



Mount Baker – Snoqualmie National Forest Alternative Transportation Feasibility Study

Phase II: Final Report

April 2014



Summit at Snoqualmie shuttle vehicle in service (top) and schoolbus unloading young MBSNF visitors near Denny Creek (bottom). Source: Volpe Center



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Report Notes

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- Mount Baker-Snoqualmie National Forest (MBSNF) (Everett, WA). The Forest is located east of Seattle and consists of 1.7 million acres that cover portions of Whatcom, Skagit, Snohomish, King, and Pierce Counties.
- U.S. Department of Transportation (DOT) Volpe National Transportation Systems Center (Volpe Center) (Cambridge, MA). The Volpe Center is a Federal, fee-for-service organization that performs transportation work for Federal, state, local, and international public agencies and entities.
- Western Federal Lands Highway Division (WFLHD) (Vancouver, WA). WFLHD is part of the Federal Highway Administration's Office of Federal Lands Highway, serving the transportation engineering and planning needs of agencies that manage Federal land in Oregon, Washington, Idaho, Montana, Alaska, and the Yellowstone and Grand Teton National Parks in Wyoming.
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Executive Summary

Funded by a grant from the Federal Transit Administration, this report is a product of Phase II of the Mount-Baker Snoqualmie National Forest (MBSNF or the Forest) Alternative Transportation Study. The report provides analysis and recommendations in two areas: regional traveler information and transit feasibility for the Interstate 90 corridor between Seattle and Snoqualmie Pass. Volpe's project team focused on these areas based on results from Phase I of the study and a decision from the MBSNF Leadership Team.

The report includes an assessment of the Forest's transportation problems and any underlying causes and presents a series of transportation alternatives and recommendations to help solve those problems. To support this effort, the project team conducted two existing conditions assessments, facilitated a technical working group to discuss visitation management, developed a series of case studies, and engaged local and regional stakeholders for additional input and feedback. Documents from these activities are included in the report's appendices.

Regional Traveler Information

The collection and dissemination of timely and accurate traveler information allows MBSNF visitors to make informed decisions based on traffic and road conditions, facility closures, weather conditions, parking, and transportation alternatives. Electronic traveler information is often made available online and on mobile devices, as well as via dynamic message signs along highways and roads.

While sources of traveler information related to the Forest are abundant, several gaps in both the regional and Forest-specific information networks exist. Currently, Forest travelers have to rely on multiple sources of information to plan a trip. Often this information is generated by agencies and organizations that MBSNF is unable to monitor. Information gaps specific to the Forest include limited usage of graphics (such as dynamic maps) to present traveler information, minimal parking information, and a lack of real-time information pertaining to Forest roads.

The project team identified the following five priority strategies to address the gaps and improve traveler information throughout the Forest:

- *Strategy 1: Graphically display road and trail status information on the MBSNF website.*
The project team developed and delivered HTML code to illustrate how road/trail status information could be displayed on a map on the MBSNF website.
- *Strategy 2: Add a spatial component to the trip planning webpage.*
The project team developed an example design for the Forest's trip planning page that includes mapping functionality.

- *Strategy 3: Provide more detailed visitor management information online.*
The project team created an example design for individual recreation sites that incorporates a description of parking, including the number of spaces, peak times, and the availability of overflow parking, and links to traveler information pages on the Washington Department of Transportation (WSDOT) website.
- *Strategy 4: Integrate MBSNF traveler information with WSDOT systems.*
WSDOT provides extensive traveler information, much of it in real-time, through its statewide 511 travel information system and its website. While MBSNF does not have real-time information to contribute to the system, it could provide information on predicted congestion levels and/or parking availability by time of day, day of the week, and season.
- *Strategy 5: Utilize mobile applications to provide traveler information.*
Creating a MBSNF-specific mobile application or mobile site, or coordinating with partner organizations to integrate MBSNF information into an existing mobile application, will help meet the needs of visitors who desire access to accurate information while en-route.

I-90 Transit Feasibility Assessment

Based on outcomes from Phase I, the Volpe Center completed an assessment of transit feasibility along the I-90 corridor between Seattle and Snoqualmie Pass. When considering transit and evaluating the feasibility of potential routes, the project team considered a number of factors that affect all types of transit service (ridership, cost, operating models, convenience), as well as those specific to the I-90 corridor.

One major consideration is the Forest's approach to managing parking, which until recently has not been a Forest priority. While the project team identified several opportunities to pilot new transit service, all opportunities hinge on the Forest's ability to introduce transit in conjunction with a stronger visitation management program that addresses parking.

The report illustrates eight fixed-route transit alternatives for consideration, categorized by the purpose of the service.

- Two winter circulator alternatives help to manage access at ski areas and sno-parks in the Snoqualmie Pass area.
- Three summer circulator alternatives help to manage access at popular destinations in the Denny Creek area.
- Three year-round shuttle alternatives help to provide access to the Forest (Denny Creek in summer; Snoqualmie Pass in winter) from the cities of Seattle and Issaquah.

The report also provides information for a shared-use vehicle program, an alternative to fixed-route transit that encourages organizations that work directly with MBSNF's underserved populations to share responsibility for a passenger vehicle that can carry groups to the Forest.

All transit recommendations rely on partnerships with key stakeholders and transportation providers. Using a phased approach, the report recommends five actions for implementation.

- Phase 1: Expand current Summit at Snoqualmie circulator operations with a two year pilot project that includes nearby sno-parks.
- Phase 2: Develop official MBSNF guidance and support system for creating a shared-use vehicle program for use by regional non-profits and other interested partners.
- Phase 3: Pilot a winter shuttle from Seattle to Snoqualmie Pass via I-90, emphasizing connectivity with the circulator service introduced in Phase 1.
- Phase 4: Pilot a summer shuttle from Seattle and a Denny Creek circulator together.
- Phase 5: Engage communities and recreational interests along the I-90 corridor and promote recreation-based transit connectivity with the I-90 shuttle implemented in Phases 3 and 4.

Next Steps

The report presents several next steps that are immediately implementable and will continue the momentum that MBSNF has established in its pursuit of alternative transportation.

- Conduct a Parking Management Impact Assessment that identifies the financial costs and benefits of restructuring current Forest parking policies.
- Continue traveler information improvement, including the implementation of a web-based map tool on the MBSNF website showing road and trail conditions and closures.
- Conduct a webinar for all project stakeholders to discuss alternatives, recommendations and next steps.
- Re-engage Summit at Snoqualmie to discuss partnership opportunities. Prepare to submit applications for Federal funding as calls for submission are released.
- Begin outreach with major regional stakeholders and corporate entities to foster future transit partnerships.

I. Introduction

Mount Baker-Snoqualmie National Forest (MBSNF or the Forest) is located in close proximity to the Puget Sound region in western Washington State. In 2008, the Forest received an alternative transportation planning grant from the Federal Transit Administration's (FTA) Paul S. Sarbanes Transit in Parks (TRIP) Program¹. MBSNF applied for the grant for the following reasons, defined as goals of the study:

- Examine visitor use trends and transportation issues;
- Engage stakeholders and explore partnership opportunities for alternative transportation implementation;
- Improve travel options and information about travel options; and
- Identify options for additional alternative transportation planning or implementation projects.

The study was divided into two phases. Phase I was the scoping phase and was conducted from May 2011 to January 2012. Phase II carried out the strategies recommended from Phase I, and its results are documented in this report.

1.1 Phase I Recap

The purpose of Phase I was to identify how the bulk of the TRIP planning grant could be best used, given the multiple highway corridors within the Forest, the various issues, and the limited resources of the Forest and its partners. The Phase I Final Report² defines alternative transportation, describes activities that led to the TRIP grant, and documents Phase I activities, including goal identification, data assessment, stakeholder meetings, and development of a statement of work for Phase II. Phase I covered four highway corridors within MBSNF: State Route (SR) 542, U.S. Route 2 (US-2), Interstate 90 (I-90), and SR 410 (see Figure 1).

In addition to the general study goals listed above, Phase I identified six additional transportation-specific goals that could be used to identify strategies and evaluate recommendations in Phase II (Table 1).

¹ The TRIP program was an annual grant program that distributed roughly \$25 million to parks and public lands for planning and implementation of alternative transportation systems. Alternative transportation systems eligible for the TRIP program had to provide transportation benefits (as opposed to solely recreational benefits) and had to provide alternatives to travel in privately owned vehicles.

² U.S. DOT Volpe Center. [Mount Baker - Snoqualmie National Forest Alternative Transportation Feasibility Study, Phase I Final Report](#). May 2012.

Figure 1: Phase I Corridors from North to South – SR 542, US-2, I-90, and SR 410

Source: U.S. Forest Service

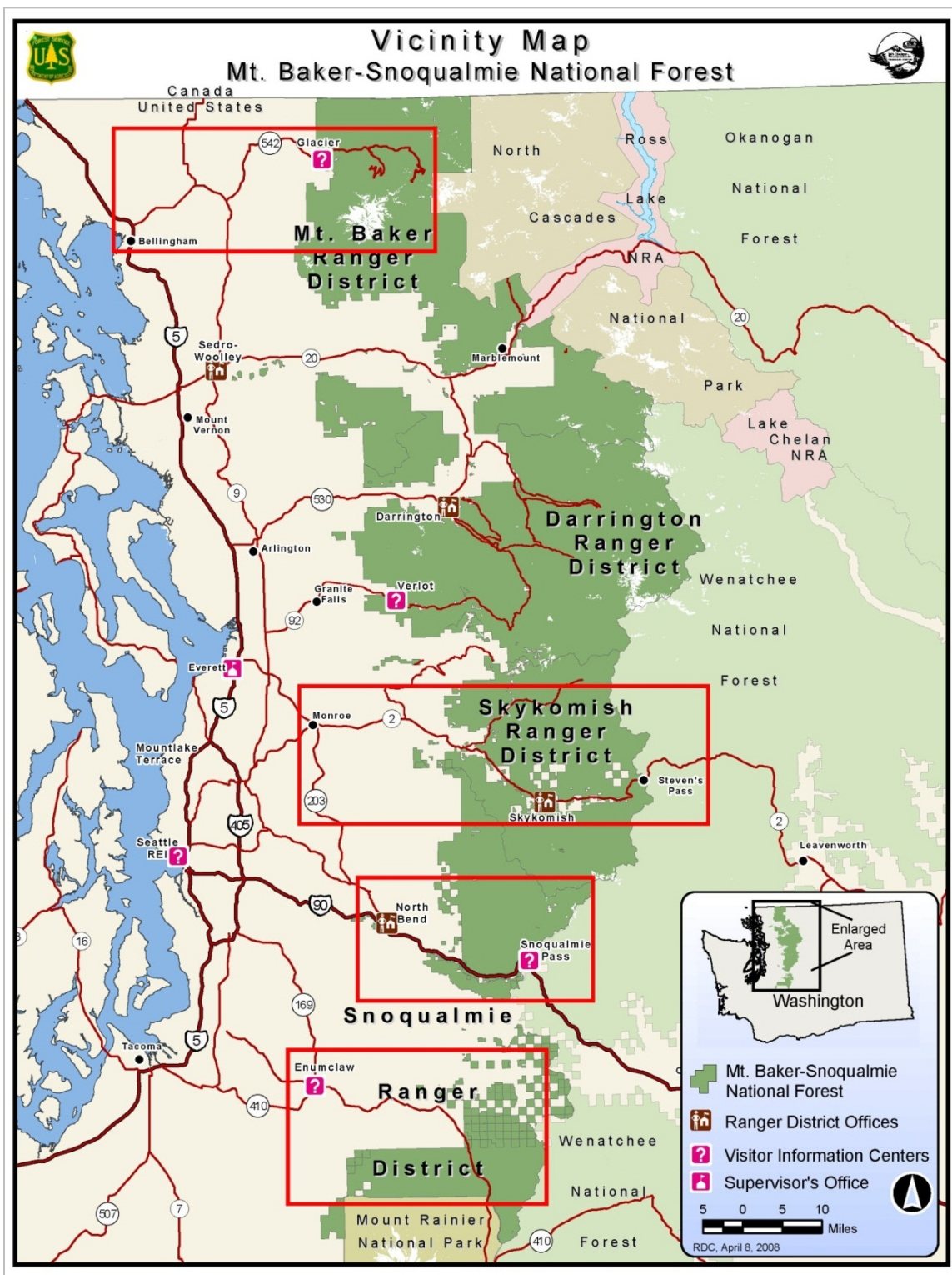


Table 1: Transportation Goals Identified in Phase I

Transportation Goal	Goal Description
Visitor experience	Provide a range of outdoor recreational experiences that are safe, convenient, and attractive to access.
Resource protection	Protect natural resources from everyday physical damage and wear-and-tear by exceeding carrying capacity as well as from activities that contribute to long-term issues such as air pollution and climate change.
Access to all	Increase access by underrepresented and underserved populations and youth, particularly those in urban areas, by providing alternative transportation options.
Partnership and community support	Consider implications of Forest actions on the economic vitality of local communities and work with communities to address issues together.
Safe, economically and environmentally sound transportation system	Invest in actions that develop a multimodal transportation system that is safe and sustainable.
Coordination with others	Participate in local, regional, and transportation planning to support Forest goals.

Phase I concluded with recommendations for work in Phase II and a statement of work to help guide the effort. With agreement from MBSNF, the team outlined four tasks:

- (1) Stakeholder and Public Outreach Strategy;
- (2) Data Collection and Analysis;
- (3) Traveler Information Assessment; and
- (4) Transit Feasibility Assessment for I-90.

1.2 Overview of Phase II and organization of this document

Beginning in June 2012, the project team carried out the four tasks identified in Phase I. An overview of these tasks, their intentions, and their respective deliverables are discussed in this section.

1.2.1 Task 1: Stakeholder and Public Outreach Strategy

The Stakeholder and Public Outreach Strategy was a continuation of an effort from Phase I to engage members of the transportation community and inform them of project developments. The outreach process included follow-up stakeholder meetings for each of

the four initial corridors, targeted stakeholder meetings with agencies and organizations that are closely tied to the I-90 corridor, and management of a project website available for the general public to access.

1.2.2 Task 2: Data Collection and Analysis

The project team collected and analyzed data to support the assessments discussed in Sections 1.2.3 and 1.2.4. Each of these efforts contributed valuable information, and the project team delivered interim reports, attached as appendices to this document, to MBSNF for review and feedback. The reports are:

- Appendix A: Existing Traveler Information Sources and Gaps Analysis
- Appendix B: I-90 Transit Feasibility Existing Conditions Report
- Appendix C: Case Studies
- Appendix D: Visitation Management Group Memorandum

The following paragraphs provide summaries of each report, including key findings.

