minority populations at town level using Block Group Data Characterize availability of low-income housing based on household income, available housing, and population growth Perform qualitative analysis of alternatives' benefits for worker commuting 	Information on minority and low income populations were obtained from municipal, county, and community representatives who have knowledge of or direct experience with issues of commuting, affordable housing, and community cohesiveness.	Executive Order 12898: avoid federal actions that cause disproportionately high and adverse impacts on minority and low income populations with respect to human health and the environment.	<ul style="list-style-type: none"> 2000 Block Group Data Interviews with municipal, county, and community representative. 	N/A
4(f) Properties	<ul style="list-style-type: none"> Publicly owned parks, recreation areas, wildlife and waterfowl refuges, or any significant historic sites 	<p>Direct Impacts: Potential for encroachment, in whole or in part on publicly owned parks, recreation areas, wildlife and waterfowl refuges, or any significant historic sites. Consideration of direct impacts on 4(f) properties also accounts for activities that could change or diminish a potential 4(f) property, thereby affecting the site's capability to perform any of its vital functions. Degree of impairment would be determined in consultation with the officials having jurisdiction over the resource (FHWA 4(f) Policy Paper revised 1989).</p> <p>Indirect and Cumulative Impacts: 4(f) properties were not identified as a key resource for indirect and cumulative impact analysis.</p>	<ul style="list-style-type: none"> Direct impacts on historic properties occur where alternative footprints encroach on listed or eligible NRHP and CRHP sites. Without an initial assessment of severity at a project level and consultation through the Section 106 process, the impact may or may not be considered severe. No criteria are established for noise impacts; therefore, FHWA noise abatement criteria are adopted. Constructive use for noise would occur when an alternative interferes with the use and enjoyment of a noise-sensitive facility, such as an outdoor amphitheater, site, or park where serenity and quiet are significant attributes. No criteria are established for visual impacts; therefore, visual assessment guidance from USFS has been adopted. Constructive use for visual resources would occur when an alternative substantially impairs visual or aesthetic qualities, obstructs or eliminates the primary view of an architecturally historic building, or detracts from the setting of a park or site that derives its value from the setting. 	Section 4(f) of the US Department of Transportation Act (US Code 49-303). Regulation provides for the protection of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, and all significant historic sites used for a highway project.	<ul style="list-style-type: none"> BLM, WRNF, ARNF, Corridor counties and municipalities (GIS data layers: trails and trailheads, parks, open space, picnic areas, campgrounds, recreation complexes and facilities, and ski areas) Coordination with SHPO and National Park Service and site file search (GIS data layers: NHLs, historic properties) 4(f) ad hoc committee (GIS data layers: input on publicly owned land of national, state, or local significance: parks, recreation areas, wildlife and waterfowl refuges) 	1:6,000 to 24,000

