

Chapter 20: Indirect Effects

20.1 Introduction

This chapter evaluates the potential indirect effects of the action alternatives identified in Chapter 2, Alternatives. Typically, for transportation improvement projects, the primary indirect effect would be changes to land use and their consequent environmental impacts. This type of indirect effect involves changes in the rate, intensity, location, and/or density of land development or changes in access. For the action alternatives, potential indirect effects also include improved access to recreation areas and ski resorts as a result of the proposed transportation improvements in Little Cottonwood Canyon. Indirect effects related to constructing the action alternatives are evaluated in each resource chapter.

What is the indirect effects impact analysis area?

The indirect effects impact analysis area consists of Cottonwood Heights, the Granite Community, Sandy, the town of Alta, portions of Salt Lake County adjacent to S.R. 210, and private and National Forest System lands in Little Cottonwood Canyon.

Indirect Effects Impact Analysis Area. The indirect effects impact analysis area consists of Cottonwood Heights, the Granite Community, Sandy, the town of Alta, portions of Salt Lake County adjacent to State Route (S.R.) 210, and private and National Forest System (NFS) lands in Little Cottonwood Canyon (for the locations of these areas, see Figure 1.1-1, Transportation Needs Assessment Study Area, in Chapter 1, Purpose and Need). The analysis also includes potential indirect effects from tolling in Big Cottonwood Canyon. The impact analysis area was selected to include locations where project-related activities could cause changes in land use, use of recreation resources, and tolling.

20.2 Regulatory Setting

The Council on Environmental Quality's (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) require that an Environmental Impact Statement (EIS) analyze the effects of a proposed action. Indirect effects are defined by the CEQ regulations (40 Code of Federal Regulations Section 1508.8) as effects

... which are caused by the [proposed] action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to the induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Federal agencies such as CEQ and the Federal Highway Administration have stated that there is no prescribed specific technique or method that must be used to analyze the indirect effects of transportation projects (FHWA 1992). A national survey of completed EISs found that a wide range of methods were used to evaluate indirect effects (USDOT 2005). For details regarding the methods used in this EIS, see Section 20.4.1, Methodology.

20.3 Affected Environment

20.3.1 S.R. 210 – Wasatch Boulevard

S.R. 210 from Fort Union Boulevard to S.R. 209 passes through an area of urban-related land uses consistent with a mature city. Cottonwood Heights and the Granite Community are mostly developed, so their population growth is expected to be low (about 5% between 2018 and 2050; CSBS 2019). Over the past couple years, a few vacant parcels have developed into residential subdivisions, and any private property along Wasatch Boulevard south of Bengal Boulevard that is still vacant is zoned for residential development.

Regionally, south of 9400 South along Wasatch Boulevard, land is mostly developed with residential uses in Sandy and Draper. Most of the undeveloped land is in two areas: (1) south of Wasatch Boulevard along North Little Cottonwood Road to S.R. 209 and (2) on Wasatch Boulevard between North Little Cottonwood Road and 9400 South. In these two areas, the undeveloped land either is being developed with residential developments, or the property owners are interested in developing the vacant property even with the current congestion on Wasatch Boulevard. (For more information, see Section 1.4.3, Current and Future Transportation System Needs, in Chapter 1, Purpose and Need.)

Understanding current commuter traffic patterns helps predict where potential changes to land use could occur. Commuters' travel origins and destinations show where people live and where they travel to work. During the morning and evening commutes, about 53% of the traffic on Wasatch Boulevard in Cottonwood Heights is coming from or going to areas south of 9400 South, including Sandy and Draper. These travelers are commuting to Interstate 215, mostly to employment in Salt Lake City (Cottonwood Heights City 2018). This commuting pattern shows that land uses south of Cottonwood Heights have a large influence on the travel demand on S.R. 210 through this city.

20.3.2 S.R. 210 – North Little Cottonwood Road to Alta

Little Cottonwood Canyon is in the Uinta-Wasatch-Cache National Forest, which is on the eastern edge of the Salt Lake City metropolitan area located in Salt Lake County. Salt Lake County has a population of about 1.12 million people. The canyon is home to two internationally recognized ski resorts, Alta and Snowbird, and includes parts of two National Wilderness Areas: Twin Peaks Wilderness to the north and Lone Peak Wilderness to the south. S.R. 210 is a designated state scenic byway because of the cliff walls and high mountains that make up the canyon.

Winter recreation activities include but are not limited to skiing at the resorts, backcountry skiing, snowshoeing, and ice climbing. During the 2017–2018 winter season, the Alta and Snowbird resorts had about 853,000 skiers. During the summer, the resorts offer abundant recreation opportunities, and land administered by the U.S. Department of Agriculture (USDA) Forest Service is used extensively for hiking, cycling, rock climbing, fishing, camping, and picnicking.

The canyon is also defined as a watershed area by the Salt Lake Valley Board of Health as authorized by Section 26A-1-121(1) of the Utah Code Annotated. The purpose of the watershed designation is to protect and promote health and promote conditions that contribute to preserving and protecting drinking water quality. The watershed provides water for cities in eastern Salt Lake County. The quality of the watershed

and the quantity of the water provided are critical to the local water supply. Because of the importance of the watershed to the water supply, dogs are not allowed in Little Cottonwood Canyon.

The substantial recreational opportunities in Little Cottonwood Canyon and its proximity to a large metropolitan area generate about 1.2 million vehicle trips into the canyon per year, which carry about 2.1 million visitors (Lamborn and Burr 2016). Visitation into the canyon is equally distributed between winter and summer uses, with winter use more focused on peak ski weekends and holidays (Mountain Accord 2015). Given that the populations of Salt Lake and Utah Counties are expected to grow by 36% and 108%, respectively, through 2050, the number of travelers into Little Cottonwood Canyon also is expected to increase through 2050 (see Section 1.4.1.2, Projected Growth in Population, Employment, and Households, in Chapter 1, Purpose and Need).

The popularity of outdoor recreation continues to grow with the population, and this trend shows no signs of slowing. One report found that the number of recreation visits to the Wasatch Mountains will likely double over the next 30 to 40 years. Such a doubling would put a major potential strain on the quality of the recreation experience as well as on habitat, the watershed in Little Cottonwood Canyon, and the existing transportation network (Envision Utah 2010).

During the summer, canyon users have difficulty finding parking near trailheads. The amount of trailhead parking is limited and can quickly reach capacity, causing many people to park on the side of the road and walk along the roadway to trailheads, which creates a safety issue. One of the most congested parking areas is the White Pine Trailhead (Mountain Accord 2014), which is located at a curve with limited sight distances and narrow shoulders, both of which increase safety-related issues for motorists, cyclists, and pedestrians. Parking along the road has created a rut at the edge of the pavement and a network of “spider web” trails that promote erosion and weed infestation. Roadside parking also creates a safety hazard for cyclists and pedestrians traveling along the shoulder of the road because it narrows the area in which they can travel and requires them to use part of the travel lane.

There are no official usage data regarding the number of cyclists using S.R. 210 in Little Cottonwood Canyon. The only available information is from a social media application (Strava) that is used by cyclists to track their rides. Strava does not account for all users and therefore underrepresents the number of cyclists. The data from Strava show that, in 2018, about 13,600 cyclist trips entered Little Cottonwood Canyon on S.R. 210 or on the Little Cottonwood Canyon Trail. About 3,500 cyclist trips terminated at Snowbird Entry 1, and about 1,800 trips terminated at Alta.