Existing Traveler Information Sources and Gaps Analysis

The Existing Traveler Information Sources and Gaps Analysis (Appendix A) provides an overview of the sources of traveler information that are currently available for four major corridors through the Forest and identifies gaps in the existing traveler information network. This information, which is summarized in Chapter 2, informed subsequent recommendations to improve traveler information.

While the breadth of traveler information for the four transportation corridors is abundant, several important gaps in both the regional and Forest-specific information network exist. At the regional level, the lack of cross-jurisdictional information requires travelers to visit multiple websites and sources to obtain information for their entire trip within the MBSNF-region. Information gaps specific to the MBSNF include a lack of spatial presentation of information, detailed parking information, and real-time information for Forest roads.

I-90 Transit Feasibility Existing Conditions Report

The I-90 Transit Feasibility Existing Conditions Report (Appendix B) lays the foundation for the I-90 Transit Feasibility Study by assessing the condition of existing programs, facilities, and other factors that may impact transit feasibility. By laying this foundation, it helps to ensure that any future transit solutions are compatible with regional transportation initiatives and identifies all opportunities for collaboration with transportation stakeholders in the corridor.

Key findings from the I-90 Transit Feasibility Existing Conditions Report include:

Data Collection

- A summer parking occupancy analysis reveals that several MBSNF parking areas within the I-90 corridor are at or over capacity during an average August weekend. The parking shortage at the Denny Creek/Franklin Falls trailhead is notably extreme, hampering circulation in the area and resulting in safety and environmental concerns.
- A winter parking occupancy analysis shows that visitation is high during an average February weekend, and that Summit at Snoqualmie ski area parking facilities are managed via on-the-ground ski area employees. The ski area also operates the Summit Shuttle, a small fleet of buses that carries visitors from remote parking areas to four distinct base facilities. Parking at the Hyak Sno-Park, managed by Washington State Parks (WSP), is also managed, and overflow parking is not allowed once the parking area is full. At other established facilities and impromptu snow play areas, as well as backcountry access points, parking is not regulated.

Transit

- The Issaquah Transit Center is a multimodal transportation facility that opened in 2008. Owned and operated by Sound Transit, with regular weekday service by several King County Metro Transit and Sound Transit bus routes, the transit center offers bus shelters, bicycle lockers, and proximity to I-90. The facility may be able to accommodate an increase in traffic, especially on weekends.
- King County Metro Transit currently operates regular weekend and weekday service to Issaquah and the Issaquah Transit Center from downtown Seattle. Its service east of Issaquah is minimal, targeting weekday commuters as far east as North Bend.
- Operated out of the Mount Si Senior Center in North Bend, Snoqualmie Valley Transportation (SVT) is primarily an on-demand transportation program designed to meet the local transportation needs of residents in the Snoqualmie Valley. In 2013, SVT began operating its first fixed route, which connects North Bend with the town of Duvall to the north. This new service is largely funded by King County Metro Transit.
- Several private companies offer charter bus transportation to the Summit at Snoqualmie during ski season.

Destinations

- In addition to MBSNF, multiple organizations own and operate recreation facilities in eastern King County. King County Parks and Recreation, the city of

Seattle, King County Natural Resources and Parks Department, Washington State Department of Natural Resources (DNR), and Washington State Parks are the biggest players in terms of public land owned and facilities operated.

- The Denny Creek and the Snoqualmie Pass areas within the I-90 study area are potential transportation hubs for MBSNF for many reasons. The Denny Creek area includes a variety of facilities and recreation opportunities, several popular trailheads, natural beauty, and is bounded by the eastbound and westbound lanes of I-90. The Snoqualmie Pass area includes a large amount of unused surface parking during summer months, the presence of a seasonal public service center, and the proximity to non-Forest facilities (hotel, restaurant, and convenience store).

Case Studies

Early in the study, the project team identified five transportation programs around the country that could offer valuable lessons to inform the consideration of transportation solutions. The programs were chosen based on potential parallels to future transit at MBSNF. The case studies of these programs investigated travel characteristics, access management strategies, operating models, and relationships to gateway communities. Each case study (Appendix C) discusses the background, operations, and lessons learned by the organizations that operate these services.

Key findings from the case studies include:

- The Maroon Bells shuttle is a successful recreation-based bus service operated by a public transit agency in partnership with the White River National Forest in Colorado. This program is an example of completely restricting private automobiles at a popular, environmentally sensitive recreation area, meaning all visitors must arrive by transit.
- The Appalachian Mountain Club, a nonprofit outdoor organization, operates a hiker shuttle within the White Mountain National Forest to serve the Club's system of backcountry accommodations. This program provides an example of a self-sufficient trailhead transit service, with operating costs covered by fares. The shuttle service features both fixed-route and on-demand transit characteristics.
- The Sequoia Shuttle is a transit program that provides service to and within Sequoia National Park in California. The system, operated under a cooperative agreement by a local transit agency, is an example of a long-haul bus service that travels from the city of Visalia and connects to a circulator service that operates inside the park.
- The King County Metro Rideshare Program is a division of King County Metro Transit, Seattle's primary public transit provider. The Rideshare program, which is aimed at weekday commuters who are not served by fixed-route transit, allows small groups of commuters with similar travel behaviors to travel in a county-

owned passenger van. While King County pays for fuel, maintenance, and program administration, commuters pay a fare to participate that cover the costs of the program.

- The Mountain Express Bus, operated by a public transit agency, began an expanded service in fall 2013 to destinations within Mount Hood National Forest. This service provides an example of building off an existing, local service and leveraging various funding sources, including Federal grants, local government, and private entities. In addition, the organizations involved have formed a formal alliance to coordinate transportation planning for the region.

Visitation Management Group

The project team recognized that while alternative transportation may be part of the solution to MBSNF's visitation and access management concerns, it also is important to acknowledge the ways in which transportation decisions impact Forest management decisions, and vice versa. In order to address this dynamic, the team sought a better understanding of the carrying capacity for each destination within the I-90 corridor. To help with this effort, MBSNF convened a Visitation Management Group to discuss and estimate the carrying capacity of recreation sites in the Forest, including the trails and trailheads that serve them. Using information from these discussions, the Transit Feasibility Team also created a Visitation Management Tool (Appendix D) to help the Forest evaluate visitor behavior and compare carrying capacities of facilities and destinations within the I-90 corridor.

Key findings from the Visitation Management Group include:

- At many of the smaller parking areas within the I-90 corridor, MBSNF currently allows vehicles to park along nearby road shoulders when the parking area is full.
- MBSNF and its law enforcement are not currently equipped to closely regulate parking. Rather, the Forest tends to focus on "hardening" or expanding facilities that are most popular to visitors. Hardening refers to the strengthening and toughening of facilities to withstand high volumes of visitors.
- Trailheads that serve multiple trails with a diversity of activities tend to attract higher volumes of people. In some cases, the capacity of a trailhead parking area is inconsistent with the capacity of the trail network.

1.2.3 Task 3: Regional Traveler Information Assessment

Delivering five strategies for consideration by MBSNF for near-term implementation, the Regional Traveler Information Assessment is included as Chapter 2 of this document. The purpose of the Regional Traveler Information Assessment is to consider how best to (1) promote alternative transportation options and (2) provide information that will inform

behavior in terms of where, when, and how visitors access the MBSNF to address congestion and parking issues.

1.2.4 Task 4: Transit Feasibility Assessment for I-90

Presented in Chapter 3 of this document, the Transit Feasibility Assessment identifies and evaluates potential transit service for the I-90 corridor to provide convenient, affordable, and alternative access to the general public and specific disadvantaged populations. In addition to traditional fixed-route transit service, the assessment also investigates opportunities for a shared-vehicle program that targets local organizations that work directly with disadvantaged populations in the Puget Sound region.

1.2.5 Next Steps

The final chapter of the document takes all completed tasks and presents a series of steps that MBSNF will need to take in order to move the project team's recommendations toward implementation.

II. Regional Traveler Information Assessment

Traveler information is a key transportation feature that facilitates visitor travel to and within the Forest. Providing timely and accurate information allows travelers to make informed decisions based on site traffic and road conditions, facility closures, weather conditions, parking availability and available alternative transportation options. Traveler information can also be used to manage issues such as traffic and/or trail congestion and limited parking capacity.

In Phase I, stakeholders identified limited, fragmented, and hidden traveler information as a problem. These stakeholders noted that visitors would benefit from improved information in a number of ways, including increased options and awareness of options, reduced experience with overcrowding and congestion, and enhanced educational resources.

2.1 Existing Traveler Information Sources

Based on recommendations from Phase I, the Volpe Center completed an assessment of the sources of traveler information that are currently available for four major corridors through the Forest. The following section provides a summary of the key findings from the traveler information assessment. See Appendix A for the full Traveler Information Existing Condition and Gaps Analysis report.

A number of organizations, including the Forest, and other public and private groups, provide traveler information for activities along the four travel corridors of SR 542, US-2, I-90, and SR 410. (See Appendix A for detailed information on sources of traveler information.) Visitors to MBSNF currently use a range of resources to help plan their trip. Compared to repeat visitors, a significantly higher proportion of first-time visitors to sites along the I-90 corridor rely on the MBSNF website to plan their trip, in terms of when and where to go. Another commonly reported source for information for those traveling along the I-90 corridor were partner agency websites, such as the Washington Trails Association and the Pacific Crest Trail Association. Compared to summer visitors, a higher percentage of winter visitors used the Washington State Department of Transportation (WSDOT's) website for trip planning.

Currently, MBSNF provides traveler information, such as trip planning, driving directions, road and trail conditions, and recreational opportunities, through multiple venues, including its website, printed materials, social media outlets, and via staff at ranger stations and visitor centers. Similarly, the WSDOT provides robust traveler information using a variety of formats. The agency operates a number of Intelligent Transportation Systems (ITS) technologies that helps it manage its roadways and provide important traveler information to the public. These systems include an extensive network of traffic cameras, variable message signs (VMS), highway advisory radio (HAR), road/weather information

systems, and traffic data collectors. WSDOT disseminates traveler information through its website and the statewide 511 traveler information system.

Additional entities, such as county governments, regional planning organizations, non-profit organizations, and membership groups provide traveler information geared to their individual users and audience. Table 2 provides a summary of the existing traveler information available for the four corridors in the study area.

Mount Baker-Snoqualmie National Forest Alternative Transportation Feasibility Study – Phase II

Table 2: Summary of Existing Traveler Information

Organization	Corridor				Real-Time Traffic	Real-Time Transit	Static Transit Information	Site Conditions	Road Conditions	Weather Conditions	Other/Notes
	SR 542	US-2	I-90	SR 410							
MBSNF	X	X	X	X				X	X	X	Popular hiking trails
Northwest Avalanche Center	X	X	X	X				X		X	Avalanche forecasts, accident information
Washington DOT	X	X	X	X	X				X	X	HAR, VMS, webcams, predicted travel volumes for key weekends
511 Traveler Information	X	X	X	X	X				X		
King County		X	X	X	X	<i>Via Link</i>	X		X		Bike map
Snohomish County		X							X		
Whatcom County	X								X		
Puget Sound Regional Council	X	X	X		<i>Via Link</i>	<i>Via Link</i>	<i>Via Link</i>		<i>Via Link</i>		
Regional Public Information Network	X	X	X	X					X		
Washington State Parks	X	X	X	X							Parking/Driving Directions
Hoodoo	X	X	X	X				X		<i>Via Link</i>	Campsite Details
America's Byways		X	X	X					<i>Via Link</i>		Recommended trip itineraries
Chinook Scenic Byway				X					<i>Via Link</i>	<i>Via Link</i>	Activities/ points of interest
Cascade Loop Scenic Highway		X									Recommended trip itineraries. Hiking trails, Webcams, Mobile App
Rideshare Online			X								Carpooling/ Ridesharing
Ski Areas	X	X	X	X							
The Mountaineers	X	X	X	X					<i>Via Link</i>	<i>Via Link</i>	

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Nooksack Nordic Ski Club	X				Via Link			X	Via Link	Via Link	Carpooling
Washington Trails Association	X	X	X	X							Hike finder, Mobile App
Organization	Corridor				Real-Time Traffic	Real-Time Transit	Static Transit Information	Site Conditions	Road Conditions	Weather Conditions	Other/Notes
	SR 542	US-2	I-90	SR 410							
Pacific Crest Trail Association	X	X	X	X				X		X	
Baker-Birch Bay	X										Activities/points of interest
Mountains to Sound Greenway			X								
TheSkiLift.org	X	X	X	X							Carpooling/ Ridesharing
Turns-All-Year	X	X	X	X				X	Via Link	Via Link	

2.2 Information Gaps

While the breadth of traveler information for the four transportation corridors is abundant, several important gaps in both the regional and Forest-specific information network exist. This section summarizes the gaps in both the regional and Forest information networks (see Appendix A for the full report on the information gap analysis).

Regional gaps in the traveler information network include:

- *Lack of cross-jurisdictional information:* As the previous section highlighted, there are numerous jurisdiction-specific sources of traveler information for the MBSNF region, yet there is no one-stop source for information for the transportation network system-wide. For example, WSDOT primarily provides information for state routes and highways, but does not include information about Forest or county roads. As a result, travelers need to visit multiple websites to obtain information for the entire trip. Some sites address this information segmentation by providing links to the external sites. However, the MBSNF site has only limited links to other information sources.

Information gaps specific to the MBSNF include:

- *Lack of spatial presentation of information:* Much of the traveler information on MBSNF's website is described with text and does not include a spatial component. For example, the road and trail status information is listed in a table format, with a separate table for each recreation area. The table format may not be the most effective way to present this information, particularly for visitors who are unfamiliar with the Forest road network.
- *Lack of detailed parking information:* The MBSNF website provides limited information on the parking facilities for the various recreation areas throughout the Forest. The driving directions on some of the individual trail/site pages list information on the location of the parking lot; however, this information does not include the number of spaces available or alternative parking options if the primary parking lot is full. In addition, there is limited signage at the sites directing travelers to other nearby parking locations.
- *Lack of real-time information for Forest roads:* The MBSNF does not provide any real-time information on the traffic or parking conditions for Forest roadways. However, the Forest's ability to provide real-time information is limited by several factors. Most areas of the Forest lack cell phone and internet connectivity. As a result, any real-time information that is made available via the internet cannot reach users when they are actually in the forest. In addition, staff are limited in their ability to collect data and distribute it. Limited staffing determines the frequency of updates and can bottleneck the process.