Impact Data
Environmental Sensitivity

No Action Alternative	Transit Alternatives												Highway Alternatives			Combination Highway/Transit Alternatives			
	1	2		3	4		5	6	7	8	9	10	11	12					
	Minimal Action Alternative	Rail with IMC		Advanced Guideway System	Dual-Mode Bus in Guideway		Diesel Bus in Guideway	6-Lane Highway 55 mph	6-Lane Highway 65 mph	Reversible/ HOV/HOT Lanes	6-Lane Highway with Rail and IMC	6-Lane Highway with AGS	6-Lane Highway with Dual-Mode Bus in Guideway	6-Lane Highway with Diesel Bus in Guideway					
											9 - Combination Built Simultaneously	10 - Combination Built Simultaneously	11 - Combination Built Simultaneously	12 - Combination Built Simultaneously					
											9a - Transit with Highway Preservation	10a - Transit with Highway Preservation	11a - Transit with Highway Preservation	12a - Transit with Highway Preservation					
											9b - Highway with Transit Preservation	10b - Highway with Transit Preservation	11b - Highway with Transit Preservation	12b - Highway with Transit Preservation					
KEY WILDLIFE HABITAT <small>(acres of disturbance in footprint/construction zone/ 15-foot sensitivity zone)</small>	Deer (winter concentration and severe winter range)	N/A	11 / 7 / 8	11 / 7 / 8	19 / 9 / 17	11 / 7 / 8	11 / 7 / 8	11 / 7 / 8	11 / 7 / 8	11 / 7 / 8	11 / 7 / 8	20 / 12 / 21	11 / 7 / 8	11 / 7 / 8					
	FP + CD + SZ	0	26	26	45	26	26	26	26	26	26	53	26	26					
	Rank	1	2	2	3	2	2	2	2	2	2	4	2	2					
	Elk (winter concentration severe winter range, and calving areas)	N/A	0 / 0 / 0	0.7 / 1.3 / 2.3	0 / 0 / 0.4	0 / 0.1 / 0.7	0 / 0.1 / 0.7	0 / 0.9 / 2.9	0 / 0.9 / 2.9	0 / 1.9 / 3.8	0.8 / 4.4 / 5.1	0.7 / 3.2 / 4.6	0 / 3.4 / 4.5	0 / 3.4 / 4.5					
	FP + CD + SZ	0	0	4	0	1	1	4	4	6	10	9	7	7					
	Rank	1	1	3	1	2	2	3	3	4	7	6	5	5					
	Bighorn sheep (winter and summer range and lambing areas)	N/A	48 / 31 / 33	103 / 49 / 49	75 / 23 / 50	78 / 52 / 55	78 / 52 / 55	81 / 69 / 65	86 / 69 / 65	99 / 72 / 65	126 / 82 / 66	111 / 73 / 64	104 / 75 / 65	104 / 75 / 65					
	FP + CD + SZ	0	112	201	148	185	185	215	220	236	274	248	244	244					
	Rank	1	2	5	3	4	4	6	6	7	8	7	7	7					