20.4 Indirect Effects and Mitigation Measures

The Utah Department of Transportation (UDOT) analyzed the indirect effects of mobility changes on S.R. 210 from Fort Union Boulevard to the town of Alta. This analysis includes traffic capacity improvements on Wasatch Boulevard; improved winter recreation access to the ski resorts as a result of increased bus, gondola, and cog rail capacity; and improved summer recreation access to the ski resorts as a result of implementing a gondola or cog rail system that would operate in winter as well as summer. The action alternatives would provide bus, gondola, and/or cog rail service to the ski resorts only; there would be no stops at trailheads in lower Little Cottonwood Canyon, so the alternatives would not induce use at the trailheads.

None of the project alternatives include summer bus use in Little Cottonwood Canyon, so there would be no induced recreational visitation during the summer for the enhanced bus service alternatives. For the indirect effects analysis, the assumption is that the improved trailhead parking proposed with the project alternatives would not expand the number of parking spaces at the trailheads or along S.R. 210 from the intersection with S.R. 209 to Snowbird Entry 1 based on the inventoried number of existing parking spaces along this road segment (Avenue Consultants 2012). For the analysis in this chapter, the trailhead parking with all of the action alternatives would decrease the number of parking spaces by between 17 and 429 spaces. Therefore, there would be no induced recreational demand caused by the trailhead improvement alternatives. However, the amount of available parking would be reduced, thereby limiting overall recreation access.

Since there would be no summer bus service and because the trailhead parking alternatives would reduce overall parking at the trailheads, UDOT did not analyze the indirect effects of increased recreation use in the summer from the enhanced bus service alternatives. The gondola and cog rail alternatives would operate during the summer to the ski resorts, so the indirect analysis does analyze induced recreational use at the resorts and surrounding areas.

20.4.1 Methodology

For the S.R. 210 Project, *indirect effects* are defined as effects that could result from the action alternatives beyond direct impacts to property and resources within the project right of way and the construction footprint. In this analysis, indirect effects are primarily (1) the effects of land development that could occur due to the improved accessibility and mobility in the area influenced by the action alternatives, (2) changes to recreation use in Little Cottonwood Canyon, and (3) changes in traffic patterns due to tolling or a ban on single-occupant vehicles. Indirect effects on natural resources would typically be caused when undeveloped or partially developed land with such natural resources is converted to residential, industrial, commercial, or governmental land uses, or when a change in recreation activities induced by an alternative such as hiking harms a natural resource.

Within the indirect effects impact analysis area, the action alternatives are not expected to induce population growth in a specific geographic area. Instead, the alternatives are expected to change mobility on Wasatch Boulevard and to change how recreation users access the ski resorts with all alternatives during the winter and with the gondola and cog rail alternatives during the summer (there would be no stops at the trailheads). The transportation improvements would not change vehicle access during the summer or increase the amount of parking in Little Cottonwood Canyon at trailheads. UDOT does not expect the project alternatives to have appreciable indirect effects on the social resources of community facilities, public facilities and

services, or noise. The project alternatives would also have no indirect effects on hazardous waste sites or floodplains.

The economic impact analysis in Chapter 6, Economics, includes the potential direct and indirect effects of the project alternatives on the local and regional economies. In addition, the air quality analysis in this EIS considers regionwide conformity of transportation projects to the state implementation plan, so an analysis of potential indirect effects on air quality is included in Chapter 10, Air Quality.

The remainder of Section 20.4.1 discusses the methodology used for the indirect effects analysis. Sections 20.4.2 through 20.4.5 discuss the potential indirect effects of the project alternatives on land use, recreation, ecosystem resources (water quality, vegetation, soil, and wildlife), environmental justice populations, and tolling.

What is transportation conformity?

Transportation conformity refers to whether a proposed project would conform to the state implementation plan for meeting air quality standards. For more information, see Section 10.2.2, Transportation Conformity Requirements, in Chapter 10, Air Quality.

20.4.1.1 Land Use Changes

Evaluating the indirect effects of transportation projects can be a complex task. An indirect effects analysis involves evaluating how a given project could influence land use patterns over the project's planning horizon (for this EIS, the planning horizon is 2050). Land use patterns are the product of interdependent decisions by numerous parties including local elected officials, local and regional planning staff, developers, citizens, regional planning authorities, transportation agencies, and many other public and private entities. Land use patterns are strongly affected by economic and demographic forces that are beyond the control of governmental authorities and by an area's access to utilities such as power, water, and sewer.

UDOT based the analysis of the indirect effects on land use on a review of existing and proposed future development; existing and future improvements to the existing transportation network; improvements to travel time, access, and parking as a result of the action alternatives; and future city and county land use plans. These data were used to determine whether the action alternatives would influence changes to land use and the type and timing of development.

20.4.1.2 Visitor Use in Little Cottonwood Canyon

UDOT based the analysis of indirect effects on recreation use on the potential for buses, gondola service, or cog rail service to increase visitation to the ski resorts and the potential for transportation improvements to increase overall visitation in the canyon. There are no plans to operate the enhanced bus service alternatives in the summer, but UDOT would consider operating the gondola and cog rail alternatives in the summer with stops only at the ski resorts. Therefore, the indirect analysis in this chapter assumes that there would be no increase in summer visitation from the enhanced bus service alternatives and a potential for some increase in visitation at the ski resorts from the gondola and cog rail alternatives.

All of the trailhead parking alternatives decrease the availability of parking in the canyon and therefore would not increase summer use of designated trailheads or other access points into forest land outside the ski resorts. If in the future a plan is developed to implement summer transit to trailheads, the USDA Forest Service would prepare or be involved in the necessary study for implementation.

20.4.1.2.1 Winter Visitation

For winter use, the indirect effects analysis assumes an increased number of visitors based on increasing transit service (bus, gondola, or cog rail) and assuming that the buses, gondola service, or cog rail service operate to meet the 30th-highest hourly traffic volume demand, which is expected to occur on about 49 days (holiday periods and weekends). A toll or a ban on single-occupant vehicles would be implemented to reduce vehicle use by 30% on S.R. 210 in Little Cottonwood Canyon.

As shown in Table 20.4-1, with improved transit, there could be an additional 2,283 skiers divided between the Snowbird and Alta ski resorts on a busy ski day, or about 1,141 skiers per resort. Over the course of 49 busy ski days, that could be an additional 111,328 skiers per season. During the 2017–2018 winter season, the Alta and Snowbird resorts had about 853,000 skiers; therefore, the additional transit capacity could increase the number of skiers by about 13% over current conditions.

What is the 30th-highest hourly traffic demand?

The 30th-highest hourly traffic demand refers to the hour over an entire year with the projected 30th-highest traffic volume on S.R. 210 in Little Cottonwood Canyon. For more information, see Section 7.2.1.2, S.R. 210 – North Little Cottonwood Road to Alta, in Chapter 7, Traffic and Transportation.

Table 20.4-1. Change in Daily Skier Capacity with the Action Alternatives

Mode	Skier Capacity with Existing Infrastructure	Skier Capacity with Buses, Gondola, or Cog Rail
Parking capacity	7,595 ^a	7,595 ^a
Roadside parking	1,953 ^b	1,454 ^c
Transit	1,512 ^d	4,536 ^e
Reduction for ski resort employees ^f	1,062	1,304
Total skiers	9,998	12,281

^a Assumes resort parking of 3,500 parking spaces at average vehicle occupancy of 2.17.
^b Assumes roadside parking of 900 parking spaces at average vehicle occupancy of 2.17.
^c Assume elimination of winter roadside parking of 230 spaces as part of alternative. Vehicle occupancy of 2.17.
^d Assumes maximum capacity of current Utah Transit Authority (UTA) bus service of 36 trips from 7 AM to 1 PM with occupancy of 42 people per bus.
^e Assumes maximum capacity of Enhanced Bus Service Alternative with 108 trips from 7 AM to 1 PM with occupancy of 42 people per bus.
^f Assumes 9.6% of users are resort employees. The employees are reduced from the total skiers per day.