2.3 Recommended Strategies to Enhance Traveler Information

The project team identified an initial list of recommended strategies to address the existing regional traveler information gaps. Through coordination with the Forest Service, the team identified the following five priority strategies to address the gaps and improve traveler information for the four corridors:

- Strategy 1: Spatially Display the Road/Trail Status Information
- Strategy 2: Add a Spatial Component to the Trip Planning Page
- Strategy 3: Provide More Detailed Visitor Management Information Online
- Strategy 4: Integrate MBSNF traveler information with WSDOT systems
- Strategy 5: Utilize mobile applications to provide traveler information

The following section provides details on the five strategies and associated recommended next steps.

Strategy 1: Spatially Display the Road/Trail Status Information

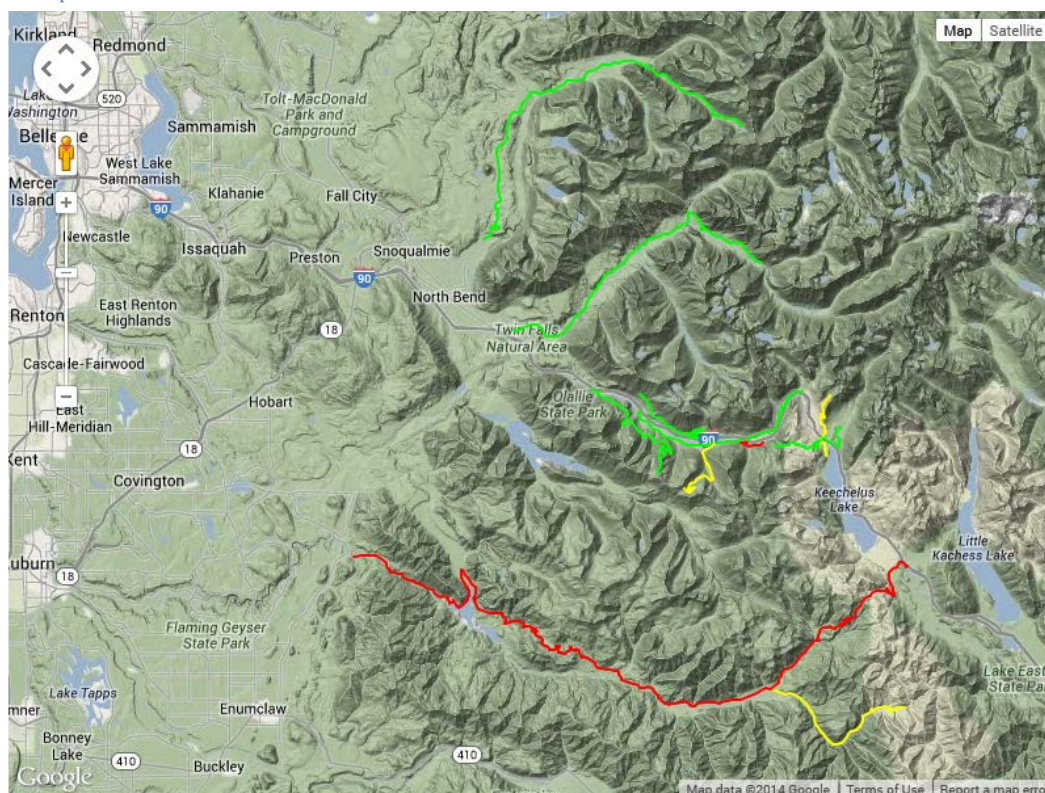
The MBSNF website displays the [road and trail status](#) information in a table format, with a separate table for each recreation area. The table format may not be the most effective way to present this information, particularly for visitors who are unfamiliar with the Forest road network. The Volpe Center created maps to spatially display the road/trail status information for the I-90 corridor. The maps use Google Fusion Tables, a Google online database that allows users to easily combine, display, and share data. The maps and public-facing tables can be readily embedded into the existing road and trail status pages on the MBSNF website.

Recommended Next Step

1. Complete road and trail status maps for the seven additional travel corridors within MBSNF and embed associated maps into the corresponding road and trail status pages on the MBSNF website.

Figure 2: Road Condition Status Map

Source: Volpe Center



Road Number	Road Name	Surface Type	Number of Lanes	Status	Status Detail	Status Updated
4832	Rocky Run	Paved/Gravel	2	OPEN	You can drive through the interstate construction on the way to the Okanogan Wenatchee National Forest. Snow level is around 3,200 feet.	8/16/13
4832/142	Gold Creek	Gravel	1	OPEN		8/16/13

Strategy 2: Add a Spatial Component to the Trip Planning Page

The [Trip Planning](#) page on the MBSNF website links users to information about campgrounds, trails, points of interest, scenic byways, and other recreation opportunities available in each of the recreation areas. Currently, the recreation areas (i.e., travel corridors) are listed by name only. As mentioned in the Information Gaps section, this format may not be the most effective way to present this information, particularly for visitors who are unfamiliar with the regional road network.

The Volpe Center developed a new design for the Trip Planning page (Figure 3) that includes a spatial component. This component has markers that correspond to the travel corridor so that users can easily identify the location of a roadway within the MBSNF region.

Figure 3: New design for Trip Planning page

Source: USFS and Volpe Center



Strategy 3: Provide More Detailed Visitor Management Information Online

While the existing MBSNF website provides a wealth of information about trails and recreation facilities, there is little information regarding visitor/access management. For example, parking facilities at many trailheads are known to reach capacity during the peak

months of summer and winter, but this information is not exhibited on the website. In fact, the Forest knows a significant amount about usage patterns, and with relatively minimal resources, this information can be displayed in a manner that would help manage visitation and parking.

The Volpe Center identified two options to provide more visitor management information to the MBSNF website:

Option A: Additional Content – Same Design

By providing additional information on parking and traffic conditions, the MBSNF can passively manage access and encourage visitors to explore less congested trails and destinations. The Volpe Center recommends that the MBSNF add the following content to the individual recreation sites' webpages:

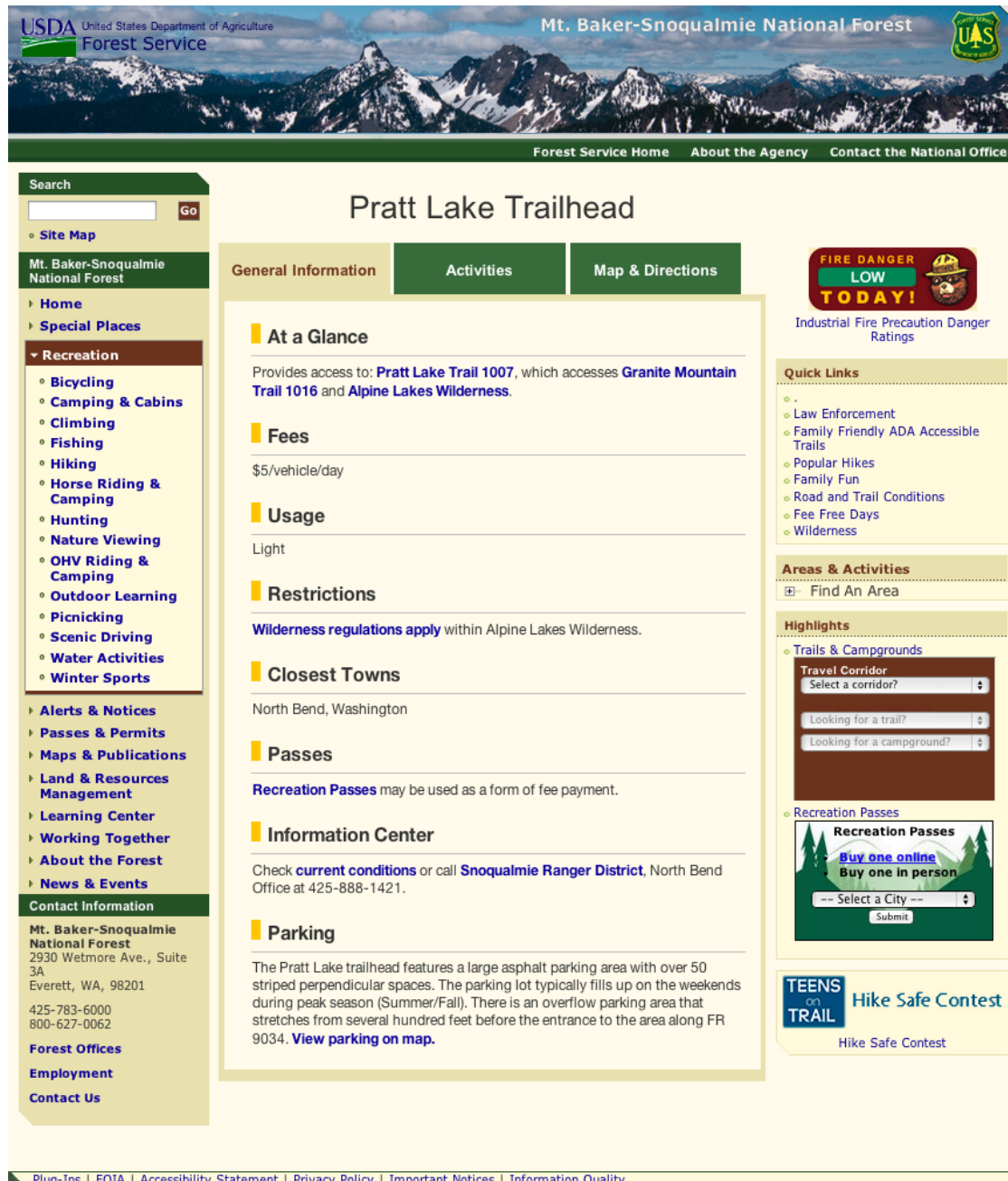
- A description of the parking available at the site, including the number of spaces, peak times, and the availability of overflow parking.
- A link to traveler information pages on the WSDOT website.
- A link to the associated Road and Trail Conditions page on the MBSNF website.

Option B: Additional Content – New Design

The project team also created a new design for individual recreation sites to streamline the user interface and emphasize the importance of each piece of information presented (Figure 4). This new design divides the content into the tabs; general information; activities; and map & directions.

Figure 4: New design for Recreation Site page

Source: USFS and Volpe Center



Strategy 4: Integrate MBSNF traveler information with WSDOT systems

The WSDOT maintains a statewide 511 travel information system whereby users may dial the toll-free “511” number to receive information on travel conditions throughout the state. The agency also provides extensive traveler information through its website. Much of the traveler information provided by WSDOT is in real-time (e.g., roadway incidents and traffic conditions). While the MBSNF does not have real-time information to contribute to the

system, it could provide information on predicted congestion levels and/or parking availability by time of day, day of the week, or season.

Recommended next steps:

1. Articulate the specific Forest-related traveler information to include in the WSDOT traveler information/511 systems. Convene a working group of the appropriate MBSNF staff to identify what information can/should be integrated into the WSDOT resources.
2. Schedule a meeting with WSDOT to discuss opportunities and data needs.

Strategy 5: Utilize mobile applications to provide traveler information

The public's increasing reliance on smartphones enabled with Global Positioning System (GPS) is changing their expectations for being able to quickly access real-time, accurate, and relevant information. A mobile device application (app) is a computer software program designed to run on internet access, Wi-Fi, and/or GPS-enabled mobile handheld devices such as smartphones and tablets. A growing number of tourism and recreation sites are developing mobile device apps to disseminate information to visitors.

Creating a MBSNF-specific mobile app would provide the Forest with the greatest ability to tailor a given resource to its visitors' needs. For example, an MBSNF mobile app can be designed to provide site-specific information (trail guides, camping site details, etc.), directions, and estimated travel times. The cost to have a professional develop a mobile app could range from \$10,000 to \$100,000 depending upon the scale and scope of the app. However, some entities, such as the Washington Trails Association (WTA), rely on volunteers to help develop mobile apps, thereby reducing the overall project costs.

The Chattahoochee-Oconee National Forest (CONF) in Georgia developed the first, and thus far, only Forest Service mobile app. The CONF developed the mobile app in response to the dramatic increase in the number of users using mobile devices to connect to the CONF website. The mobile app, which was developed by an external developer for \$15,000, is one component of the CONF's recreation marketing strategy designed to direct users to recreation sites that the Forest has prioritized and plans to maintain (due to reduced budgets, the Forest is unable to maintain all sites). The CONF mobile app includes 50 recreation sites and provides information about their facilities.

Recommended next steps

1. Actively coordinate with partner organizations to integrate MBSNF information into their existing mobile apps. Specifically, the Forest should identify sites for which it wants to encourage visitation, and coordinate with its partner organizations to

ensure that those sites are featured in the mobile app. The following partner organizations currently provide mobile apps that include Forest sites:

- Cascade Loop Scenic Highway: This free mobile app provides information on attractions and activities along the Cascade Loop. The app features a search directory, an interactive map, events calendar, and travel journal. The app currently features hikes/trails that are underutilized or that are accessible for the average person. Several Forest trails are included in the mobile app.
 - WTA Trailblazer App: This free mobile app features trail amenities, maps and directions, events and weather alerts, and a GPS mapping feature. Users can search for trails, check trail conditions, and get driving directions to trailheads (via Google maps or Apple maps). Several Forest trails are included in the mobile app.
2. Release raw data directly to the public through web services to enable citizen developers to create mobile apps that help the public access the Forest. The data can be shared with the public through bulk access to static data files (e.g., ArcGIS shapefiles) and through live web mapping feeds, such as the Google Maps API (Application Programming Interface).

III. Transit Feasibility for the I-90 Corridor

Based on recommendations from Phase I, the Volpe Center completed an assessment of transit feasibility along the I-90 corridor between Seattle and Snoqualmie Pass. The decision to focus on I-90 resulted from addressing the underlying problems associated with the Forest's transportation goals (Table 1) in conjunction with identifying opportunities that increase the potential for success in implementation.

When examined relative to the Forest's transportation goals, all of the corridors studied in Phase I compared similarly based on underlying problems. Overtaxed parking facilities, unbalanced visitation patterns, and a lack of diversity among visitors are consistent throughout the Forest. However, opportunities associated with I-90 relative to achieving these goals resulted in the decision to focus on this corridor.

- MBSNF destinations along the I-90 corridor are among the most accessible from the Seattle metropolitan area, which has a high population density, is central to the Forest's underserved populations, and is highly connected to existing alternative transportation systems.
- The I-90 corridor falls entirely within King County, whose government is responsible for operating the region's largest transit system, King County Metro.
- Due to its high capacity, I-90 is less frequently congested than other Forest highway corridors, allowing transport vehicles such as buses and vans to travel at higher speeds.
- There is a wide variety of recreation facilities within the I-90 corridor. Within MBSNF, there are many frontcountry destinations (picnic areas, campgrounds, nature trails, etc.) and many trailheads leading to wilderness/backcountry destinations. Closer to Seattle, there are many other non-USFS outdoor recreation opportunities as well.
- Planning and transportation activities along I-90 are supported by a variety of agencies and major organizations, increasing the potential for partnerships.