	High quality songbird habitat (aspen and riparian forest)	N/A	1 / 1 / 1	4 / 3 / 4	3 / 1 / 3	1 / 1 / 1	1 / 1 / 1	1 / 1 / 1	0 / 0 / 1	1 / 1 / 1	4 / 4 / 4	3 / 1 / 4	1 / 1 / 1	1 / 1 / 1					
FP + CD + SZ	0	3	11	7	3	3	3	1	3	12	8	3	3						
Rank	1	3	6	4	3	3	3	2	3	7	5	3	3						
Summary	FP / CD / SZ	N/A	61 / 40 / 42	119 / 61 / 64	96 / 33 / 71	90 / 60 / 65	90 / 60 / 65	93 / 78 / 77	97 / 78 / 77	111 / 82 / 78	142 / 98 / 83	135 / 90 / 93	117 / 87 / 79	117 / 87 / 79					
	FP + CD + SZ	0	143	244	200	215	215	248	252	271	323	318	283	283					
	Overall rank	1	2	5	3	4	4	5	5	6	7	7	6	6					
TES SPECIES HABITAT <small>(acres of disturbance in footprint/construction zone/ 15-foot sensitivity zone)</small>	Lynx linkage areas	N/A	48.6 / 34.8 / 34.7	121.9 / 93.1 / 94.0	115.8 / 4.1 / 123.3	59.7 / 37.0 / 38.4	59.7 / 37.0 / 38.4	95.9 / 47.2 / 45.6	87.6 / 45.2 / 43.6	99.0 / 47.3 / 45.6	198.8 / 116.3 / 111.8	198.6 / 55.9 / 137.0	114.9 / 75.4 / 66.0	114.9 / 75.4 / 66.0					
	Boreal toad habitat	N/A	0 / 0 / 0	0.15 / 0.11 / 0.17	0 / 0 / 0.001	0.10 / 0 / 0.02	0.10 / 0 / 0.02	0.11 / 0.14 / 0.17	0.11 / 0.14 / 0.17	0.13 / 0.17 / 0.19	0.21 / 0.20 / 0.33	0.20 / 0.23 / 0.29	0.17 / 0.19 / 0.26	0.17 / 0.19 / 0.26					
	Colorado River and Greenback Cutthroat trout	N/A	0.19 / 0.15 / 0.15	0.66 / 0.41 / 0.31	0.43 / 0.07 / 0.46	0.26 / 0.15 / 0.16	0.26 / 0.15 / 0.16	0.20 / 0.14 / 0.15	0.20 / 0.14 / 0.15	0.27 / 0.15 / 0.15	0.75 / 0.45 / 0.31	0.59 / 0.17 / 0.47	0.27 / 0.20 / 0.15	0.27 / 0.20 / 0.15					
	Summary	FP / CD / SZ	N/A	48.7 / 34.9 / 34.9	122.7 / 93.6 / 94.5	116.2 / 4.1 / 123.7	60.0 / 37.2 / 38.5	60.0 / 37.2 / 38.5	96.3 / 47.5 / 45.9	87.9 / 45.5 / 43.9	99.4 / 47.6 / 45.9	199.7 / 117.0 / 112.4	199.4 / 56.3 / 137.8	115.3 / 75.8 / 66.4	115.3 / 75.8 / 66.4				
		FP + CD + SZ	0	118.5	310.8	244.0	135.7	135.7	189.7	177.3	192.9	429.1	393.5	257.5	257.5				
		Rank	1	2	8	6	3	3	5	4	5	10	9	7	7				
VEGETATION <small>(acres of disturbance footprint/ construction zone/ 15' sensitivity zone)</small>	Previously Disturbed (not included in summary or rank)	N/A	167 / 89 / 76	345 / 142 / 100	326 / 36 / 221	200 / 99 / 92	200 / 99 / 92	223 / 148 / 116	220 / 145 / 112	253 / 148 / 111	454 / 214 / 135	462 / 151 / 224	303 / 177 / 132	303 / 177 / 132					