20.4.1.2.2 Summer Visitation

The analysis of summer visitation considers whether the proposed summer operation of a gondola or cog rail system in Little Cottonwood Canyon would merely provide an additional transportation amenity or whether it would attract additional visitors beyond those who would normally drive to the ski resorts for recreation. Summer visitation at the ski resorts is an extremely competitive market, with multiple resorts vying to maintain or improve their share of a market. Resorts often look to broaden their range of recreation offerings, which individually might not specifically increase visitation but collectively might improve the overall attractiveness of a resort. An example of this would be adding an alpine slide in the resort base area.

It is not possible to predict with any certainty the number of additional summer gondola and cog rail riders to the ski resorts beyond those who were already planning to make the trip by private vehicle. Some users might have planned a trip to the ski resorts by vehicle but might decide to take the gondola or cog rail instead to enjoy the scenic ride. The analysis in this chapter attempts to determine how many additional users would make the trip to the resorts only because of the gondola or cog rail. The proposed gondola and cog rail systems would have restrictions such as operating hours and a prohibition on bicycles. With such a prohibition on bicycles on the gondola or cog rail system, use of the trails below the Snowbird resort by cyclists would not increase as a result of the gondola or cog rail alternatives between the resorts and the entrance of Little Cottonwood Canyon. Many summer and fall events have their own appeal, and some of the people who would participate in the events might take the gondola or cog rail instead of using their personal vehicle. This would not increase the number of users in Little Cottonwood Canyon but rather would shift their transportation mode. During the summer, the price of a ticket to ride the gondola or cog rail would not be subsidized, which might discourage use since taking a personal vehicle would be faster and less costly.

Because summer use of the gondola and cog rail is difficult to predict, UDOT used the best available information regarding how new infrastructure can induce use (HDR 2020a). In 2018, a visitation and use assessment was conducted for a new gondola connecting the base areas at the Squaw Valley/Alpine Meadows ski resort in California. The assessment determined that the gondola would likely increase winter visitation by about 1.4% during the first year (SE Group and RRC Associates 2018). The rate of increased visitation was predicted to eventually go to zero in year 5 as the interest factor of the new gondola wore off. For the analysis of the gondola and cog rail alternatives in this chapter, the analysis assumes that the *number* of additional summer visitors—as a result of an assumed initial 1.4% bump in the first year—would stay constant through 2050. The Squaw Valley/Alpine Meadows analysis was used to predict summer visitation estimates for the gondola alternatives because of the similarities of a new gondola or cog rail system in a ski resort setting.

If a gondola or cog rail system is built in Little Cottonwood Canyon, tourists might take the gondola or cog rail to at least Snowbird for reasons of curiosity. The gondola or cog rail system might garner national and international media coverage, which could result in an initial increase in summer visitation in Little Cottonwood Canyon for tourists already traveling to Utah.

A traffic analysis conducted by UDOT based on historical data over a 10-year period found a 1.2% annual growth factor for traffic in Little Cottonwood Canyon. UDOT used the 2018 average eastbound traffic on S.R. 210 for Saturday and Sundays (4,660 vehicles) in the summer months of June through September and applied the 1.2% growth factor to determine the projected traffic in 2050. Based on the 2018 weekend summer traffic, UDOT determined that, in 2050, there would be an estimated 6,760 vehicle trips into Little Cottonwood Canyon. UDOT assumed a similar summer occupancy rate per vehicle of 2.1 persons as during

a winter weekend. This would result in about 14,196 visitors in Little Cottonwood Canyon on weekends in 2050. Using the 1.4% visitation increase attributed to the gondola or cog rail, about **198 additional visitors per day** would visit the ski resorts who would not have otherwise made the trip. This number is likely high because the traffic volumes include travel to all areas in Little Cottonwood Canyon, not just the ski resorts that would be served by the gondola or cog rail; however, the exact number of additional users overall could be higher or lower than the 198 predicted in this analysis.

The increased number of visitors to the ski resorts in the summer would be below the number of visitors in the winter, so the ski resorts have the infrastructure to support the use and would likely open the necessary facilities to accommodate the use. The additional 198 people per day might stay around the immediate resort area or hike on the trails surrounding the resorts.

20.4.1.3 Latent (or Induced) Demand

Latent demand (sometimes called induced demand) is the concept that increasing a road's capacity, and thereby reducing congestion and travel time, encourages more people to drive on the road. However, the purpose of all of the action alternatives is to improve mobility on S.R. 210 and achieve this goal by reducing personal vehicle use in Little Cottonwood Canyon during the winter by implementing a toll or a ban on single-occupancy vehicles. The goal of the project is to reduce the use of personal vehicles in the canyon by 30%, thus counteracting the latent demand caused by less congested roads.

What is latent (or induced) demand?

Latent demand is the concept that increasing a road's capacity, and thereby reducing congestion and travel time, encourages more people to drive on the road.

If S.R. 210 becomes more congested, the toll or vehicle occupancy restriction would be changed to continue to reduce the use of personal vehicles. In addition, none of the action alternatives increase winter parking, thus eliminating the potential for more vehicles accessing the ski resorts. The increase in visitation at the ski resorts would result from the increases in transit capacity provided by the bus, gondola, and cog rail alternatives. With the extra capacity provided by buses, gondola, and cog rail, it is possible that more people would have the opportunity to visit the resorts.

During the summer, traffic on S.R. 210 in Little Cottonwood Canyon operates under mostly free-flow conditions because travel is spread throughout the day. Since there is usually little congestion, latent demand is unlikely to occur. In addition, the action alternatives would not increase the roadway capacity of S.R. 210 during the summer. Therefore, with the action alternatives, S.R. 210 would essentially operate the same as under existing conditions during the summer, and induced travel or use is not expected.

20.4.1.4 Tolling or Vehicle Occupancy Restrictions

With any of the action alternatives, UDOT would implement a toll or a ban on single-occupant vehicles during the winter. The purpose of the toll or ban would be to incentivize transit use and reduce the use of personal vehicles during winter by 30% to the ski resorts. S.R. 210 in Little Cottonwood Canyon is the only road that services the ski resorts and it ends at the top of the canyon, so tolling would not increase traffic on other routes into Little Cottonwood Canyon since there are no bypass routes by which drivers could avoid vehicle restriction policies. Taking the enhanced bus service, gondola, or cog rail to the ski resorts would be the only option to avoid paying the toll.

A potential indirect effect of a toll or a ban on single-occupant vehicles on S.R. 210 could be that skiers would visit other ski resorts that are not accessed via roads with restrictions. The main traffic impact would be to S.R. 190 in Big Cottonwood Canyon, which is about 3 miles north of Little Cottonwood Canyon and provides access to two ski resorts (Solitude and Brighton). If skiers use S.R. 190 to avoid a toll or a ban on single-occupant vehicles on S.R. 210, this could increase congestion levels on S.R. 190, causing delays to reach the ski resorts and traffic backups on Fort Union Boulevard and Wasatch Boulevard near the entrance to Big Cottonwood Canyon.

To mitigate the potential for indirect effects in the form of increased congestion on S.R. 190, UDOT would likely implement a toll or a ban on single-occupant vehicles on this road as well, so both S.R. 190 and S.R. 210 would have similar congestion-management policies. If a toll were implemented for S.R. 190, bus service would need to be improved for those not willing to pay a toll or for single occupant vehicles. The indirect effects analysis considers the impact of a toll or a ban on single-occupant vehicles on S.R. 190.