3.1 General Transit Service Considerations

When considering transit and evaluating the feasibility of potential routes, the project team considered a number of factors that affect all types of transit service. The following section broadly presents these considerations and discusses the associated challenges and opportunities for each.

Ridership

The paramount concern for any transit service is whether there will be enough ridership to support and justify its provision. The project team assessed alternatives in terms of various factors that contribute to demand, in concert with considering the purpose of the service and all other factors discussed below. The team assessed costs per passenger based on

whether a hypothetical 15-passenger vehicle carries 5, 10, or 15 passengers. This helps illustrate the significant cost difference in operating a widely-used transit service with full vehicles versus a rarely used transit service with empty vehicles.

Cost

For most passengers who have a choice to drive or take transit, the cost of transit must be comparable or less expensive than the cost to drive. Fuel, parking costs (such as the Northwest Forest pass), and vehicle depreciation all factor into the cost of a car trip, whereas with transit, a fare is often a passenger's primary expense. The price that a passenger is willing to pay may vary, however, depending on quality of experience and convenience, discussed below.

Quality of Experience

Positive rider experience is important when evaluating a transit system's success. If a transit experience is pleasant, a potential passenger may overlook higher cost or less convenience. Transit service also allows for large groups to travel together, and there may be opportunities to enhance visitor experience through on-vehicle interpretation. A high quality visitor experience can lead to the transit service becoming an attraction in and of itself (not unlike a scenic railroad or a bus tour), drawing passengers who are interested in a more immersive visit to the Forest. Other amenities common on long-distance bus routes include high-speed internet and in-vehicle entertainment systems.

Convenience

Convenient transit service is easily accessible, runs on schedule, is easy to navigate, requires a minimal amount of pre-trip planning, and operates at times that are in line with travelers' needs. It is difficult for transit to match the convenience of driving unless parking at a destination is inconvenient, expensive, or prohibited. Therefore, transit must be as convenient as possible for the greatest number of potential riders, and other factors such as cost and quality of experience must be taken into account when determining a visitor's transportation needs.

Funding

Funding for transportation is a constant challenge, and traditional fixed-route transit is an even more difficult proposition. When it is considered a public service, transit providers usually strive to make their services affordable to all segments of the population. The result is that passenger fares rarely cover the cost of operations. Transit providers must look elsewhere to pay for capital and operations costs, frequently employing multiple strategies such as state and federal grants, advertisements, state/municipal levies, and public-private partnerships.

Many transportation experts would agree that, when compared to capital expenses, funding for transit operations is a much bigger challenge for transit providers over the long term. As a result, most government discretionary grant programs fund capital expenses for organizations that have solid, long-term, operations-based funding streams. A public agency that is able to demonstrate long-term financial commitment to operations will have a better change of tapping into federal resources to fund capital projects (such as vehicle acquisition or facility improvement). This commitment can be demonstrated through partnerships with existing transportation providers, particularly with the incentive of joining forces with a federal partner that has access to programs that fund capital improvements.

Marketing and Branding

A strong advertising program is essential to a transit system's viability. Often one of the most overlooked areas of a transit project, a targeted, long-term marketing campaign help to publicize the service and informs travelers of transportation options of which they may not be aware. A strong marketing campaign must include appropriate branding of the service, as well as a multi-faceted approach to disseminating traveler information such as maps, schedules, how-to-ride information, and trip planning.

Branding is an important part of establishing an identity for a transit system, not only for general exposure but also to bolster travel confidence among its passengers. Therefore, traveler information and wayfinding are important considerations. By developing accessible materials with regard to design and function, passengers become familiar with the system-wide signage and messaging, building assurance that the transit service will safely and comfortably take them to their destination.

Partnership Opportunities

It is a major endeavor, particularly for public lands management agencies, to manage, operate, maintain, and promote transit service. Therefore, many public lands have found that partnerships are key to the feasibility and sustainability of transit service. Partners can be transportation providers, funders, volunteer groups, promoters, potential users, and other stakeholders. While larger partnerships usually require stronger oversight, the benefits of joining forces far outweigh the increased administrative burden.

Multimodal Connectivity

Any transportation system functions best when strategically connected to the greater transportation network of an area or region. In the case of transit, this means taking advantage of:

- Transit services and facilities, such as transit routes and hubs, park-and-ride facilities, bus shelters, and transit-friendly development.

- Private automobile facilities, including safe parking areas and access to major routes/highways.
- Bicycle facilities, including local and regional trails, bicycle racks on buses, and bicycle parking at important destinations.
- Pedestrian facilities, such as sidewalks, crosswalks, pedestrian-friendly development, and local and regional trails.

Physical Constraints

Many transit services utilize large vehicles, and operators must take into account any physical constraints such as bridge heights, road design, turning radii at intersections, and turn-arounds in parking areas.

Accessibility

Federal guidelines for accessibility generally require that persons with disabilities are afforded the same level of access as all users. Details vary for public lands access, but it is likely that any passenger vehicle owned and/or operated on federal lands will need to accommodate those with disabilities and mobility impairments.

Safety

Very simply, the public will generally not patronize a transit service whose safety record is in question, especially if car travel is available. In order to succeed, any bus or shuttle system must be a safe alternative to driving. In many cases, transit service can be safer than traveling by car (on dangerous roads or in winter conditions, for example), and this potential benefit should not be ignored.

3.2 Transit Considerations Specific to I-90 and MBSNF

In addition to some of the general considerations mentioned in the previous section, there are several additional unique circumstances that either directly or indirectly affect I-90 transit feasibility. This section presents some of the specific considerations for MBSNF.

3.2.1 Parking Management

Parking is a major concern at many trailheads throughout MBSNF, and those in the I-90 corridor are no exception. Designated parking areas are often full, and visitors frequently park in undesignated areas along nearby access roads. This results in unsafe conditions for pedestrians (including children), dangerous navigational conditions for emergency vehicles, degradation of roadside vegetation, and generally unpleasant conditions for a visitor seeking a pristine natural environment.

Aside from requiring all vehicles to display the Northwest Forest Pass, MBSNF does little to manage visitation in some of the most popular areas. Furthermore, the impacts of increasing regulations at certain destinations are not entirely clear. For example, in order

to manage parking, the Forest will have to consider the cost of infrastructure, signage, and enforcement. It will also need to consider the potential loss of revenue associated with limiting the number of vehicles that are able to park in certain areas. Finally, MBSNF will need to consider an array of access tools and strategies, including transit, to manage access at popular destinations while meeting visitor demand.

3.2.2 Denny Creek Parking Expansion

In summer 2013, MBSNF received a grant from the Public Lands Highways Discretionary (PLHD) program to expand parking near the Denny Creek/Franklin Falls trailheads at the intersection of FR 58 and FR 5830.³ Based on the project team’s observations, this expansion is an important improvement to the area and addresses many of the project team’s concerns related to pedestrian safety in the area. The demand for access to the Denny Creek and Franklin Falls trails, as well as the capacity of those trails, currently exceeds the available parking facilities.

Currently, the PLHD grant provides funds for the design of 107 additional private vehicle parking spaces and several large vehicle spaces to accommodate buses. At the project team’s recommendation, MBSNF ensured that the parking area design provides adequate space for maneuvering large passenger vehicles. Design staff will revise the plan to ensure that space can accommodate for future installation of bus shelters and a vehicle turn-around facility.

3.2.3 Traveler Information

Presented in Chapter 2 of this report, the project team conducted a Traveler Information Assessment for the entire MBSNF region. Though regional in scope, the Traveler Information Assessment provided some important takeaways that are directly applicable to the implementation of transit in the I-90 corridor.

Public and private entities provide many traveler information services for the I-90 corridor, both online and along the physical corridor. These are documented in the Traveler Information Assessment Existing Traveler Information Sources and Gaps Analysis (Appendix A). For example, WSDOT provides information on its website and maintains a number of traveler information services on I-90, including a traffic camera, variable message signs, highway advisory radio, and traffic data collectors. As the Forest looks to expand its technical capabilities with regard to traveler information, it will be important to coordinate with agencies like WSDOT to ensure travelers have the best available information available to them. Opportunities for expanding traveler information services are laid out in five strategies in Section 2.3 of this report.

³ <http://flh.fhwa.dot.gov/programs/plh/discretionary/awards-2012-additional.htm>

3.2.4 Visitor Information

In coordination with the Forest, West Virginia University (WVU) conducted summer and winter surveys of visitors at key I-90 sites as well as focus group discussions with both existing and potential visitors in three locations within the Seattle metropolitan area. WVU collected information on sociodemographics, visitation patterns and activities, and preferences on existing and potential transportation services, including transit. Some of the key takeaways from the resulting data are as follows:

- Visitation characteristics
 - Nearly all of the visitors to MBSNF sites along I-90 are repeat visitors (94%), local (94%), and on day trips (93%), with an average visit length of five hours.
- Visitor Characteristics
 - Visitors are mostly white (90%) and have at least a Bachelor's degree (86%), in contrast with the Seattle metropolitan area (72% white and 56% population with a Bachelor's degree or higher according to the 2010 U.S. Census and 2011 American Community Survey).
 - Visitors listed the following as the main reasons for recreating on the Forest: spending time with friends and family and getting exercise.
 - Non-white summer visitors were more likely to put the following as reasons for recreation on the Forest: spending time with family, visiting new places, and trying new activities.
- Transit preferences
 - Almost half of visitors (49%) reported they would be somewhat or very likely to use public transportation within the Forest and over a third (38%) reported the same interest in public transportation to the Forest from Seattle or another urban area.
 - Visitors expressed the highest interest in public transportation service to trailheads (55%) in the summer and to ski areas, Sno-parks, and trailheads (55%, 45%, 44%) in the winter. Less than half of visitors reported that they were not interested in public transportation to any location (44% in summer, 24% in winter).
 - For factors influencing willingness to use public transit:
 - Summer visitors listed schedule as the most important consideration, and then cost and traffic, followed by parking shortages and environmental impact.
 - Winter visitors listed parking shortages as the most important consideration, and then schedule and cost, followed by traffic, environmental impact, and weather.
 - For willingness to pay for transportation services:

- For transportation to the Forest from an urban area, a third of visitors indicated they would be willing to pay up to \$10, over a third up to \$20, and an additional 20 percent, above \$20.
- For transportation within the Forest, most visitors (63%) indicated they would be willing to pay up to \$10, with an additional 20 percent willing to pay up to \$20.
- Nearly all visitors (91%) indicated they would pay some amount for transportation to or within the Forest.
- Seasonal differences
 - Summer visitors are less diverse (92% white) than winter visitors (86% white).
 - Winter visitors expressed higher likelihood in using transit, either to the Forest (42% vs. 36%) or within the Forest (59% vs. 44%).

In addition, themes from the focus groups included these observations:

- Providing potential visitors with the opportunity to access the Forest by different transportation options is only one element of encouraging non-traditional visitors and removing barriers; offering and communicating about the range of activities and benefits of accessing the Forest are also essential.
- There are opportunities to leverage interest and resources of local nonprofits and owners of existing fleets of vans and buses to support different options.

3.3 Managing Access within MBSNF versus Providing Access to MBSNF

Based on the Forest’s transportation goals, the project team identified two categories to help frame the Forest’s motivations for pursuing transit: (1) managing access within MBSNF and (2) providing access to MBSNF. By thinking about these categories separately, the project team was able to create a framework for developing and evaluating transit alternatives, ensuring that all potential transportation alternatives will help the Forest achieve the transportation goals identified in Table 1.

3.3.1 Managing Access within MBSNF

Conceptually, managing access on MBSNF seeks to align visitor demand with the physical carrying capacity of Forest facilities and destinations. This includes parking management (discussed in Section 3.2.2), but also includes demand management for trails and destinations within the Forest, as well as supporting facilities such as restrooms, picnic shelters, and camp sites. Access management may also include developing and staffing new programs to support changes in visitor demand for different types of recreational activities.

Based on discussions with MBSNF staff and leadership, current access management practices on the Forest are minimal. Often, National Forests are thought of as “America’s Backyard”, implying that these lands are available to anyone, without restriction to access and with minimal regulation. Implementing regulatory measures may be contentious with certain user groups, and creating new programs that attract new Forest users may increase management needs. Any increase in management will be difficult to support financially, but the project team believes that in order for transit on the Forest to succeed, it must be part of a comprehensive access management program that is well connected to program development on the Forest.

The first two groups of transit alternatives presented in Sections 3.4 and 3.5 focus on managing access within the Forest. Called “circulator” routes, Alternatives 1 and 2 explore opportunities for a winter circulator, and Alternatives 3, 4, and 5 explore opportunities for a summer circulator. Each is designed to connect visitors to their travel destinations, with a focus on destinations that may benefit from access management strategies. Thus, transit can be thought of as a tool to support access management, as long as it is used in conjunction with a parking management program.

If implemented comprehensively, a circulator route in conjunction with a parking management program could help to alleviate congestion at popular trailheads and destinations, eliminate unsafe parking behavior, provide safe loading and unloading areas for large passenger vehicles, reduce erosion and damage to roadside vegetation, and manage visitation such that Forest facilities are able to accommodate demand.

3.3.2 Providing Access to MBSNF

When considering opportunities for providing access to MBSNF, the project team explored ways to transport visitors from throughout the Puget Sound region to the Forest. This category of transit relates to the Forest transportation goal to provide access to all with a focus on underserved populations, particularly those without access to a private automobile.

In considering the target population for transit, the project team identified two sub-groups, often referred to as the car-free population and the car-less population. The car-free population refers to persons who have access to an automobile but prefer to travel via other transportation modes. Those who are car-less do not have access to an automobile and are often constrained from owning and/or operating a private automobile (financially, physically, or otherwise). While the car-free population will drive if there is no convenient alternative, the car-less population does not have that option.

Assumed general differences between the car-free population and the car-less population are important, particularly as they relate to improving transportation access to underserved populations. Even if they prefer not to drive, those in the car-free population

still have that option available. Transportation would not be considered a barrier to access. If not driving a private vehicle, they might catch a ride with others, rent a car, or take an existing private shuttle in the wintertime.

Since those in the car-less population do not have access to a vehicle, the lack of transportation to the Forest would be considered a barrier to access. However, the project team posed the question to several local organizations representing members of the car-less population: “Were transportation not a barrier, would those in the car-less population seek access to MBSNF? Is visiting the Forest something that interests them, regardless of transportation?” All feedback claimed that those who are car-less currently do not think about MBSNF as an option for their recreation needs. In order to accommodate this group, MBSNF will need to consider both transportation and recreation programming in concert.