	Alpine Meadows - Tundra	N/A	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0					
	Aspen Forest	N/A	1 / 1 / 1	3 / 3 / 3	2 / 1 / 3	1 / 1 / 1	1 / 1 / 1	1 / 1 / 1	0 / 0 / 0	1 / 1 / 1	3 / 3 / 3	3 / 1 / 3	1 / 1 / 1	1 / 1 / 1					
	Barren Land	N/A	12 / 6 / 7	11 / 6 / 5	8 / 1 / 7	2 / 2 / 2	2 / 2 / 2	12 / 6 / 7	2 / 3 / 5	12 / 6 / 7	19 / 8 / 8	20 / 6 / 9	12 / 6 / 7	12 / 6 / 7					
	Douglas-Fir Forest	N/A	2 / 1 / 2	3 / 2 / 3	2 / 1 / 3	2 / 1 / 2	2 / 1 / 2	2 / 1 / 2	6 / 2 / 3	2 / 2 / 2	2 / 2 / 3	2 / 2 / 1	2 / 2 / 2	2 / 2 / 2					
	Grass / Forb Meadows	N/A	1 / 2 / 4	4 / 4 / 6	3 / 1 / 4	1 / 1 / 1	1 / 1 / 1	1 / 2 / 5	1 / 2 / 4	1 / 2 / 5	5 / 6 / 9	4 / 5 / 8	1 / 2 / 5	1 / 2 / 5					
	Lodgepole Pine Forest	N/A	0 / 1 / 1	2 / 3 / 4	1 / 0 / 2	0 / 0 / 1	0 / 0 / 1	0 / 1 / 2	0 / 1 / 2	0 / 1 / 2	2 / 3 / 5	1 / 3 / 4	0 / 1 / 2	0 / 1 / 2					
	Mountain Shrubland	N/A	19 / 14 / 16	9 / 9 / 11	8 / 5 / 7	6 / 6 / 7	6 / 6 / 7	19 / 16 / 20	10 / 13 / 17	19 / 18 / 22	21 / 21 / 25	22 / 19 / 23	20 / 19 / 22	20 / 19 / 22					
	Piñon-Juniper	N/A	8 / 6 / 7	8 / 6 / 7	10 / 6 / 9	8 / 6 / 7	8 / 6 / 7	8 / 6 / 7	8 / 6 / 7	8 / 6 / 7	8 / 6 / 7	10 / 6 / 9	8 / 6 / 7	8 / 6 / 7					
	Ponderosa Pine Forest	N/A	11 / 11 / 15	19 / 18 / 23	15 / 11 / 21	12 / 17 / 23	12 / 17 / 23	13 / 17 / 23	13 / 17 / 24	15 / 18 / 24	16 / 24 / 27	14 / 19 / 25	14 / 20 / 26	14 / 20 / 26					
	Sagebrush Shrubland	N/A	15 / 8 / 9	10 / 6 / 7	13 / 6 / 10	10 / 6 / 7	10 / 6 / 7	15 / 8 / 9	16 / 8 / 9	15 / 8 / 9	15 / 8 / 9	18 / 8 / 12	15 / 8 / 9	15 / 8 / 9					
	Spruce - Fir Forest	N/A	1.8 / 2.3 / 3.2	6.3 / 5.5 / 7.7	3.9 / 1.0 / 4.4	2.9 / 2.2 / 3.8	2.9 / 2.2 / 3.8	2.9 / 3.6 / 7.0	2.9 / 3.6 / 7.0	3.2 / 5.1 / 8.4	6.5 / 10.1 / 13.1	5.6 / 9.2 / 11.9	3.5 / 6.8 / 9.5	3.5 / 6.8 / 9.5					
	Summary	FP / CD / SZ	N/A	70 / 52 / 66	76 / 64 / 75	67 / 33 / 70	44 / 41 / 53	44 / 41 / 53	75 / 61 / 82	58 / 56 / 78	77 / 66 / 87	100 / 92 / 108	100 / 78 / 107	76 / 71 / 90	76 / 71 / 90				
	FP + CD + SZ	0	188	215	170	138	138	218	192	230	300	285	237	237					
	Rank	1	4	5	3	2	2	5	4	6	8	7	6	6					