20.4.1.5 Visitor Capacity Analysis

UDOT received numerous comments during the EIS scoping period that a visitor capacity analysis should be conducted to determine how many recreation users can be supported by the natural resources in Little Cottonwood Canyon before the environment and the recreation experience are degraded. The visitor capacity analysis could then inform the alternatives development process so that potential alternatives would be designed to limit the number of recreation users to the number determined by the visitor capacity analysis. Although some commenters felt that current levels of visitation are beyond the current capacity of the environment and the recreation experience in Little Cottonwood Canyon, other commenters supported transit and other alternatives that would improve the capacity of the transportation system.

Although the intent of the action alternatives in this EIS is not to increase visitation in the canyon but rather to improve overall transportation mobility by implementing transit and reducing personal vehicle use, it is likely that the growing recreation demand caused by an increase in population in Salt Lake Valley could increase visitation. During the EIS process, UDOT and the USDA Forest Service (a cooperating agency in preparing this EIS) considered the visitor carrying capacity of Little Cottonwood Canyon. The USDA Forest Service advised UDOT on the potential impacts to NFS lands and forest resources in accordance with the 2003 *Revised Forest Plan: Wasatch-Cache National Forest* (USDA Forest Service 2003).

The *Forest Plan* acknowledges that Mill Creek, Big Cottonwood, and Little Cottonwood Canyons provide a wide array of recreation opportunities designed to serve a large and growing urban population while maintaining stable watersheds, water quality, and the ecological integrity of the land, its physical resources, and its biological communities. The *Forest Plan* directs Forest decisions responding to increasing recreation demands to give first consideration to desired water quality and riparian conditions.

In specific regard to wilderness, the *Forest Plan* directs the USDA Forest Service to control and reduce the adverse impacts of human use through education and minimum regulation. The *Forest Plan* also indicates that the USDA Forest Service will not allow crowding and physical impacts from visitor use to reach levels where solitude is destroyed or evidence of humans dominates. Through its implementation of the *Forest Plan*, the USDA Forest Service closely monitors use levels on NFS lands to preserve forest resources and protect wilderness characteristics. The USDA Forest Service acknowledges that, in the future, management might be needed to limit resource impacts from user visitation. The *Forest Plan* states that such management options could include, but are not limited to, use capacity analysis, allowed use limits and quotas, permit systems, designated camp sites, wilderness management plans, and/or amendments to the *Forest Plan* (USDA Forest Service 2018).

For this EIS, a visitor capacity analysis was not performed. Through its implementation and monitoring of the management protocols and objectives in the *Forest Plan*, the USDA Forest Service determined that many areas on the Uinta-Wasatch-Cache National Forest can handle increased use, without substantial resource impacts, and while maintaining quality recreation experiences for visitors, with the construction and sustained operations and maintenance of infrastructure designed to accommodate current and future visitor demands. The construction and sustained operations and maintenance of infrastructure could greatly reduce visitor impacts to natural resources in some areas through controlled access, improved trails, proper toilet facilities, and safe parking. Throughout the EIS process, the USDA Forest Service collaboratively worked with UDOT and the other cooperating and participating agencies to develop mitigation measures, as necessary, for the alternatives evaluated in this EIS to protect NFS lands and forest resources (USDA Forest Service 2018).

The indirect effects analysis in this chapter is based on studies that evaluated the impacts of visitation in wilderness areas on water quality, wildlife, soils, vegetation, and trail users' expectations regarding the quality of their recreation experience.

20.4.2 Enhanced Bus Service Alternatives

The Enhanced Bus Service Alternative and the Enhanced Bus Service in Peak-period Shoulder Lane Alternative would have the same indirect effects, as described below.

20.4.2.1 S.R. 210 – Wasatch Boulevard

UDOT does not expect that the additional roadway capacity that would be added on Wasatch Boulevard with the enhanced bus service alternatives would induce local or regional development. The proposed roadway widening is consistent with Cottonwood Heights City's land use and transportation plans for Wasatch Boulevard. City planning representatives also believe that residential growth along Wasatch Boulevard will continue with or without the S.R. 210 Project (that is, with an action alternative or with the No-Action Alternative) and that improvements to Wasatch Boulevard would not change the rate of development or the timing and types of developments (HDR 2019).

Additionally, for the following three main reasons, UDOT does not expect the improvements to Wasatch Boulevard proposed in this EIS to induce development.

- Wasatch Boulevard is part of a mature, regional transportation system that already provides a high degree of accessibility to the surrounding developed areas. Research has shown that the extent of indirect effects is influenced by the maturity of the regional transportation system, and greater effects are associated with new roads compared with existing roads that are expanded (Haughwout and Boarnet 2000; NCHRP 2002). No new roads are proposed with the S.R. 210 Project, and the existing access to the regional transportation network would not change except to improve safety and reduce congestion. Therefore, no new access to undeveloped areas would be provided.
- The improvements to Wasatch Boulevard are intended primarily to improve safety and reduce congestion on this 2.2-mile segment. UDOT does not expect the travel-time savings during peak travel periods to be great enough to substantially change regional land use patterns or to substantially shift development from one part of the region to another.

Traffic analyses have estimated that the travel-time savings in 2050 on the 2.2-mile segment of Wasatch Boulevard to be about 5 minutes on average per vehicle during the PM peak period (3 PM to 6 PM). Practitioners who study transportation-related indirect effects believe that at least 10 minutes of travel-time savings are needed before intraregional land use patterns are substantially affected (Avin and others 2007). In addition, adding new travel lanes would not shorten the distances among destinations, nor would it serve land that does not already have access to Wasatch Boulevard. The new travel lanes also would not affect travel times during nonpeak periods when traffic is currently typically free-flowing.

- Land use patterns and development have already established themselves along Wasatch Boulevard and in communities in southern Salt Lake County such as Draper. Because so much development has occurred, it is difficult to distinguish the role of Wasatch Boulevard from other factors that influence development, especially because the region already has a high level of transportation accessibility, and employment centers already are distributed throughout Salt Lake County. Therefore, it is not likely that improvements to Wasatch Boulevard would further change land uses.

Based on the above three factors, the proposed improvements to Wasatch Boulevard are not expected to induce development or population growth in Salt Lake County and thereby cause indirect effects.

20.4.2.2 S.R. 210 – North Little Cottonwood Road to Alta

20.4.2.2.1 Land Use

Ski Resorts

Similar to Wasatch Boulevard, S.R. 210 in Little Cottonwood Canyon is a mature transportation system. Neither of the enhanced bus service alternatives would increase roadway capacity for personal vehicles during the year. Personal vehicle access for current and future residents would be unchanged and so would not cause induced development changes in the town of Alta or on private land. The main change would be the increased transit capacity provided by the enhanced bus service.

As discussed in Section 20.4.1.2.1, Winter Visitation, the enhanced bus service could result in about 1,141 more skiers per resort on each of about 49 busy ski days per year. With the increase in skiers, the resorts might want to improve some infrastructure to handle the increased demand. See Section 20.4.2.2.2, Recreation, for more information regarding adding lift capacity at the resorts. Beyond lift improvements, the resorts might also want to add other facilities such as more restrooms and additional lodge capacity. These infrastructure improvements that would result from the increased visitation would not change the existing resort-based land uses and so would not result in an indirect effect on land use. Any changes to the ski resorts would require an update to each resort's master development plan.