Alternatives 6, 7, and 8, described in Section 3.6, explore opportunities for a long distance fixed-route shuttle that provides access to MBSNF. In Section 3.7, Alternative 9 describes a shared-use vehicle program that may better target the car-less population by offering organized outings that are sponsored by participating agencies and/or organizations.

3.4 Transit Alternatives: Winter Circulator

The following section presents two alternatives for a winter circulator, developed to help MBSNF and partner organizations manage access at facilities in and around Snoqualmie Pass during winter months. Major winter recreation destinations in the area include the Summit at Snoqualmie (comprised of four distinct ski areas: Summit West, Summit Central, Summit East, and Alptenal), Hyak Sno-Park, Gold Creek Sno-Park, and Gold Creek Pond.

Currently, the Summit Shuttle, operated by the Summit at Snoqualmie carries thousands of visitors between the four ski areas throughout the winter as needed.. Visitors currently utilize the shuttle to access their desired destinations when parking areas are full, to switch hills without the inconvenience of traveling back to their car, or to return to their car after traversing ski hills via backcountry crossover trails. While there is ample parking at Summit Central and Summit East, there is an acute parking shortage at neighboring Hyak and Gold Creek Sno-Parks (both of which are managed by Washington State Parks), as well as along FR 4832 near the turnoff to Gold Creek Pond (FR 144).

On weekends, winter recreationalists routinely fill the parking area at Hyak Sno-Park to access a popular sledding hill and the John Wayne Pioneer Trail. At Gold Creek Sno-Park, relatively few off-street parking spaces result in hundreds of cars parallel parked along the roadway and dangerous conditions for pedestrians in snowy conditions. At the turnoff to Gold Creek Pond, there is no off-street parking available. Extending the Summit Shuttle to serve Washington State Parks -managed sno-parks and Gold Creek Pond could help to improve these conditions.

3.4.1 Assumptions

For proposed winter services, all alternatives assume:

- **Partnership with Summit at Snoqualmie** – Given the proximity of proposed routes to the current service area of the Summit Shuttle, this analysis is predicated on extending the service area of the Summit Shuttle to include the sno-parks closest to the ski hills.
- **15-minute headways** – The Summit Shuttle currently serves each Summit at Snoqualmie ski hill every 15 minutes. This analysis assumes that Summit at Snoqualmie would prefer to maintain this level of service to its customers, thus requiring the addition of more vehicles to the existing fleet if the route is to be extended.
- **Saturday and Sunday service between 9AM and 5PM** – The project team’s winter parking analysis revealed that key sno-park hours are between 9AM and 5PM on weekends, with parking at or near capacity between 11AM and 3PM. Compared to weekends, sno-park use on weekdays is relatively low. See Appendix B for winter parking analysis details.
- **Twelve-week winter operating season** – Though it depends on snow conditions, the period of peak winter use extends from mid-December to mid-March.
- **Sno-park visitors can park at Summit East using a cooperative parking arrangement with Summit at Snoqualmie** – The project team’s parking analysis identified that parking capacity at Summit East does not reach 70 percent of capacity on a high visitation weekend day. Summit East is also the closest Summit at Snoqualmie parking facility to the sno-parks.
- **Transit accommodation at sno-parks operated by Washington State Parks** – The study team observed narrow roadways and limited turnaround opportunity at Washington State Parks sno-parks that may limit transit access, particularly at Gold Creek Pond. This analysis assumes that Summit at Snoqualmie, Washington State Parks, and WSDOT achieve a workable plowing arrangement to facilitate transit vehicles.
- **Continued Summit at Snoqualmie parking management and expanded Washington State Parks parking management** – The study team observed a highly organized parking management system at the Summit East parking area. While parking is managed at Hyak Sno-Park through area closures when the parking area reaches capacity, there is no parking management strategy in place at Gold Creek Sno-Park. This analysis assumes continued and expanded parking management to encourage transit use and enable transit vehicle access.
- **Dwell times** – Travel times include vehicle dwell time at pick-up/drop-off locations along each route, as well as layover times for driver breaks.

3.4.2 Alternative 1: Winter Circulator to Hyak and Gold Creek Sno-Parks

Alternative 1 (Figure 4) is an extension of the Summit Shuttle to Hyak and Gold Creek Sno-Parks. Alternative 1 would necessitate two additional vehicles in operation in order to maintain a 15-minute headway. The shuttle would stop at Hyak Sno-Park and Gold Creek Sno-Park and return to Summit East before proceeding north on the regular Summit Shuttle route to Summit Central. A potential schedule for Alternative 1 is shown in Table 3.

Alternative 1A: Alternative 1 plus extension to Gold Creek Pond Turnoff

Alternative 1A (also shown in Figure 4) is the same as Alternative 1, but with an extension of service to the turnoff to Gold Creek Pond, where there is no official parking and access conditions are potentially dangerous to pedestrians. With the added distance, Alternative 1A would require three additional vehicles in operation.

Figure 5: Alternatives 1 and 1A

Source: Volpe Center

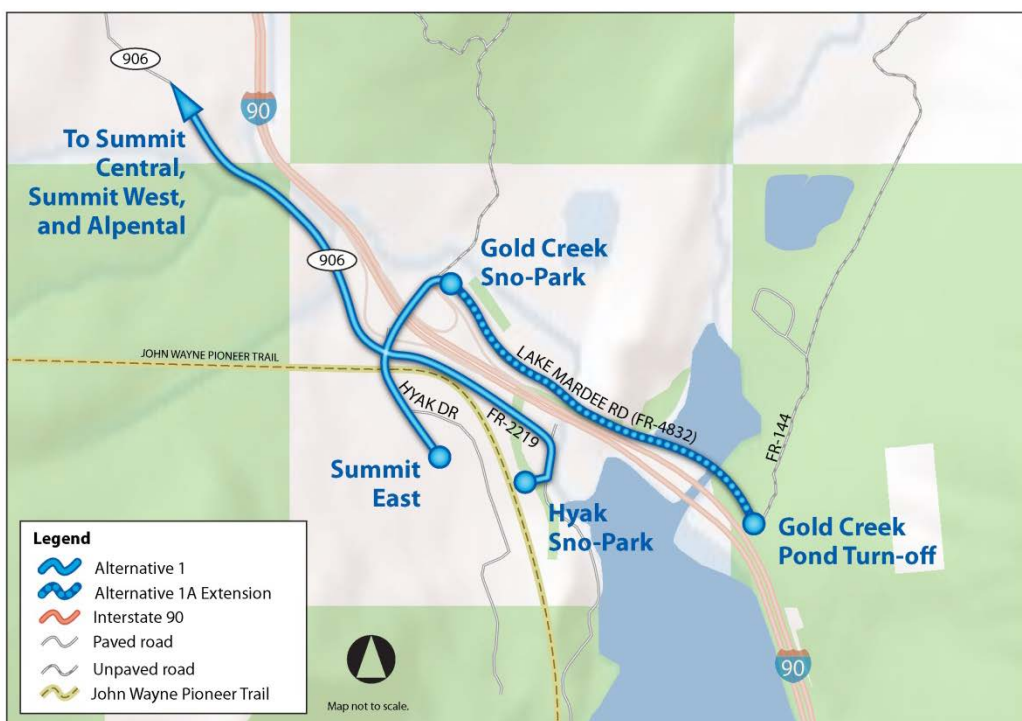


Table 3: Hypothetical Schedule for Alternative 1

Summit East	Hyak Sno-Park	Gold Creek Sno-Park	Summit East (Shuttle Continues to Summit Central/Summit West/Alpental)
9:00 AM	9:08 AM	9:17 AM	9:25 AM
9:15 AM	9:23 AM	9:32 AM	9:40 AM
9:30 AM	9:38 AM	9:47 AM	9:55 AM
Continues same pattern throughout day with departures every 15 minutes			
4:00 PM	4:08 PM	4:17 PM	4:25 PM
4:15 PM	4:23 PM	4:32 PM	4:40 PM
4:30 PM	4:38 PM	4:47 PM	4:55 PM

3.4.3 Alternative 2: Winter Circulator to Gold Creek Sno-Park

Alternative 2 (Figure 5) is an extension of the Summit Shuttle to Gold Creek Sno-Park, requiring one additional vehicle in operation. Unlike Alternative 1, this route bypasses Hyak Sno-Park, which is may be accessible with improvements by foot from Summit East via Rampart Drive. Alternative 2 would serve Gold Creek Sno-Park and return to Summit East before proceeding north on the existing Summit Shuttle route to Summit Central. A potential schedule for Alternative 2 is shown in Table 4.

Alternative 2A: Alternative 2 plus extension to Gold Creek Pond turnoff

Alternative 2A (Figure 5) is the same as Alternative 2, but with an extension of service to the Gold Creek Pond turnoff, where there is no official parking and access conditions are potentially dangerous. With the added distance, Alternative 2A would require two additional vehicles in the Summit Shuttle fleet.

Figure 6: Alternatives 2 and 2A

Source: Volpe Center

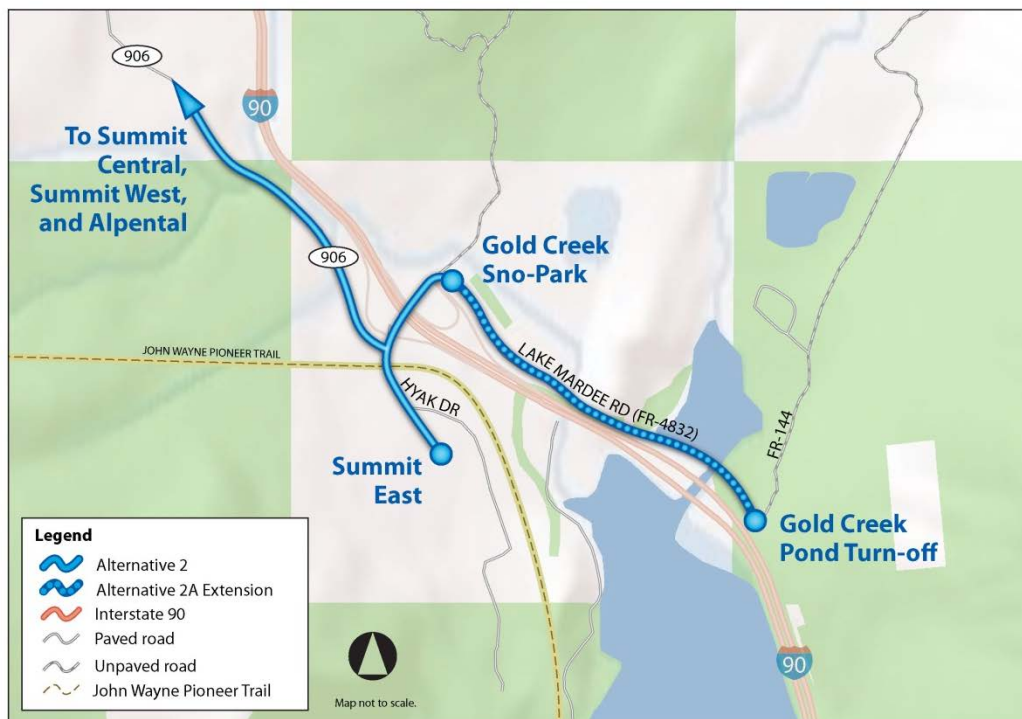


Table 4: Hypothetical Schedule for Alternative 2

Summit East	Gold Creek Sno-Park	Summit East (Shuttle Continues to Summit Central/Summit West/Alpentel)
9:00 AM	9:07 AM	9:14 AM
9:15 AM	9:22 AM	9:29 AM
9:30 AM	9:37 AM	9:44 AM
Continues same pattern throughout day with departures every 15 minutes.		
4:15 PM	4:22 PM	4:29 PM
4:30 PM	4:37 PM	4:44 PM
4:45 PM	4:52 PM	4:59 PM

3.4.4 Winter Circulator Operating Expenses

The Transit Feasibility team assessed the costs of the winter circulator alternatives using the following assumptions:

- 15-minute headways
- Operating cost per hour: \$40 to \$100⁴
- Average Ridership: 5 to 15 people at one time

As shown in Table 5, each alternative entails considerable differences in costs. Providing service to Hyak Sno-Park in Alternative 1 is more than double the cost of Alternative 2, which does not provide service to Hyak Sno-Park. Similarly, providing service to the Gold Creek Pond turnoff increases the cost of each of the two options, Alternatives 1A and 2A. Although service to Hyak Sno-Park would add convenience and increase potential ridership, the area is located less than 1000 feet from some Summit East parking areas and pedestrian connections could be established along Rampart Drive. At the same time, Gold Creek Pond is not easily accessible on foot from Summit East or the Gold Creek Pond Sno-Park main parking area, and circulator service could greatly enhance access to the area.

Table 5: Comparison of Winter Circulator Fixed Route Alternatives

Winter Circulator Alternative	Total Running Time (Min)	Number of Vehicles	Cost Per Trip	Annual Operating Costs	Cost per Passenger (5)	Cost per Passenger (10)	Cost per Passenger (15)
Alternative 1 – Hyak and Gold Creek Sno-Parks	23	2	\$15- \$39	\$17,280- \$43,200	\$3.08- \$7.70	\$1.54- \$3.85	\$1.03- \$2.57
Alternative 1A – (+ Gold Creek Pond)	33	3	\$22- \$54	\$25,920- \$64,800	\$4.34- \$10.85	\$2.17- \$5.43	\$1.45- \$3.62
Alternative 2 – Gold Creek Sno-Park	13	1	\$8- \$21	\$8,640- \$21,600	\$1.68- \$4.20	\$0.84- \$2.10	\$0.56- \$1.40
Alternative 2B – (+ Gold Creek Pond)	22	2	\$15- \$37	\$17,280- \$43,200	\$2.94- \$7.35	\$1.47- \$3.64	\$0.98- \$2.45

These cost figures do not consider who will pay for the service and how. Since Summit at Snoqualmie does not currently charge fares to ride the Summit Shuttle, and money is not exchanged on the vehicle, it would be difficult to charge a fare to passengers boarding at Summit East and bound for a sno-park. Also, recreationalists who drive to sno-parks must purchase vehicle passes that support Washington State Parks operations or risk being

⁴ The \$40 figure represents the current operating cost of a Summit Shuttle vehicle and is based on information provided by the Summit at Snoqualmie. The \$100 figure represents the upper limit for vehicle operating cost for similar service, based on Volpe Center experience.

ticketed. While a Summit Shuttle expansion could help alleviate congestion, safety, and visitor experience concerns at the sno-parks, these benefits must be carefully weighed against potential loss in revenue to Washington State Parks from any decrease in vehicle pass sales, which are used to fund sno-park operation. To provide the service, Summit at Snoqualmie will have to consider added operations costs to its existing shuttle service and potential worsening of the Summit East parking situation in light of incentives MBSNF or Washington State Parks may offer.