Legend:
 Least Impact
 Intermediate Impact
 Greatest Impact

FP = Footprint
 CD = Construction Disturbance
 SZ = Sensitivity Zone

Note: Range of numerical rank varies by resource/receptor. The rank does not imply a level of environmental significance.

A. Environmental Analysis and Data

Impact Data
Environmental Sensitivity

	No Action Alternative	Transit Alternatives					Highway Alternatives			Combination Highway/Transit Alternatives				
		1	2	3	4	5	6	7	8	9	10	11	12	
		Minimal Action Alternative	Rail with IMC	Advanced Guideway System	Dual-Mode Bus in Guideway	Diesel Bus in Guideway	6-Lane Highway 55 mph	6-Lane Highway 65 mph	Reversible/ HOV/HOT Lanes	6-Lane Highway with Rail and IMC	6-Lane Highway with AGS	6-Lane Highway with Dual-Mode Bus in Guideway	6-Lane Highway with Diesel Bus in Guideway	
									9 - Combination Built Simultaneously	10 - Combination Built Simultaneously	11 - Combination Built Simultaneously	12 - Combination Built Simultaneously		
									9a - Transit with Highway Preservation	10a - Transit with Highway Preservation	11a - Transit with Highway Preservation	12a - Transit with Highway Preservation		
									9b - Highway with Transit Preservation	10b - Highway with Transit Preservation	11b - Highway with Transit Preservation	12b - Highway with Transit Preservation		
WETLANDS acres of disturbance in footprint/construction from sensitivity zone	Eagle River	N/A	0.4 / 0.5 / 1.0	2.1 / 1.4 / 1.5	1.4 / 0 / 1.3	0 / 0 / 0	0 / 0 / 0	0.4 / 0.5 / 1.0	0.1 / 0.4 / 0.8	0.4 / 0.5 / 1.0	2.2 / 1.5 / 1.7	2.7 / 1.2 / 2.1	0.4 / 0.5 / 1.0	0.4 / 0.5 / 1.0
	Blue River	N/A	0.07 / 0.4 / 0.8	0.6 / 0.8 / 1.1	0.3 / 0.4 / 1.1	0.1 / 0.5 / 0.8	0.1 / 0.5 / 0.8	0.1 / 0.5 / 0.8	0.1 / 0.5 / 0.8	0.1 / 0.5 / 0.8	0.5 / 0.8 / 1.1	0.4 / 0.5 / 1.1	0.1 / 0.5 / 0.8	0.1 / 0.5 / 0.8
	Clear Creek	N/A	0.6 / 0.8 / 1.0	1.4 / 1.9 / 2.2	0.7 / 0.7 / 1.2	0.6 / 1.1 / 1.6	0.6 / 1.1 / 1.6	0.6 / 2.2 / 2.8	0.8 / 2.4 / 3.1	0.9 / 2.6 / 3.7	1.7 / 4.2 / 4.9	1.5 / 3.9 / 4.9	1.3 / 3.5 / 4.4	1.3 / 3.5 / 4.4
	FP / CD / SZ	N/A	1.0 / 1.8 / 2.8	4.0 / 4.1 / 4.8	2.4 / 1.1 / 3.6	0.8 / 1.6 / 2.4	0.8 / 1.6 / 2.4	1.2 / 3.2 / 4.6	1.0 / 3.2 / 4.8	1.5 / 3.6 / 5.5	4.4 / 6.5 / 7.8	4.5 / 5.6 / 8.2	1.8 / 4.5 / 6.2	1.8 / 4.5 / 6.2
	FP + CD + SZ	0	5.6	12.9	7.1	4.8	4.8	9.0	9.0	10.6	18.7	18.3	12.5	12.5
	Rank	1	3	7	4	2	2	5	5	6	8	8	7	7
SPRINGS/FENS acres of disturbance in footprint/construction from sensitivity zone	Eagle River	N/A	0 / 0 / 0	0.1 / 0.2 / 0.2	0.1 / 0 / 0.2	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0.2 / 0.2 / 0.2	0.2 / 0.2 / 0.2	0 / 0 / 0	0 / 0 / 0
	Blue River	N/A	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0
	Clear Creek	N/A	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0