Town of Alta

In 2019, the Town of Alta passed a resolution (2019-R-14) supporting a visitor management plan in anticipation of roadway capacity and mobility improvements on S.R. 210. Neither of the enhanced bus service alternatives would increase the capacity for personal vehicles on S.R. 210, and both alternatives would try to reduce personal vehicle use by 30% during the winter. Thus, there should be a beneficial impact to the transportation system in the town of Alta during the winter. Specifically, the enhanced bus service alternatives would reduce congestion and roadside parking by about 230 spaces near the resorts by eliminating winter roadside parking. The proposed bus service would stop at the ski resorts only and so would not induce visitation in the town of Alta. Overall, the proposed enhanced bus service improvements should reduce congestion in the town of Alta, thereby reducing the need for the Town to manage traffic, an activity that would affect the Town's operating budget.

20.4.2.2.2 Recreation

Winter Recreation

For winter use, the indirect effects analysis assumes an increased number of visitors based on increasing bus service and assuming that the buses operate to meet the 30th-highest hourly traffic volume, which is expected to occur on about 49 days (holiday periods and weekends). A toll or a ban on single-occupant vehicles would be implemented to reduce vehicle use by about 30% on S.R. 210 in Little Cottonwood Canyon. As shown above in Table 20.4-1, Change in Daily Skier Capacity with the Action Alternatives, with the enhanced bus service, there could be an additional 2,283 skiers divided between the Snowbird and Alta ski resorts on a busy ski day, or about 1,141 skiers per resort. This increase in use would occur on about 49 busy ski days per year (weekends and holiday periods).

The increase in users caused by the enhanced bus service alternatives could detract from the skier experience. Note that the analysis assumes that the enhanced bus service alternatives operate at 100% capacity from 7 AM to 1 PM. This is unlikely, so the total number of skiers would likely be less. In addition, some backcountry skiers might take the bus to the resorts, which could also increase backcountry use.

The ski resorts would be responsible for managing the increased visitation. The National Ski Area Permit Act of 1986, as amended by the Ski Area Recreational Opportunity Enhancement Act of 2011 (16 United States Code Section 497b), directs the U.S. Secretary of Agriculture to permit acreage sufficient and appropriate to accommodate a permittee's needs for ski operations and appropriate ancillary facilities, as determined by the Secretary, and does not explicitly direct the Secretary to set visitor capacity limits for the permitted acreage. Managing visitors' experience and safety is the responsibility of each individual ski area. This management is reflected in a ski area's master development plan, which is required by the standard Forest Service Ski Area Term Special Use Permit, and its operating plan, which outlines the ski area's responsibilities for protecting public health, safety, and the environment and for ensuring delivery of high-quality services. Additionally, the ski resort permits require the resorts to provide appropriate infrastructure to accommodate skiers.

Representatives with the ski resorts were uncertain how additional skiers would change ski resort operations. With the potential for about 1,141 additional skiers at each ski resort, the resorts might want to increase ski lift capacity to maintain the skier experience and reduce lift lines, or add other infrastructure at larger base facilities. Increasing lift capacity could include replacing existing ski lifts with higher-capacity ski lifts or new ski lifts. It is not possible at this time to identify specific improvements, the locations of the improvements, or the timing. Any improvements at the resorts have the potential to cause the following impacts:

- Temporary loss of soil productivity from construction compaction
- Soil erosion and sediment delivery to local streams
- Water quality impacts to the watershed
- Fill placed in wetlands
- Loss of vegetation and impacts to sensitive plant species
- Spread of invasive plants
- Loss of wildlife habitat
- Loss of cultural resources
- Change in the visual landscape character
- Improved access for skiers

If a resort were to propose to expand lift capacity or add other infrastructure to address an increased number of skiers, the USDA Forest Service would prepare an environmental document under NEPA. The environmental document would assess impacts and mitigation for the proposed improvements for consideration by the USDA Forest Service in its decision regarding whether to issue an approval. The resort would also need to obtain other environmental permits. The resorts would also need to work within the limits of existing culinary water allotments (provided by Salt Lake City) and sanitary sewer capacity. According to discussions with a representative with Salt Lake County Service Area #3, which manages drinking water and sewer use in Little Cottonwood Canyon, contracted water use is 34% of the total available amount, and sewer use is about 6%. Overall, the representative with Service Area #3 believes that there is enough water and sewer capacity to accommodate increased use (Hanson 2021).

Recreation users' perception of the additional skiers at each resort would vary. Most ski resort users expect some level of crowds and lift wait times. Not all recreationists perceive the environment in the same way; what is a quality ski experience to one person might be entirely undesirable to another. It is not possible to predict each user's recreation experience, but increased use of recreation areas and longer lift lines would likely lower the quality of the recreation experience for most users. The impacts to backcountry use, during which some users might expect some solitude while skiing, would be greater. Overall, the quality of the recreation experience depends on the expectations of each user, even with increased visitation.

Increased use at the resorts and in the backcountry could increase safety risks, specifically an increase in the potential for user conflicts on busy ski terrain. At the resorts, these conflicts are managed to reduce the risk of an accident. However, as the number of skiers increases, the risk of an accident could increase if the additional use is not managed appropriately. In the backcountry, skier conflicts are not managed. If backcountry use does increase, the risk of skiing accidents and skier-induced avalanches could also increase.

Summer Recreation

The enhanced bus service alternatives would not operate during the summer, so there would be no change to visitor summer use as a result of bus service that could cause indirect effects on recreation use. However, with the Enhanced Bus Service in Peak-period Shoulder Lane Alternative, cyclists would be allowed to use the shoulder lane during the summer and during the winter when the lane is not being used by buses.

UDOT evaluated the potential for the peak-period shoulder lanes to induce additional cyclist use in Little Cottonwood Canyon. No available data or studies are available with which to accurately predict how improved shoulders would induce cyclist use in conditions similar to Little Cottonwood Canyon. S.R. 210 is very steep; its average grade is 7.2%, and its maximum grade is 11%. This steep grade deters typical recreational or casual cyclists because of the steep climb and the fast speeds when going downhill (often equal to vehicle speeds of 40 miles per hour). The total elevation gain from the canyon entrance to the town of Alta is about 4,000 feet over 8 miles. The steep grade deterrent could be overcome by the use of electric bicycles, but cyclists would still need to contend with downhill speeds.

In addition, the peak-period shoulder lanes would not be separated from the travel lanes by a barrier. As occurs currently on S.R. 210, cyclists biking uphill would be traveling much more slowly than vehicles on a windy canyon road, which might make some users uncomfortable. Typically, cyclists feel more comfortable in a barrier-separated lane, which is more likely to increase cyclist use (Aldred and others 2017; IIHS 2019). Because the steep grades in the canyon would remain, and because the peak-period shoulder lanes would not be separated from the travel lanes by a barrier, UDOT does not expect the Enhanced Bus Service in Peak-period Shoulder Lane Alternative to substantially increase cyclist use of S.R. 210 in Little Cottonwood Canyon. The use of electric bicycles could increase; it is not possible to predict the increases in electric bicycle use.

20.4.2.2.3 Ecosystem Resources (Water Quality, Vegetation, Soil, and Wildlife)

Winter

As stated in Section 20.4.2.2.2, Recreation, UDOT expects that the number of winter skiers (resort and backcountry) would increase on busy ski days. The ski resorts are designed for winter use and have appropriate infrastructure to manage the use as required by their respective special-use permit. Refer to that section for more information regarding adding lift capacity and other infrastructure at the resorts and the potential environmental impacts from these improvements. The impacts could include increased erosion and sediments, reduced water quality, and loss of vegetation and wildlife habitat.