3.5 Transit Alternatives: Summer Circulator

Currently, there is no summer circulator in MBSNF. The following section presents three alternatives for a new summer circulator, developed to help MBSNF manage access at some of the most popular summer destinations in the I-90 corridor between Exits 45 through 54.

It is estimated that MBSNF attracts hundreds of thousands of visitors each summer to areas within the I-90 corridor.⁵ Without transportation alternatives, visitors rely on personal automobiles to reach trailheads, campgrounds, and picnic areas. While there is ample parking at less popular attractions like McClellan Butte, there are acute parking shortages at popular sites, particularly Mason Lake/Ira Spring, Talapus Lake, Pratt Lake, and the Denny Creek Area. On weekends, summer recreationalists routinely fill designated parking areas to capacity, causing dozens of visitors to park along roadways at any given site. In the case of Denny Creek, sometimes more than one hundred vehicles will park along FR 5830 and FR 58, creating hazardous pedestrian conditions and presenting a considerable challenge to drivers attempting to move large vehicles through the area. A new circulator transit service could help alleviate these challenges by eliminating dangerous parking behavior in undesignated areas and managing visitor demand by promoting and providing transportation service to alternative destinations along the circulator route.

3.5.1 Assumptions

For proposed summer services, all options assume:

- **Partnership with Summit at Snoqualmie or private/public operator** – Given that the Forest Service is not equipped to own or operate a transit service, this analysis assumes the service will be operated by a third party through a cooperative agreement, special use permit, or service contract. Since the Summit at Snoqualmie has a fleet of passenger vehicles that is mostly unused during summer months, it would be ideal if the ski area could provide operating services. In exchange for this service, the Forest will need to identify ways to contribute to the partnership. Financial support for capital expenditures such as vehicles and facilities is available through several federal public lands transportation programs

⁵ For details about estimated visitation to the I-90 corridor, see Appendix B.

- **30-minute headways** – Based on similar services in other public lands contexts, the study team felt that 30-minute service to each proposed stop represents an adequate, achievable level of service that will not diminish visitor experience.
- **Transit accommodation as part of the planned parking area expansion at Denny Creek** – MBSNF recently received a \$522,000 PLHD grant from the U.S. Department of Transportation to add approximately 70 parking spaces in the Denny Creek Area. This analysis assumes that parking expansion will incorporate large passenger vehicle accommodation, such as stops and turnarounds and adequate turning radii at intersections. See Section X for more information.
- **Friday, Saturday, and Sunday service between 9AM and 5PM** – The project team’s summer parking analysis revealed that trailheads are primarily used between 9AM and 5PM on weekends, with parking at or near capacity at most trailheads during that period. Compared to weekends, trailhead use on weekdays is relatively lower but still significant, especially on Fridays. See Appendix B for summer parking analysis details.
- **Twenty-week summer operating season** – The project team’s I-90 Existing Conditions Report reveals that, depending on weather conditions, the peak summer season at MBSNF extends from late May to.
- **Parking enforcement along Forest roadways** – The project team observed highly congested parking areas and hundreds of vehicles parked along roadways, particularly in the vicinity of Denny Creek (along FR 58 and FR 5830) and on approaches to parking areas for Mason Lake/Ira Spring, Talapus Lake, Pratt Lake/Granite Mountain, and Asahel Curtis Nature Trail. This analysis assumes the implementation of parking management and enforcement to encourage transit use and enable transit vehicle access.
- **Dwell times** – Travel times include vehicle dwell time (the amount of time the vehicles rests at pick-up/drop-off locations) along each route, as well as layover time (the amount of time a vehicles rests between each complete trip) for driver breaks.

3.5.2 Alternative 3: Summer Circulator between Pratt Lake and Denny Creek Trailhead

Alternative 3 (Figure 6) provides service to the Denny Creek Parking Area, Denny Creek Trailhead, Denny Creek Campground, Pratt Lake, Asahel Curtis Nature Trail, and Asahel Curtis Picnic Area, before returning to Denny Creek Parking Area. Alternative 3 would require two vehicles in order to achieve a 30-minute headway. A hypothetical schedule for Alternative 3 is shown in Table 6.

Figure 7: Alternative 3

Source: Volpe Center

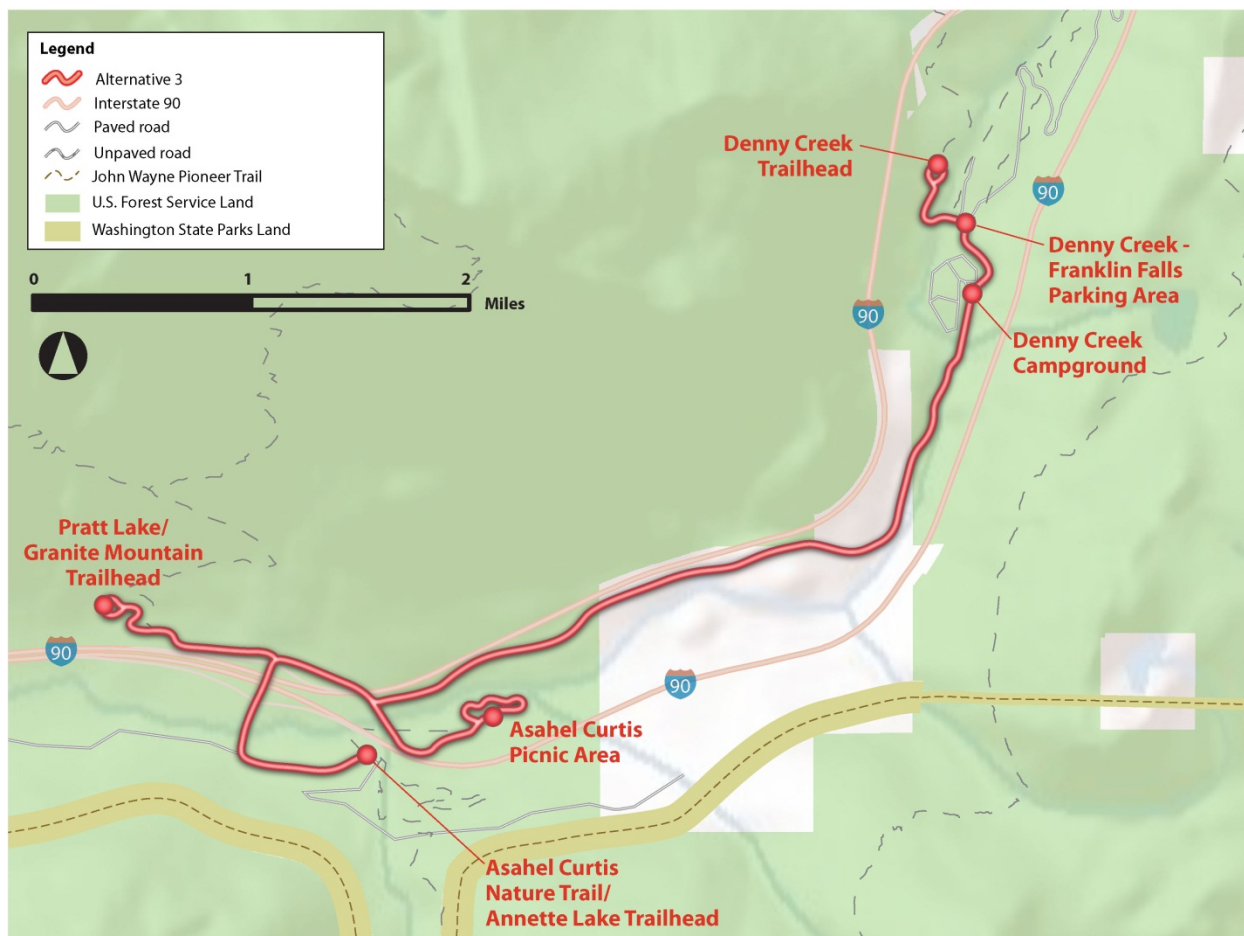


Table 6: Hypothetical Schedule for Alternative 3

Denny Creek Parking Area	Denny Creek Trailhead	Denny Creek Campground	Pratt Lake	Asahel Curtis Nature Trail	Asahel Curtis Picnic Area	Denny Creek Parking Area
9:00 AM	9:05 AM	9:10 AM	9:22 AM	9:30AM	9:38 AM	9:45 AM
9:30 AM	9:35 AM	9:40 AM	9:52 AM	10:00 AM	10:08 AM	10:15 AM
10:00 AM	10:05 AM	10:10 AM	10:22 AM	10:30AM	10:38 AM	10:45 AM
10:30 AM	10:35 AM	10:40 AM	10:52 AM	11:00 AM	11:08 AM	11:15 AM
Continues same pattern throughout day with departures every 30 minutes.						
4:00 PM	4:05 PM	4:10 PM	4:22 PM	4:30 PM	4:38 PM	4:45 PM
4:30 PM	4:35 PM	4:40 PM	4:52 PM	5:00 PM	5:08 PM	5:15 PM

3.5.3 Alternative 4: Summer Circulator between Pratt Lake and Snow Lake Trailhead

Alternative 4 (Figure 7) would extend the service area explored in Alternative 3 to provide access to the Snow Lake and Pacific Crest Trails. Alternative 4 would require three vehicles to maintain a 30-minute headway. Unlike Alternative 3, Alternative 4 would consolidate service in the Denny Creek Area (campground, parking area, and turnaround) to one stop at the proposed parking area expansion site. A potential schedule for Alternative 4 is shown in Table 7.

Figure 8: Alternative 4

Source: Volpe Center

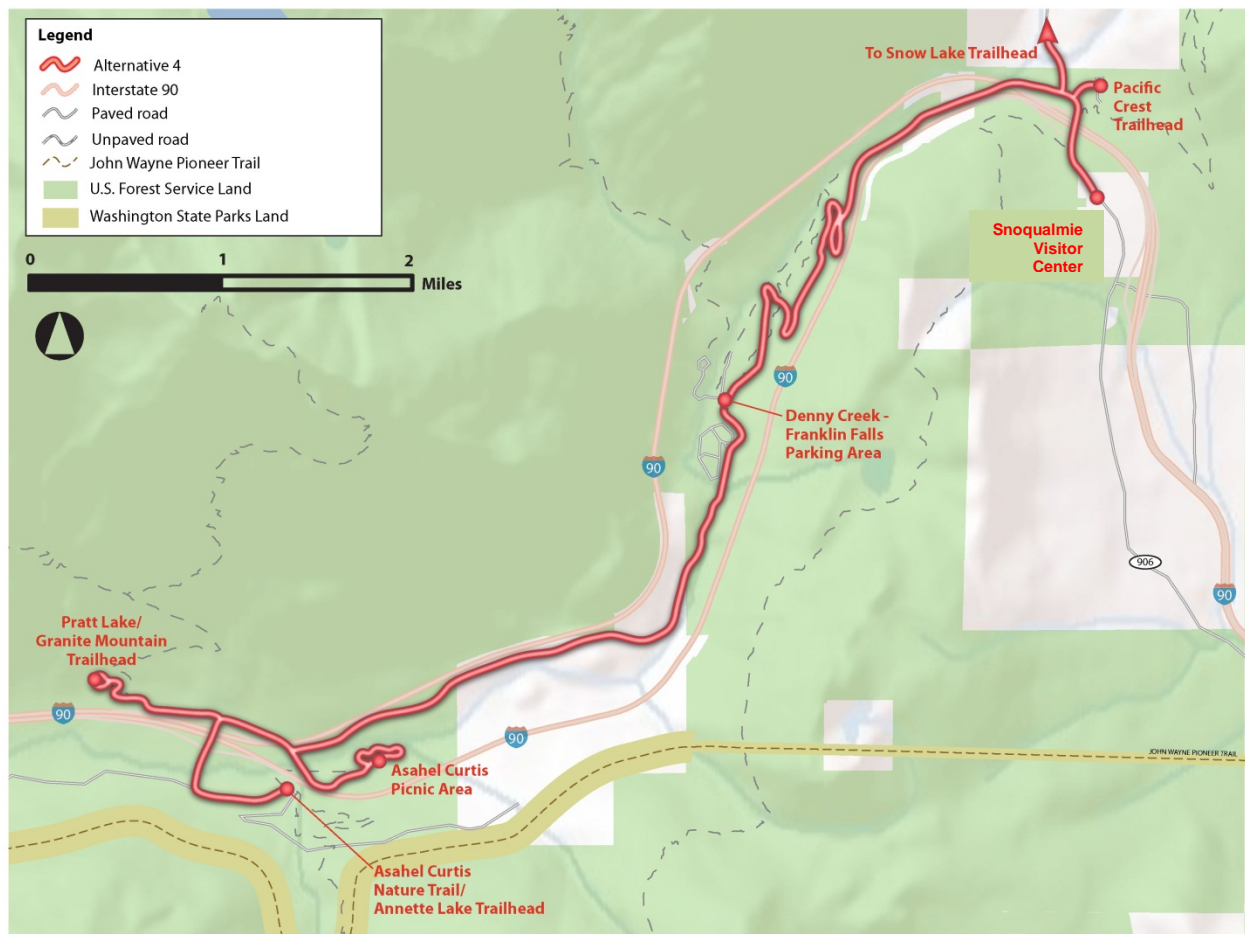


Table 7: Hypothetical Schedule for Alternative 4

Denny Creek Parking Area	Pratt Lake	Asahel Curtis Nature Trail	Asahel Curtis Picnic Area	Denny Creek Parking Area	Snow Lake Trailhead	Pacific Crest Trailhead	Denny Creek Parking Area
9:00 AM	9:12 AM	9:20 AM	9:28 AM	9:39 AM	9:53 AM	10:01 AM	10:07 AM
9:30 AM	9:42 AM	9:50 AM	9:58 AM	10:09 AM	10:23 AM	10:31 AM	10:37 AM
10:00 AM	10:12 AM	10:20 AM	10:28 AM	10:39 AM	10:53 AM	11:01 AM	11:07 AM
Continues same pattern throughout day with departures every 30 minutes.							
3:30 PM	3:42 PM	3:50 PM	3:58 PM	4:09 PM	4:23 PM	4:31 PM	4:37 PM
4:00 PM	4:12 PM	4:20 PM	4:28 PM	4:39 PM	4:53 PM	5:01 PM	5:07 PM
4:30 PM	4:42 PM	4:50 PM	4:58 PM	5:09 PM	5:23 PM	5:31 PM	5:37 PM

3.5.4 Alternative 5: Summer Circulator between Pratt Lake and Gold Creek Pond

Alternative 5 (Figure 8) extends the service area explored in Alternative 4, adding access both to Summit West and Gold Creek Pond. Alternative 5 would require four vehicles in order to maintain a 30-minute headway. A potential schedule for this route is shown in Table 8.