	FP / CD / SZ	N/A	0 / 0 / 0	0.1 / 0.2 / 0.2	0.1 / 0 / 0.2	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0.2 / 0.2 / 0.2	0.2 / 0.2 / 0.2	0 / 0 / 0	0 / 0 / 0
	FP + CD + SZ	0	0	0.5	0.3	0	0	0	0	0	0.6	0.6	0	0
	Rank	1	1	3	2	1	1	1	1	1	4	3	1	1
OTHER WATERS OF THE US acres of disturbance in footprint/construction from sensitivity zone	Eagle River	N/A	0.8 / 0.5 / 0.9	1.2 / 0.6 / 0.7	0.9 / 0.1 / 0.9	0.1 / 0.1 / 0.2	0.1 / 0.1 / 0.2	0.8 / 0.5 / 0.9	0.5 / 0.3 / 0.4	0.8 / 0.5 / 0.9	2.0 / 0.8 / 1.1	2.4 / 0.6 / 1.4	0.8 / 0.5 / 0.9	0.8 / 0.5 / 0.9
	Blue River	N/A	0.2 / 0.4 / 0.6	0.3 / 0.5 / 0.7	0.3 / 0.4 / 0.7	0.2 / 0.4 / 0.6	0.2 / 0.4 / 0.6	0.2 / 0.4 / 0.6	0.2 / 0.4 / 0.6	0.2 / 0.4 / 0.6	0.3 / 0.5 / 0.7	0.3 / 0.4 / 0.7	0.2 / 0.4 / 0.6	0.2 / 0.4 / 0.6
	Clear Creek	N/A	0.4 / 1.8 / 3.5	1.0 / 3.9 / 7.0	0.9 / 2.2 / 4.8	0.5 / 1.9 / 4.3	0.5 / 1.9 / 4.3	0.6 / 2.1 / 5.4	2.1 / 2.4 / 5.7	0.7 / 2.4 / 6.6	0.7 / 4.8 / 8.7	0.6 / 4.2 / 7.5	0.5 / 3.9 / 8.1	0.5 / 3.9 / 8.1
	FP / CD / SZ	N/A	1.3 / 2.7 / 5.0	2.5 / 5.0 / 8.4	2.1 / 2.7 / 6.4	0.8 / 2.4 / 5.1	0.8 / 2.4 / 5.1	1.5 / 3.0 / 6.8	2.7 / 3.1 / 6.6	1.6 / 3.4 / 8.1	3.0 / 6.0 / 10.6	3.3 / 5.2 / 9.6	1.4 / 4.8 / 9.6	1.4 / 4.8 / 9.6
	FP + CD + SZ	0	9.0	15.9	11.2	8.3	8.3	11.3	12.4	13.1	19.6	18.1	15.8	15.8
	Rank	1	3	7	4	2	2	4	5	6	9	8	7	7
RIPARIAN AREAS acres of disturbance in footprint/construction from sensitivity zone	Eagle River	N/A	3.6 / 2.0 / 2.0	2.2 / 1.5 / 1.8	1.8 / 1.0 / 1.8	1.1 / 1.0 / 1.1	1.1 / 1.0 / 1.1	3.6 / 2.0 / 2.0	4.6 / 2.2 / 2.2	3.6 / 2.0 / 2.0	4.3 / 2.4 / 2.4	4.6 / 1.9 / 2.4	3.6 / 2.0 / 2.0	3.6 / 2.0 / 2.0
	Blue River	N/A	1.1 / 1.3 / 1.5	3.2 / 1.9 / 1.9	2.7 / 1.4 / 2.0	1.1 / 1.3 / 1.5	1.1 / 1.3 / 1.5	1.1 / 1.3 / 1.5	1.1 / 1.3 / 1.5	1.1 / 1.3 / 1.5	3.2 / 1.7 / 2.0	2.7 / 1.4 / 1.9	1.1 / 1.3 / 1.5	1.1 / 1.3 / 1.5
	Clear Creek	N/A	1.8 / 1.5 / 1.6	2.9 / 1.9 / 2.2	2.4 / 1.5 / 2.0	1.9 / 1.7 / 2.3	1.9 / 1.7 / 2.3	2.3 / 2.7 / 4.3	2.7 / 2.8 / 4.6	2.5 / 4.2 / 4.8	3.1 / 6.3 / 5.4	2.8 / 5.4 / 5.0	2.7 / 5.4 / 5.2	2.7 / 5.4 / 5.2
	FP / CD / SZ	N/A	6.5 / 4.8 / 5.1	8.3 / 5.3 / 5.9	6.9 / 3.9 / 5.8	4.1 / 4.1 / 4.9	4.1 / 4.1 / 4.9	7.0 / 6.0 / 7.8	8.3 / 6.3 / 8.3	7.2 / 7.5 / 8.2	10.6 / 10.4 / 9.8	10.1 / 8.7 / 9.3	7.4 / 8.6 / 8.7	7.4 / 8.6 / 8.7
	FP + CD + SZ	0	16.4	19.5	16.6	13.1	13.1	20.8	22.9	22.9	30.8	28.1	24.7	24.7
	Rank	1	3	4	3	2	2	5	6	6	9	8	7	7
SUMMARY WETLAND RELATED RESOURCES acres of disturbance in footprint/construction from sensitivity zone	FP / CD / SZ	N/A	8.9 / 9.2 / 12.8	14.9 / 14.6 / 19.3	11.6 / 7.7 / 16.0	5.6 / 8.1 / 12.4	5.6 / 8.1 / 12.4	9.6 / 12.2 / 19.3	12.1 / 12.6 / 19.8	10.2 / 14.4 / 21.9	18.2 / 23.2 / 28.4	18.1 / 19.8 / 27.3	10.6 / 17.9 / 24.5	10.6 / 17.9 / 24.5
	FP + CD + SZ	0	30.9	48.8	35.3	26.1	26.1	41.1	44.5	46.5	69.8	65.2	53.0	53.0
	Rank	1	3	6	4	2	2	5	6	6	9	8	7	7