Currently, under the existing conditions, backcountry skiers disturb some wildlife and cause some water quality impacts (as a result of no restrooms being available). If improved transit use results in more backcountry use, there would be an increase in wildlife disturbance and the potential for indirect effects on the watershed. Backcountry use could increase at a similar rate as ski resort use with enhanced bus service. However, neither of the enhanced bus service alternatives is proposing additional backcountry access, only additional transit capacity to the resorts. The actual increase in backcountry use is difficult to predict since it depends on each backcountry skier's willingness to use transit and walk from the ski resorts to access backcountry areas; however, backcountry use could increase.

A literature analysis found that people who rapidly or directly approach wildlife are more distressing for wildlife than are people who approach slowly or indirectly. One source stated that hikers approaching from above and over a ridge are particularly surprising to wildlife. Backcountry skiers follow a similar pattern as hiking since they ascend mountains on skis and descend at high speeds. Backcountry skiing therefore results in less predictable human-wildlife interactions than on-trail skiing and results in a large zone of influence on wildlife. Recent assessments suggest that recreationists, like predators, affect animals' individual fitness and, in turn, population dynamics. This is important to understand and communicate to the public because nonmotorized recreationists tend to believe that their activities are benign due to their dispersal across large areas. However, this wide distribution might actually exacerbate users' disturbance of wildlife (Wrigley, no date).

An increase in the number of backcountry skiers could have a minor impact on the watershed from users not having access to restrooms. The actual change to the watershed from an increase in backcountry use is difficult to predict, but a minor indirect effect is expected.

Summer

The enhanced bus service alternatives would not operate during the summer, so there would be no change to visitor summer use as a result of bus service and no associated indirect effects on ecosystem resources.

As stated in the section titled Summer Recreation on page 20-14, UDOT does not expect the Enhanced Bus Service in Peak-period Shoulder Lane Alternative to substantially increase cyclist use of S.R. 210 because of the addition of the peak-period shoulder lanes. Cyclists would ride in a paved shoulder lane and would have the opportunity to use restrooms at trailheads and the ski resorts. Therefore, UDOT does not expect that any induced cyclist use would degrade water quality in the Little Cottonwood Canyon watershed.

20.4.2.3 Mobility Hubs Alternative

The enhanced bus service alternatives would include two mobility hubs: one at the gravel pit and the other at 9400 South and Highland Drive.

20.4.2.3.1 Gravel Pit

The gravel pit mobility hub would be located at a site that is currently occupied by an active aggregate mine and would include a parking structure of about 1,500 spaces. Cottonwood Heights City’s planning of the site would allow for a major commercial and residential development when mining operations cease. Cottonwood Heights City has stated that the mobility hub would complement the development by providing parking and potential patrons who would use the commercial establishments before or after skiing. The City has also stated that the planned development at the gravel pit would occur with or without the mobility hub. Without the mobility hub, the layout of the site would be different, with parking mixed throughout the development instead of in one central location. Because the development envisioned by Cottonwood Heights City would occur with or without the mobility hub, the gravel pit mobility hub would not induce development at the existing site.

What is a mobility hub?
A mobility hub is a location where users can transfer from their personal vehicle to a bus.

What is the gravel pit?
The gravel pit is an existing aggregate (gravel) mine located on the east side of Wasatch Boulevard between 6200 South and Fort Union Boulevard.

20.4.2.3.2 9400 South and Highland Drive

The 9400 South and Highland Drive location already has a UTA park-and-ride lot, and the area surrounding the park-and-ride lot is fully developed with commercial and residential uses. Therefore, the expanded mobility hub at this location would not induce development in undeveloped areas. Some redevelopment could occur.

20.4.2.4 Avalanche Mitigation Alternatives

The avalanche mitigation alternatives would not induce traffic growth or change the patterns or amount of recreation use in Little Cottonwood Canyon; therefore, no indirect effects are anticipated from the avalanche mitigation alternatives.

20.4.2.5 Trailhead Parking Alternatives

Recreation

With the trailhead parking alternatives, the overall amount of summer parking available in Little Cottonwood Canyon would decrease by between 17 and 429 spaces compared to what is currently available. Under the alternative with the least reduction in parking spaces (17), the current roadside parking would be eliminated by placing no-parking signs within ¼ mile of the trailheads, and the number of parking spaces at existing parking areas would be increased by the number of eliminated parking spots on the roadside. Because overall parking levels would not increase with any of the trailhead parking alternatives, there would be no adverse indirect effects on trailhead use from the enhanced bus service alternatives. However, some recreation users would be negatively affected since the amount of parking at trailheads would be reduced.

Overall, the improvements to trailhead parking and the elimination of roadside parking would benefit recreation users by providing restroom facilities, designated parking areas, and safe parking and trail access. The overall goal of the improved trailhead parking is to focus parking at the smaller areas of the trailheads rather than being distributed widely along S.R. 210. Focusing impacts on a smaller area allows greater efficiencies in management.

The No Trailhead Improvements and No Roadside Parking from S.R. 209/S.R. 210 Intersection to Snowbird Entry 1 Alternative would reduce parking by 429 spaces. This alternative would likely have the greatest benefit to recreation users who seek solitude by reducing the number of people who can access a specific trailhead.

Ecosystem Resources (Water Quality, Vegetation, Soil, and Wildlife)

The trailhead parking alternatives would not increase visitation, so there would be no indirect negative effects from visitation on water quality, vegetation, soil, or wildlife at trailheads. Potential direct and indirect effects on these resources from construction and operation of the improved trailheads are described in Chapter 12, Water Resources, and Chapter 13, Ecosystem Resources.

There would be a potential indirect benefit from improved trailhead parking. Eliminating roadside parking would reduce the indirect effects of “spider web” trails, including the potential for invasive species, soil erosion, litter, and poor sanitation practices caused by recreation users parking along the road and entering the forest at random locations, as they would with the No-Action Alternative. When users park along a road, the resulting unmanaged use can directly disturb riparian habitat, destroy vegetation by creating unauthorized trails, erode stream banks, produce litter and waste, increase the potential for wildlife encounters, and degrade water quality (USDA Forest Service 2016).

Concentrating recreation users to managed trailheads would result in positive effects. The benefits of managed trailheads would include reducing the degradation of riparian habitat, reducing soil erosion, and improving water quality with the introduction of more restrooms and water quality buffers at parking areas. Installing toilets at the trailheads and providing information on kiosks about conservation would improve water quality by reducing poor sanitation practices by users. If toilets are available, users would be less likely to use the riparian area and other drainage features to relieve themselves. Kiosks would inform forest users about ways to have less of an impact on the wilderness and ways to “leave no trace” (USDA Forest Service 2016).

The elimination of roadside parking from the S.R. 209/S.R. 210 intersection to Snowbird Entry 1 would have the greatest indirect beneficial effect on soil erosion, water quality, and wildlife by reducing the number of unmanaged trail networks into the forest and focusing use to authorized trailheads where use can be managed.

20.4.3 Gondola Alternative A (Starting at Canyon Entrance)

Gondola Alternative A is designed to have the same person-carrying capacity from North Little Cottonwood Road to the town of Alta as the enhanced bus service alternatives. Therefore, the indirect effects of Gondola Alternative A would be the same as those of the enhanced bus service alternatives with regard to the indirect effects of the mobility hubs, avalanche mitigation alternatives, and trailhead parking alternatives, as well as indirect effects during the winter on land use, recreation, and ecosystem resources, from North Little Cottonwood Road to the town of Alta.