Figure 9: Alternative 5

Source: Volpe Center

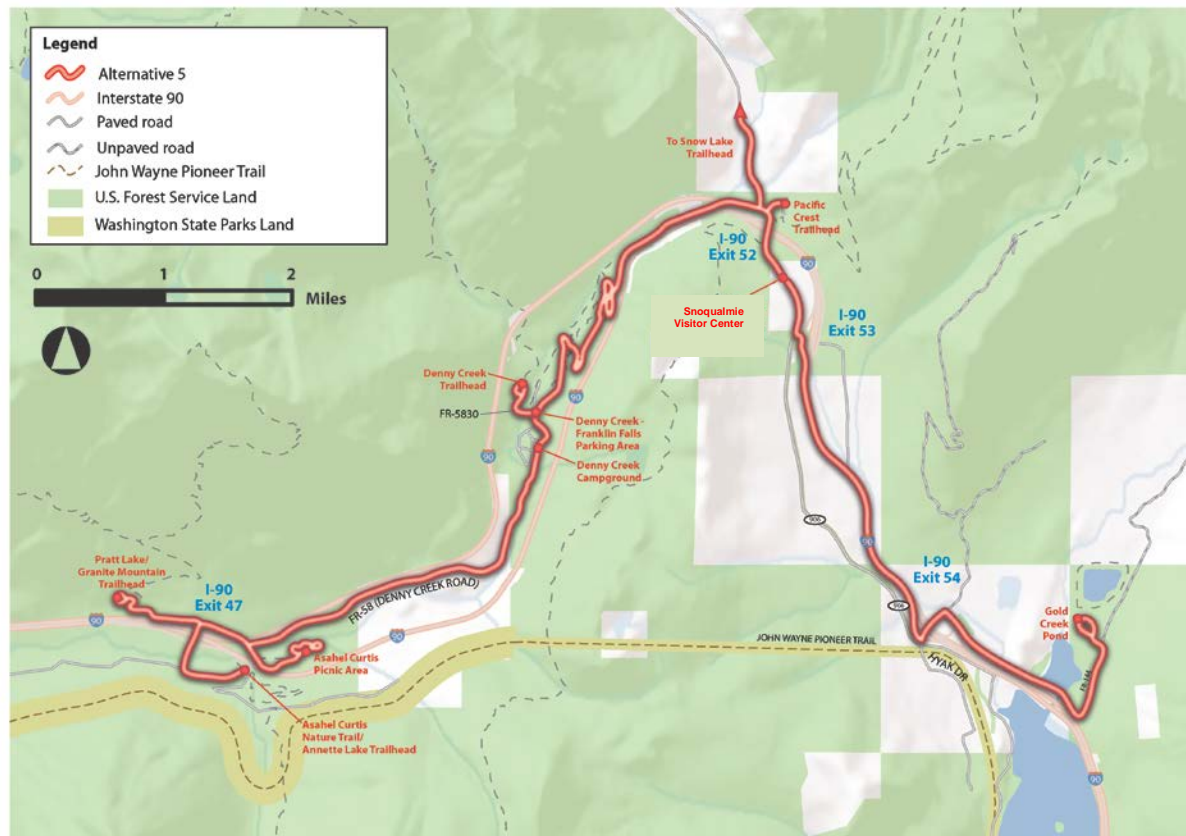


Table 8: Hypothetical Schedule for Alternative 5

Denny Creek Parking Area	Pratt Lake	Asahel Curtis Nature Trail	Asahel Curtis Picnic Area	Denny Creek Parking Area	Snow Lake Trailhead	Pacific Crest Trailhead	Summit West	Gold Creek Pond	Denny Creek Parking Area
9:00 AM	9:12 AM	9:20 AM	9:28 AM	9:39 AM	9:53 AM	10:01 AM	10:07 AM	10:20 AM	10:36 AM
9:30 AM	9:42 AM	9:50 AM	9:58 AM	10:09 AM	10:23 AM	10:31 AM	10:37 AM	10:50 AM	11:06 AM
10:00 AM	10:12 AM	10:20 AM	10:28 AM	10:39 AM	10:53 AM	11:01 AM	11:07 AM	11:20 AM	11:36 AM
10:30 AM	10:42 AM	10:50 AM	10:58 AM	11:09 AM	11:23 AM	11:31 AM	11:37 AM	11:50 AM	12:06 PM
Continues same pattern throughout day with departures every 30 minutes.									
3:00 PM	3:12 PM	3:20 PM	3:28 PM	3:39 PM	3:53 PM	4:01 PM	4:07 PM	4:20 PM	4:36 PM
3:30 PM	3:42 PM	3:50 PM	3:58 PM	4:09 PM	4:23 PM	4:31 PM	4:37 PM	4:50 PM	5:06 PM

3.5.5 Summer Circulator Operating Expenses

The project team assessed the costs of the summer fixed-route circulator options using the following assumptions:

- 30-minute headways
- Operating costs per hour: \$40-\$100⁶
- Average Ridership: 5-15 people at one time

As shown in Table 9, each alternative entails considerable differences in costs. While service starting at Pratt Lake is the common denominator for all three alternatives, moving the service area east, from Denny Creek Trailhead to Snow Lake Trail and Gold Creek Pond, increases costs by 50 percent and 100 percent for Alternatives 3 and 4 respectively. For Alternative 4, while expanding service to the popular Snow Lake Trail increases ridership potential, it could worsen overcrowding in these sensitive areas. For Alternative 5, while Gold Creek Pond is not as popular of a destination as Snow Lake Trail and Pacific Crest Trailhead, MBSNF is interested in increasing visitation to this frontcountry recreation area. Expanding service to this area, however, would be twice as expensive if headways remained the same.

⁶ Similar to the winter circulator, the \$40 figure represents the current operating cost of a Summit Shuttle vehicle based on information provided by the Summit at Snoqualmie. The \$100 figure represents the upper limit for vehicle operating cost for similar service, based on Volpe Center experience.

Table 9: Comparison of Summer Circulator Fixed Route Options

Summer Circulator Alternative	Total Running Time (Min)	Number of Vehicles	Cost Per Trip	Annual Operating Costs	Cost per Passenger (5)	Cost per Passenger (10)	Cost per Passenger (15)
Alternative 3 – Between Pratt Lake and Denny Creek Trailhead	54	2	\$36- \$90	\$43,200- \$108,000	\$7.19- \$17.97	\$3.59- \$8.98	\$2.40- \$5.99
Alternative 4 – Between Pratt Lake and Snow Lake Trail	78	3	\$52- \$130	\$64,800- \$162,000	\$10.41- \$26.03	\$5.21- \$13.02	\$3.47- \$8.68
Alternative 5 – Between Pratt Lake and Gold Creek Pond	110	4	\$73- \$183	\$86,400- \$216,000	\$14.67- \$36.7	\$7.33- \$18.33	\$4.89- \$12.22

3.6 Transit Alternatives: MBSNF Shuttle

The following section presents three alternatives for providing fixed-route transit service to MBSNF from points west along the I-90 corridor.

The project team investigated a range of alternatives that would provide access to MBSNF via a long-distance shuttle from Seattle, Issaquah, and/or North Bend. The report focuses on three potential routes deemed most viable by the project team. All three routes are considered for summer service (with four options for intermediate stops), while two routes are evaluated for winter service. Each route has different operating characteristics and costs depending on the season. All alternatives have potential for pilot testing, depending on support from MBSNF partners and funding opportunities.

Each winter option would connect to the existing Summit Shuttle service provided by the Summit at Snoqualmie. Each summer option supports connectivity with concurrent or future implementation of a summer circulator service discussed in Section 7.

3.6.1 Assumptions

For proposed summer and winter services, all options assume:

- **Partnership with private/public operator** – Given that the Forest Service is not likely to own or operate a transit service, this analysis assumes the service will be operated by a third party through a cooperative agreement or service contract.
- **60-minute headways** – Based on similar services in other public lands contexts, the Transit Feasibility team felt that service every 60 minutes represents an adequate, achievable level of service.
- **Transit accommodation at Denny Creek and Summit at Snoqualmie**– The project team assumed that parking expansion in the Denny Creek Area will incorporate shuttle stops and large passenger vehicle turnarounds. The team also assumed that Summit at Snoqualmie will remove snow to facilitate transit vehicles at Summit Central.
- **Friday (3PM-7PM) and Saturday and Sunday service (8AM-7PM)** – The I-90 Existing Conditions Report shows that, depending on weather conditions, winter and summer usage is highest and parking most congested on Fridays, Saturdays, and Sundays.
- **Twelve-week winter and twenty-week summer operating seasons** – The I-90 Existing Conditions Report shows that, depending on weather conditions, the peak winter and summer usage season extends from December to February and late-May to early-October respectively.
- **Summer and winter parking management** –This analysis assumes parking management and enforcement is implemented to encourage transit use and enable transit vehicle access along narrow roadways.
- **Multi-modal connections in Seattle (International District) and Issaquah Transit Center** – The project team assumes that shuttle buses will be granted curbside access at both Seattle’s International District and Issaquah Transit Center. While other locations in or near Seattle may be considered for the western terminus of the shuttle, the International District has the densest and most varied transit service in the region, including connections to regional train and light-rail service. Service from the International District promotes multimodality and provides the greatest number of connections for people without access to a vehicle. For potential riders who prefer to drive to a shuttle stop, the Issaquah Transit Center offers ample parking in a secure garage.
- **Dwell times** – Travel times include vehicle dwell time at pick-up/drop-off locations along each route, as well as layover times for driver breaks.

The project team developed sample schedules for each route and associated cost estimates for descriptive and comparative purposes. The characteristics for each option will form the

basis for later evaluation against criteria developed from feasibility considerations and the Forest’s transportation goals (Table 1).

3.6.2 Alternative 6: MBSNF Shuttle from Downtown Seattle (Winter/Summer)

Alternative 6 (Figure 10) is the longest shuttle route developed for evaluation, connecting downtown Seattle’s International District to the Forest. Alternative 6 would require two vehicles in order to maintain 60-minute headways. In this alternative, a winter access shuttle would serve Summit Central, and a summer access shuttle would serve the Denny Creek Parking Area. A potential schedule for Alternative 6 is shown in Table 10.

Alternative 6A: Alternative 6, with a stop at Issaquah Transit Center (Winter/Summer)

Alternative 6A would add a stop at Issaquah Transit Center, requiring three vehicles to meet the 60-minute headway requirement.

Alternative 6B: Alternative 6, with stops at Issaquah Transit Center and North Bend (Summer Only)

Alternative 6B adds stops at Issaquah Transit Center and downtown North Bend, requiring three vehicles to accommodate 60-minute headways. No winter service was analyzed for this alternative as North Bend is primarily a summer activity center.

Figure 10: Alternatives 6, 6A, and 6B

Source: Volpe Center



Table 10: Hypothetical Weekend Schedule for Alternative 6

Departing Shuttle	Downtown Seattle (International District)	Denny Creek OR Summit Central	Downtown Seattle
#1	8:00 AM	9:00 AM	10:00 AM
#2	9:00 AM	10:00 AM	11:00 AM
#1	10:00 AM	11:00 AM	12:00 PM
Continues same pattern throughout day with departures every 60 minutes.			
#1	4:00 PM	5:00 PM	6:00 PM
#2	5:00 PM	6:00 PM	7:00 PM

3.6.3 Alternative 7: MBSNF Shuttle from Issaquah (Winter/Summer)

Alternative 7 (Figure 11) is a mid-range shuttle service route developed for evaluation that would carry potential riders from the Issaquah Transit Center to the MBSNF. In this alternative, a winter access shuttle would serve Summit Central, while a summer access shuttle would serve the Denny Creek Parking Area. Alternative 7 would require two vehicles, and unlike Alternative 6, riders would have to travel to the origin by private vehicle or connecting transit service. A potential schedule for this route is shown in Table 11.

Alternative 7A: Alternative 7, with a stop in North Bend

Alternative 7A is similar to Alternative 7, but would include an additional stop in North Bend. Alternative 7A would require three vehicles to maintain a 60-minute headway.

Figure 11: Alternatives 7 and 7A

Source: Volpe Center



Table 11: Hypothetical Weekend Schedule for Alternative 7

Departing Shuttle	Issaquah Transit Center	Denny Creek OR Summit Central	Issaquah Transit Center
#1	8:00 AM	8:40 AM	9:20 AM
#2	9:00 AM	9:40 AM	10:20 AM
#1	10:00 AM	10:40 AM	11:20 AM
Continues same pattern throughout day with departures every 60 minutes.			
#2	5:00 PM	5:40 PM	6:20 PM
#1	6:00 PM	6:40 PM	7:20 PM

3.6.4 Alternative 8: MBSNF Shuttle from North Bend

Alternative 8 is the shortest shuttle service route developed for evaluation, connecting potential riders from the gateway community of North Bend directly to the Forest (see Figure 12). Alternative 8 would require one vehicle to maintain a 60-minute headway.