Legend:
 = Least Impact
 = Intermediate Impact
 = Greatest Impact

FP = Footprint
 CD = Construction Disturbance
 SZ = Sensitivity Zone

Notes:
 Range of numerical rank varies by resource/receptor. The rank does not imply a level of environmental significance
 While the footprint, construction disturbance, and sensitivity zone of select alternatives occur in fens, impacts to springs/fens are considered avoidable based on assumptions described in section 3.6.

Impact Data
Environmental Sensitivity

	No Action Alternative	Transit Alternatives												Highway Alternatives				Combination Highway/Transit Alternatives																	
		1	2			3			4			5			6			7			8			9			10			11			12		
		Minimal Action Alternative	Rail with IMC			Advanced Guideway System			Dual-Mode Bus in Guideway			Diesel Bus in Guideway			6-Lane Highway 55 mph			6-Lane Highway 65 mph			Reversible/ HOV/HOT Lanes			6-Lane Highway with Rail and IMC			6-Lane Highway with AGS			6-Lane Highway with Dual-Mode Bus in Guideway			6-Lane Highway with Diesel Bus in Guideway		
FISHERIES Linear feet of stream affected in footprint/construction Summary (acres)	"High-value" fisheries	N/A	5.5 / 4.5 / 4.7	8.5 / 6.6 / 5.4	7.1 / 0.7 / 6.9	1.3 / 0.8 / 0.8	1.3 / 0.8 / 0.8	5.5 / 4.5 / 4.7	5.1 / 4.5 / 4.6	5.5 / 4.5 / 4.7	12.4 / 7.8 / 6.6	11.2 / 7.2 / 7.9	5.5 / 4.5 / 4.7	5.5 / 4.5 / 4.7																					
	Gold Medal fisheries	N/A	1.5 / 0.6 / 0.7	2.1 / 1.0 / 1.0	0.9 / 0 / 1.0	0 / 0 / 0	0 / 0 / 0	1.5 / 0.6 / 0.7	0 / 0 / 0	1.5 / 0.6 / 0.7	4.1 / 0.9 / 0.9	4.2 / 0.3 / 0.7	1.5 / 0.6 / 0.7	1.5 / 0.6 / 0.7																					
	Species of special concern	N/A	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0																					
	"High-value" fisheries	N/A	1.0 / 0.8 / 0.8	1.1 / 0.9 / 1.1	1.1 / 0.8 / 0.9	1.0 / 0.8 / 0.8	1.0 / 0.8 / 0.8	1.0 / 0.8 / 0.8	1.0 / 0.8 / 0.8	1.0 / 0.8 / 0.8	1.1 / 0.8 / 1.0	1.1 / 0.8 / 0.9	1.0 / 0.8 / 0.8	1.0 / 0.8 / 0.8																					
	Gold Medal fisheries	N/A	0.2 / 0.2 / 0.2	0.2 / 0.2 / 0.2	0.2 / 0.2 / 0.2	0.2 / 0.2 / 0.2	0.2 / 0.2 / 0.2	0.2 / 0.2 / 0.2	0.2 / 0.2 / 0.2	0.2 / 0.2 / 0.2	0.2 / 0.2 / 0.2	0.2 / 0.2 / 0.2	0.2 / 0.2 / 0.2	0.2 / 0.2 / 0.2																					
	Species of special concern	N/A	0 / 0 / 0	0.4 / 0.3 / 0.2	0.3 / 0 / 0.3	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0.4 / 0.3 / 0.2	0.3 / 0 / 0.3	0 / 0 / 0																					
	"High-value" fisheries	N/A	2.5 / 2.3 / 2.6	4.5 / 3.2 / 3.8	5.0 / 2.1 / 2.9	2.8 / 2.8 / 3.6	2.8 / 2.8 / 3.6	2.8 / 3.8 / 4.5	2.8 / 3.9 / 4.5	3.3 / 4.1 / 5.0	4.5 / 5.0 / 5.9	4.3 / 4.8 / 5.7	4.0 / 4.6 / 5.6	4.0 / 4.6 / 5.6																					
	Gold Medal fisheries	N/A	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0																					