Gondola Alternative A would not have indirect effects on the Wasatch Boulevard segment of S.R. 210. However, unlike the enhanced bus service alternatives, Gondola Alternative A would operate during the summer, so it would have the potential for additional indirect effects on land use, recreation, and ecosystem resources during the summer. The indirect effects of summer gondola use are described below.

What are gondola base and terminal stations?

As used in this chapter, the term *terminal station* refers to the first and last stations on a passenger's gondola trip. Passengers board and disembark the gondola cabins at the terminal stations.

The *base station* is the terminal station at the bottom of the canyon, and a *destination station* is a terminal station at the top of the canyon.

20.4.3.1 Land Use

Potential summer use of the gondola could increase visitation to the Snowbird and Alta resorts. Most users would stay at the resorts or use the adjacent trails. UDOT does not expect that gondola use would change development patterns in the town of Alta.

20.4.3.2 Recreation

As described in Section 20.4.1.2.2, Summer Visitation, Gondola Alternative A would operate during the summer. During the summer, the price of a ticket to ride the gondola would not be subsidized, which could discourage use since taking a personal vehicle would be faster and less costly. However, the summer operation of the gondola could increase summer visitation by about 198 people per day. Even with the increase in summer users, the resorts would still operate well below their wintertime use. The additional summer users could increase crowds at both resorts including at restaurants, shops, and other resort attractions. This would provide an indirect economic benefit to the resorts.

The additional gondola users might also decide to hike on trails at the resorts. UDOT does not anticipate that all 198 additional users per day would go to one resort, but rather that the additional users would be divided between Alta and Snowbird, with Snowbird receiving the majority because it would be the first gondola stop and has more summer amenities. Also, not all additional users would go hiking; some would stay within the developed resort area. Assuming that the 198 users per day would be spread throughout the day, trail use would not increase substantially enough to detract from users' outdoor recreation experience at the resorts.

To eliminate the potential for mountain bikers to take the gondola up to the Snowbird resort and ride down on unauthorized trails or trails not designed for mountain bike use, users would not be allowed to bring bicycles into the gondola cabins. This could be perceived as a negative impact to mountain bike recreation, but it would benefit wildlife, wildlife habitat, and hikers by not increasing use of unauthorized trails or

increasing bike use on existing trails as a result of the gondola. Bicycles would be prohibited until the USDA Forest Service makes an administrative decision regarding the construction of NFS trails below the resorts for bicycle use.

20.4.3.3 Ecosystem Resources (Water Quality, Vegetation, Soil, and Wildlife)

The most likely impacts to ecosystem resources would be from summer hikers. Given the additional 198 summer users per day as described in Section 20.4.1.2.2, Summer Visitation, the increased trail use with Gondola Alternative A could increase the following effects:

- Soil erosion and sediment delivery to local streams
- Water quality impacts to the watershed
- Loss of vegetation and impacts to sensitive plant species
- Spread of invasive plants
- Potential to disturb wildlife

Because not all 198 additional users per day would go hiking and because any hiking would be spread among the numerous existing trails surrounding the resorts, UDOT does not anticipate substantial indirect effects from summer use of the gondola on water quality, vegetation, soil, or wildlife.

20.4.4 Gondola Alternative B (Starting at La Caille)

The indirect effects of Gondola Alternative B would be the same as those of Gondola Alternative A except for the potential to induce development around the gondola base station at La Caille.

Gondola Alternative B would be located at a future development called the La Caille Center and Villages. The development would be located on about 37.5 acres and would include residential units, restaurants, a winery, a hotel, and shops. The developers would preserve a portion of the development (Superior Peak Phase II) for the Gondola Alternative B base station and 1,500 parking stalls. Noted in the development plan is that “the La Caille Master Plan is not dependent upon the gondola being constructed on this site. Superior Peak Phase II (3-year estimate) will not be constructed until the gondola decision is made, and if it is not chosen it will be sold as individual lots” (CW Management Corporation 2020).

Because the La Caille Center and Villages development would be built with or without Gondola Alternative B, the proposed gondola base station at this location would not induce development, and no indirect effects on land development and associated environmental resources would occur. However, the location of the gondola base station adjacent to the La Caille Center and Villages development could provide an economic benefit to the proposed hotels, shops, and restaurants.

20.4.5 Cog Rail Alternative (Starting at La Caille)

With the Cog Rail Alternative, as described in Section 20.4.1.2.2, Summer Visitation, the cog rail service would operate during the summer, the same as with the gondola alternatives. As with the gondola alternatives, UDOT expects that summer operation of the Cog Rail Alternative could increase summer visitation at the resorts by about 198 people per day in 2050. Therefore, the indirect effects of the Cog Rail Alternative's summer operations on land use, recreation, and ecosystem resources would be the same as those of Gondola Alternative A.

The potential for the Cog Rail Alternative to induce development at the cog rail base station at La Caille would be the same as for the gondola base station with Gondola Alternative B.

What are cog rail base and terminal stations?

As used in this chapter, the term *terminal station* refers to the first and last stations on a passenger's cog rail trip. Passengers board and disembark the cog rail vehicles at the terminal stations.

The *base station* is the terminal station at the bottom of the canyon, and a *destination station* is a terminal station at the top of the canyon.

20.4.6 Tolling or Vehicle Occupancy Restrictions on S.R. 210

Some commenters stated that a toll or a ban on single-occupant vehicles in Little Cottonwood Canyon could cause users to shift to Big Cottonwood Canyon or potentially another resort, thereby impacting other roads or creating additional crowds. As stated in Chapter 6, Economics, for tolling to be effective in reducing congestion on S.R. 210 and to get about 30% of personal vehicle users onto transit, the toll could be between \$20 and \$30 per vehicle (the final cost has not been determined and would be based on travel demand). At that toll rate, about 550 vehicles or about 1,200 skiers (assuming an average vehicle occupancy of 2.17 people) per day might no longer visit the ski resorts in Little Cottonwood Canyon, instead going to other ski resorts (HDR 2020b).

What is travel demand?

Travel demand is the expected number of transportation trips in an area. Travel demand can be met by various modes of travel, such as automobile, bus, rail, carpooling, walking, and cycling.

If tolling or a ban on single-occupant vehicles were implemented in Little Cottonwood Canyon, UDOT would likely implement a similar tolling policy in Big Cottonwood Canyon to reduce the potential for causing greater traffic congestion on S.R. 190. Therefore, it is unlikely that tolling would cause indirect effects from increased use if tolling were implemented. Additionally, with improved travel times from the project alternatives on S.R. 210 in Little Cottonwood Canyon, it is not likely that users would shift to Big Cottonwood Canyon.

There could be a shift of skiers to the other resorts along the Wasatch Front if a toll were implemented in both Big and Little Cottonwood Canyons. It is not possible to know which resorts the skiers would visit to avoid paying a toll in the Cottonwood Canyons. However, given that there are three other resorts within a similar driving time from Salt Lake City, UDOT does not expect tolling to cause either additional roadway congestion or overcrowding at any one resort.

The USDA Forest Service may implement site fees in Little Cottonwood Canyon under the Federal Lands Recreation Enhancement Act. The fees would apply to specific recreation sites such as the Grit Mill and White Pine Trailheads. The proposed UDOT toll would apply only to areas above Snowbird Entry 1, so there would be no toll on users of specific recreation sites below this point. In addition, the UDOT toll would be in effect only during busy morning periods in the winter, so late spring, summer, and fall users would not need

to pay a toll in addition to a site fee for recreation above Snowbird Entry 1. Winter backcountry skiers who park at the end of S.R. 210 to ski might need to pay a toll or subsidized transit fee plus a USDA Forest Service site fee to access winter backcountry skiing. If a recreation site fee is implemented, UDOT would work with the USDA Forest Service to develop a system to prevent backcountry users from having to pay two fees. This system could include UDOT paying a yearly fee for winter operation and maintenance of amenities at the recreation site or potentially constructing the amenities for the USDA Forest Service.

20.4.7 Tolling or Vehicle Occupancy Restrictions on S.R. 190 in Big Cottonwood Canyon

If tolling or a ban on single-occupant vehicles were implemented on S.R. 210 in Little Cottonwood Canyon, UDOT would likely implement similar congestion-management strategies for S.R. 190 in Big Cottonwood Canyon. Similar to S.R. 210, UDOT would also likely implement an improved bus service on S.R. 190 for those users who do not want to pay a toll or carpool. The potential indirect effects on S.R. 190 could be to environmental justice populations from a toll and to all users from the construction and operation impacts from implementing an improved bus service.

20.4.7.1 Indirect Effects on Environmental Justice Populations

The tolling impacts on S.R. 190 would be similar to those described for S.R. 210 (see Chapter 5, Environmental Justice). The toll would likely be in effect in the upper canyon immediately before the Solitude ski resort, thereby allowing continued nontolled access to the lower portions of Big Cottonwood Canyon. The toll would not apply to residents of Big Cottonwood Canyon.

Along with any toll, UDOT would likely implement improved bus service. The improved bus service along with tolling would likely improve travel times to the ski resorts in Big Cottonwood Canyon. The reduction in travel time would benefit all populations including minority and low-income populations that recreate in Big Cottonwood Canyon during the winter. In addition, the improved bus service would provide frequent bus service from a mobility hub, and the travel time and convenience would be the same as taking a personal vehicle, thereby providing efficient access to all populations that want to access the ski resorts. The bus service would run directly from the mobility hub to the ski resorts.

Currently, bus service is provided free for season ski pass holders and resort employees and for a charge of \$5 per trip for non-pass holders. Similar to existing conditions, the improved bus service would cost substantially less than a toll in order to make the service an attractive alternative to using a personal vehicle. The proposed toll rate could range between \$20 and \$30 per vehicle, which many skiers could see as a financial burden. However, because the improved bus service would include a low-cost, convenient alternative to paying the toll with the same travel time as a personal vehicle, it would not be an adverse impact to any populations accessing the ski resorts. Overall, an improved bus service would provide a substantial travel time benefit to all skiers and employees at the resorts. The bus service could be used by backcountry skiers as well.

Because the improved bus service would provide convenient access to all populations and would provide a low-cost alternative to paying a toll, tolling would not cause disproportionately high and adverse effects on any minority or low-income populations wishing to access the ski resorts, in accordance with the provisions of Executive Order 12898 and Federal Highway Administration Order 6640.23a.

Some members of low-income populations might use S.R. 190 to access recreation at Guardsman Pass to snowmobile, backcountry ski, snowshoe, and cross-country ski. This area would not be serviced by the improved bus service, but it would be within the tolled area. The Guardsman Pass area does not receive a high amount of use because of the limited parking along the narrow road, but some low-income populations might use this area. The toll could be in effect during the morning peak period only (7 AM to 10 AM), which would allow low-income populations to recreate after 10 AM to avoid having to pay the toll. With the implementation of these measures, UDOT would reduce the adverse effects on low-income populations from the toll for those wanting to recreate at Guardsman Pass. Therefore, with the proposed mitigation measures, tolling would not cause disproportionately high and adverse effects on any minority or low-income populations that want to use Guardsman Pass, in accordance with the provisions of Executive Order 12898 and Federal Highway Administration Order 6640.23a.

During the winter, the lower portion of Big Cottonwood Canyon (below the Solitude ski resort and outside both the Solitude and Brighton ski resorts) is used by recreationists to snowshoe, backcountry ski, ice climb, hike, and rock climb. With the improved bus service, there would be no bus stops in the lower canyon at trailheads for environmental justice populations as an alternative to paying a toll. Increasing the number of bus stops to address the wintertime lower-canyon users would slow the bus service for the vast majority of users, thereby making the service less attractive as an alternative to paying a toll. Not having an alternative to paying a toll to use the lower canyon to recreate could be an adverse impact to low-income populations. Practicable measures to avoid or reduce these potential adverse effects could include the following:

- Place the toll gantry immediately prior to the Solitude ski resort. This would allow low-income populations wanting to recreate outside the ski resorts in the lower portion of Big Cottonwood Canyon to avoid having to pay the toll.
- Have the toll in effect only during the morning peak period (7 AM to 10 AM), which would allow low-income populations to recreate after 10 AM to avoid having to pay a toll.

With the implementation of these measures, UDOT would reduce the adverse effects on low-income populations from the toll for those wanting to recreate in the lower portion of Big Cottonwood Canyon. Therefore, with the proposed mitigation measures, tolling would not cause disproportionately high and adverse effects on any minority or low-income populations, in accordance with the provisions of Executive Order 12898 and Federal Highway Administration Order 6640.23a.

The travel demand management strategy of a ban on single-occupant vehicles would eliminate single-occupant vehicles from Big Cottonwood Canyon during peak travel periods (7 AM to 10 AM) and would require the single occupants to use the improved bus service to visit the ski resorts. For low-income populations, this strategy would not have a disproportionately high and adverse effect for those wanting to recreate in the lower canyon since they can carpool or wait to recreate after peak periods, similar to other lower-canyon users.

20.4.7.2 Indirect Effects of Improved Bus Service

If UDOT implements a toll or a ban on single-occupant vehicles on S.R. 190, an improved bus service would be implemented. The service would likely start at the gravel pit mobility hub and provide direct bus service to the Solitude and Brighton ski resorts. In Big Cottonwood Canyon, the buses would likely stop at the Solitude ski resort or on the loop at the Brighton ski resort. Some improvements at these locations might be needed for the bus service, but UDOT anticipates that they would occur within existing paved areas. No other stops are anticipated, and UDOT would not provide summer bus service since there would likely not be a summer toll.

At the gravel pit mobility hub, UDOT might need to expand the parking and bus service (including any associated maintenance) area beyond that described for the enhanced bus service alternatives for S.R. 210. This expansion could include increasing the height of parking structure or building a separate structure for S.R. 190 bus service. The construction would occur within the existing gravel pit area. A survey of this area found no wetlands or other biological resources and no cultural resources. With any mobility hub, UDOT would ensure the appropriate water quality treatment. With the additional bus service and vehicles accessing the mobility hub, the amount of air pollutant emissions from vehicles on Wasatch Boulevard would increase. The increased air pollutant emissions along with the S.R. 210 mobility hub traffic could cause local air quality impacts during peak use periods during the winter.

The traffic impacts with the gravel pit mobility hub would be minor. UDOT has designed the gravel pit mobility hub with an interchange that could accommodate the additional traffic from the enhanced S.R. 190 bus service.

20.4.8 Mitigation Measures

The implementation of tolling in Big Cottonwood Canyon could cause an adverse impact to low-income populations wanting to recreate during the winter in the lower canyon (below the ski resorts) or at Guardsman Pass. Practicable measures to avoid or reduce these potential adverse effects could include the following:

- Place the toll gantry immediately prior to the Solitude ski resort. This would allow low-income populations wanting to recreate outside the ski resorts in the lower portion of Big Cottonwood Canyon to avoid having to pay the toll.
- Have the toll in effect only during the morning peak period (7 AM to 10 AM), which would allow low-income populations to recreate after 10 AM to avoid having to pay the toll.

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