	Species of special concern	N/A	0.2 / 0.1 / 0.2	0.3 / 0.2 / 0.2	0.2 / 0.1 / 0.1	0.3 / 0.1 / 0.2	0.3 / 0.1 / 0.2	0.2 / 0.1 / 0.1	0.2 / 0.1 / 0.1	0.3 / 0.1 / 0.2	0.4 / 0.2 / 0.2	0.3 / 0.2 / 0.2	0.3 / 0.2 / 0.2	0.3 / 0.2 / 0.2																					
	"High-value" (FP / CD / SZ)	N/A	9.0 7.6 8.1	14.1 10.7 10.3	13.2 3.6 10.7	5.1 4.4 5.2	5.1 4.4 5.2	9.3 9.1 10.0	8.9 9.2 9.9	9.8 9.4 10.5	18.0 13.6 13.5	16.6 12.8 14.5	10.5 9.9 11.1	10.5 9.9 11.1																					
	Gold Medal (FP / CD / SZ)	N/A	1.7 0.8 0.9	2.3 1.2 1.2	1.1 0.2 1.2	0.2 0.2 0.2	0.2 0.2 0.2	1.7 0.8 0.9	0.2 0.2 0.2	1.7 0.8 0.9	4.3 1.1 1.1	4.4 0.5 0.9	1.7 0.8 0.9	1.7 0.8 0.9																					
	Special concern (FP / CD / SZ)	N/A	0.2 0.1 0.2	0.7 0.5 0.4	0.5 0.1 0.4	0.3 0.1 0.2	0.3 0.1 0.2	0.2 0.1 0.1	0.2 0.1 0	0.3 0.1 0.2	0.8 0.5 0.4	0.6 0.2 0.5	0.3 0.2 0.2	0.3 0.2 0.2																					
FP + CD + SZ	0	28.6	41.4	31.0	15.9	15.9	32.2	28.9	33.7	53.3	51.0	35.6	35.6																						
Rank	1	3	6	4	2	2	4	3	4	7	7	5	5																						
STREAMS Linear feet of stream affected in footprint/construction Summary	Eagle River	N/A	1,351 / 858 / 1,226	2,201 / 901 / 1,384	1,100 / 71 / 1,748	170 / 98 / 488	170 / 98 / 488	1,351 / 719 / 1,365	1,519 / 768 / 1,422	1,351 / 719 / 1,365	3,746 / 929 / 1,841	3,986 / 1,085 / 1,888	1,351 / 719 / 1,365	1,351 / 719 / 1,365																					
	Blue River	N/A	238 / 158 / 940	277 / 192 / 973	265 / 158 / 976	238 / 158 / 940	238 / 158 / 940	238 / 158 / 940	238 / 158 / 940	238 / 158 / 940	277 / 192 / 973	265 / 158 / 976	238 / 158 / 940	238 / 158 / 940																					
	Clear Creek	N/A	2,115 / 6,457 / 7,746	4,784 / 12,621 / 9,101	3,649 / 7,465 / 9,437	2,227 / 6,654 / 12,138	2,227 / 6,654 / 12,138	2,503 / 7,567 / 15,660	4,726 / 7,706 / 14,898	2,678 / 10,397 / 15,862	3,644 / 17,693 / 14,463	3,369 / 15,945 / 13,647	2,494 / 15,566 / 14,342	2,494 / 15,566 / 14,342																					
	FP / CD / SZ	N/A	3,704 / 7,473 / 9,912	7,262 / 13,714 / 11,458	5,014 / 7,694 / 12,161	2,635 / 6,910 / 13,566	2,635 / 6,910 / 13,566	4,092 / 8,444 / 17,965	6,483 / 8,632 / 17,260	4,267 / 11,274 / 18,167	7,667 / 18,814 / 17,277	7,620 / 17,188 / 16,511	4,083 / 16,443 / 16,647	4,083 / 16,443 / 16,647																					
	FP + CD + SZ	0	21,089	32,434	24,869	23,111	23,111	30,501	32,375	33,708	43,758	41,319	37,173	37,173																					
Rank	1	2	6	4	3	3	5	6	6	9	8	7	7																						

Legend:
 = Least Impact
 = Intermediate Impact
 = Greatest Impact

FP = Footprint
 CD = Construction Disturbance
 SZ = Sensitivity Zone

Note: Range of numerical rank varies by resource/receptor. The rank does not imply a level of environmental significance.

Place holder for MANAGEMENT AREA PRESCRIPTIONS, CURRENTLY DEV LANDS

Place holder for CURRENTLY DEV LANDS AND ROW

Place holder for VISUAL

Place holder for NOISE

Place holder for AIR ~ CO, NO, SO, NITROGEN

Place holder for AIR ~ PM, DUST