Figure 12: Alternative 8

Source: Volpe Center

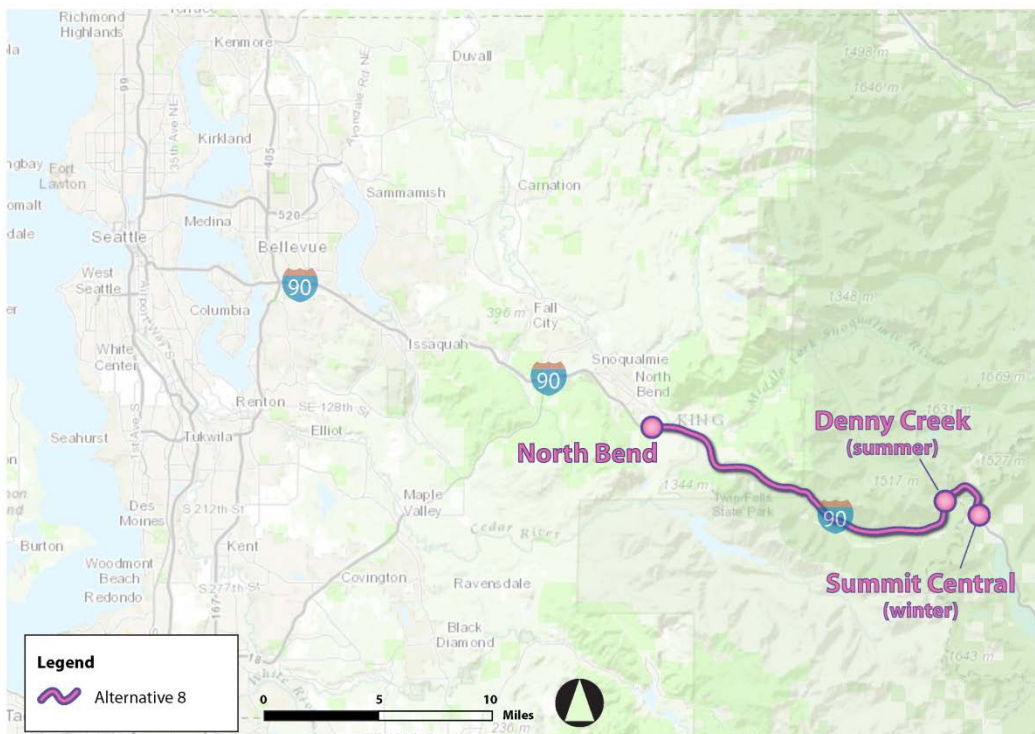


Table 12: Hypothetical Schedule for Alternative 8

North Bend	Denny Creek	North Bend
8:00 AM	8:25 AM	8:55 AM
9:00 AM	9:25 AM	9:55 AM
10:00 AM	10:25 AM	10:55 AM
Continues same pattern throughout day with departures every 60 minutes.		
5:00 PM	5:25 PM	5:55 PM
6:00 PM	6:25 PM	6:55 PM

3.6.5 MBSNF Shuttle Alternative Operating Expenses

The Transit Feasibility team assessed the costs of the fixed-route shuttle alternatives using the following assumptions:

- 60-minute headways
- Operating costs per hour: \$40-\$100
- Average Ridership: 5-15 people at one time

As shown in Table 13, each alternative entails considerable differences in costs. For transit service originating in Seattle (Alternatives 6/6A/6B), adding a stop at either Issaquah Transit Center or both Issaquah Transit Center and North Bend increases costs by 50 percent. Shortening the total route and originating the service at Issaquah Transit Center or North Bend cuts costs by 25 percent and 50 percent for Alternatives 7 and 8 respectively. While these alternatives may be more cost effective, they provide far less access to dense population centers and multi-modal hubs. For service out of Issaquah Transit Center, riders would either have to drive or take connecting transit service, which would require at least one bus transfer. For service out of North Bend, prospective riders could also drive or take transit, but there is only weekday transit service in North Bend currently.

Table 13: Comparison of MBSNF Shuttle Alternatives (Winter and Summer)

	Total Running Time (Min)	Number of Vehicles	Cost Per Trip	Annual Operating Costs	Cost per Passenger (5)	Cost per Passenger (10)	Cost per Passenger (15)
Alternative 6 – Downtown Seattle to MBSNF	120	2	\$80- \$200	\$41,600- \$104,000	\$15.98- \$39.95	\$7.99- \$19.97	\$5.33- \$13.32
<i>Alternative 6A – (+ Issaquah TC)</i>	133	3	\$88- \$221	\$62,400- \$156,00	\$17.69- \$44.23	\$8.85- \$22.11	\$5.90- \$14.74
<i>Alternative 6B – (+ Issaquah TC and North Bend)</i>	150	3	\$100- \$250	\$62,400- \$156,000	\$19.97- \$49.93	\$9.99- \$24.97	\$6.66- \$16.64
Alternative 7 – Issaquah Transit Center to MBSNF	86	2	\$57- \$143	\$41,600- \$104,000	\$11.41- \$28.53	\$5.71- \$14.27	\$3.80- \$9.51
<i>Alternative 7A – (+ North Bend)</i>	103	2	\$68- \$171	\$41,600- \$104,000	\$13.70- \$34.24	\$6.85- \$17.12	\$4.57- \$11.41
Alternative 8 – North Bend to MBSNF	60	1	\$40- \$100	\$20,800- \$52,000	\$7.99- \$19.97	\$3.99- \$9.99	\$2.66- \$6.66

3.6.6 Connecting to Community Circulators

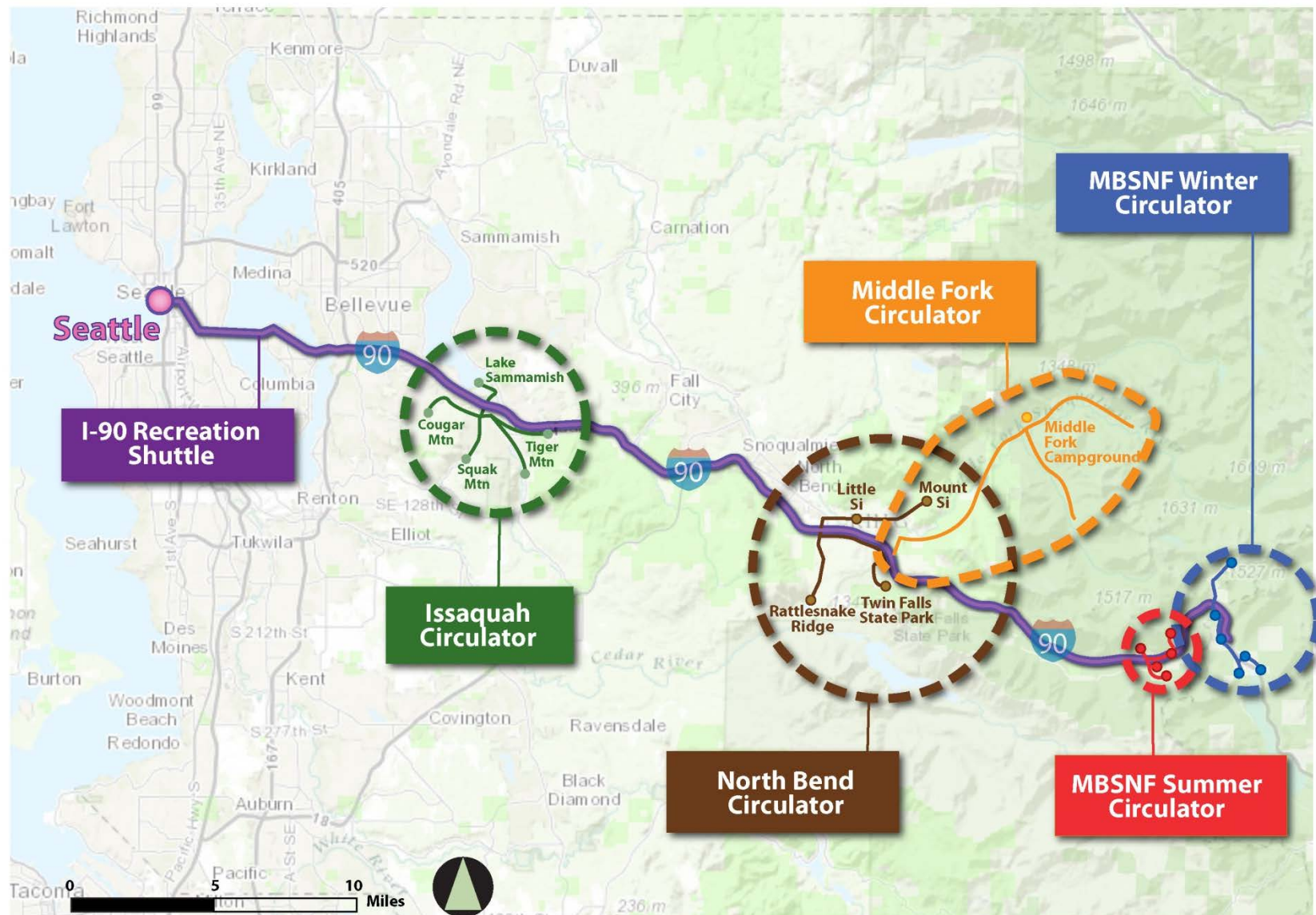
With stops in Issaquah and North Bend, Alternative 6B has the greatest number of opportunities for connectivity, and Figure 12 attempts to illustrate how smaller community circulator services could connect to the MBSNF shuttle. Alternative 6B could be promoted as a “recreation shuttle” that travels along I-90 within King County from Seattle to

Snoqualmie Pass, connecting to smaller circulator systems that distribute passengers to various recreation destinations within the corridor (not just those in MBSNF).

As developed, Alternative 6B provides long-distance transit service along I-90, stopping at locations close to the highway. In addition to picking up passengers at each stop, the shuttle could coordinate with local services and provide a seamless transfer to a local circulator system. In addition to the summer and winter circulators presented in this report, which focus on access to MBSNF destinations, there may be additional opportunities to connect to non-Forest recreation destinations, such as Mount Si and Rattlesnake Ridge near North Bend, and Cougar Mountain and Tiger Mountain near Issaquah.

This concept allows organizations to focus on transit operations in areas with which they are most familiar. MBSNF (in partnership with the Summit at Snoqualmie or another concessionaire) would concentrate on the summer and winter circulators at Denny Creek and Snoqualmie Pass; an organization (SVT, for example) would be responsible for circulator service to recreation destinations in the North Bend/Snoqualmie area; and another organization (for example, the City of Issaquah, the Issaquah Alps Trails Club, or King County Metro Transit) would focus on circulator service to Lake Sammamish and the Issaquah Alps. The I-90 Recreation Shuttle would be the responsibility of a regional organization with interests in all areas of the corridor, such as King County Metro Transit or the Mountains to Sound Greenway.

Figure 13: Phase 5 Feasibility Concept Diagram



3.7 Shared-use Vehicle Program

The following section evaluates the possibility of a creating a shared-use vehicle program to transport visitors from throughout the Puget Sound area to MBSNF. A range of service models is worthy of consideration. This section explains what a shared-vehicle program is; discusses some of the benefits and drawbacks of a shared-use vehicle program; describes general considerations and cost variations for a range of program models and service levels; and identifies existing relevant programs.

3.7.1 What is a Shared-use Vehicle Program?

A shared-use vehicle program is a transportation concept that involves making a large passenger vehicle (or fleet of vehicles), such as a van or small bus, available to two or more organizations to share. Depending on the program model, organizations work together to meet transportation needs, optimizing expenses and allowing for travel that is better tailored to each organization's needs. With a shared-use vehicle program, a sponsor organization such as MBSNF may provide capital funding assistance and administrative support, but the program would ultimately be operated and carried forward by the organizations that choose to participate.

3.7.2 Benefits and Drawbacks of a Shared-use Vehicle Program

A shared-use vehicle program is worth considering as an alternative to, or in conjunction with, fixed-route transit service to MBSNF. Potential benefits of a shared-use program include:

- **Available on-demand:** A shared-use vehicle that is available to multiple organizations allows trips to be planned in advance when it is most convenient for an organization's members. Shared-use vehicle trips are scheduled to meet the demand of a single outing, allowing organizations to promote the service and know in advance how many seats are required. As results, there is less risk of operating empty vehicles.
- **Not fixed to a specific route:** Trips served by a shared-use vehicle are inherently flexible and can serve different destinations depending on the desires of participating organizations.
- **Use of vehicles tailored to organization's needs:** Depending on interest, the vehicles used for a shared-use program can be specifically selected based on need. Organizations specializing in trail construction and improvement can focus on a vehicle's durability and the ability to carry equipment; organizations that serve the elderly can concentrate on passenger comfort and accessibility.
- **Minimal support required by MBSNF:** The role of MBSNF is primarily to guide partners towards implementing a shared-vehicle program. The Forest may also be

eligible to provide capital assistance through Federal transportation funding sources. Once a program is up and running, MBSNF can provide support through Forest programming and advice in terms of destinations and recreational opportunities.

- **Multiple levels of investment, minimizing risk:** Depending on how frequently an organization or group of organizations expects to use a vehicle, there are several different models that allow a shared-use vehicle program to adapt as demand changes. While purchasing a vehicle may be the best model for organizations that already understand their transportation needs, other options exist for organizations that have an interest in participating in a shared-use vehicle program but are still unsure of how its members will react to the new service. Thus, the risk associated with a shared-use vehicle program is relatively low, especially when compared to fixed-route transit service.

A shared-use vehicle program also has several drawbacks associated with it, including:

- **Not open to the public:** Unlike a fixed-route service where dates, times, and stop information are available to the public, a shared-use vehicle program is most likely only promoted within the participating organizations.
- **Asks organizations to administer a new program:** A shared-use vehicle program requires organizations to bear the responsibility of implementation, administration, and in some cases, operation. For smaller organizations, this may be a challenge, although the possibility of joining forces with similar organizations helps to alleviate some of this burden.
- **Asks organizations to pay for service:** While MBSNF may be able to assist with capital funding of a shared-use vehicle program, operating costs will fall on the participating organizations. Whether the cost is covered by organizations' program funds or by the passengers that sign up for the outing, the cost of a shared-use vehicle program will be an important consideration for all participating organizations.

3.7.3 Vehicle acquisition and operation

The first consideration for a shared-use vehicle program involves how an organization or group of organizations secures a vehicle. Five possibilities are presented in this section, including ad-hoc rental, ad-hoc charter, seasonal lease, existing agency partnership, and ownership. Many, if not all, of these possibilities are exercised today by organizations that currently carry groups to the Forest.

Ad-hoc lease and ad-hoc charter

Leasing and/or chartering a vehicle is a common way of transporting groups to the Forest on an as-needed basis. The type of vehicle depends on the size of the group, but it can range

from a small 15-passenger bus to a large 50-passenger coach. A leased vehicle is typically operated by someone within the leasing organization or by an independent driver hired by the leasing organization. Charter services generally include vehicle operators as part of a complete transportation package.

Seasonal lease

A seasonal lease offers unlimited use of a vehicle to an organization through a predefined period of time. Leasing periods may be seasonal in nature, or they may run on a month-to-month basis. With this model, an organization or group of organizations would lease a vehicle from a commercial provider and, depending on the number of participants, create a schedule of use and/or reservation system for participants. Vehicles may be driven by someone within the organization, but a commercial driver's license (CDL) is required to operate any vehicle with more than 15 passengers. Finally, participating organizations would need a place to store the van when it is not in use. At the end of the leasing period, the vehicle is returned to the rental company.

Purchase

Under this model, an organization or group of organizations would purchase a van to share among program participants. The vehicle would be available year-round, and the program would likely be administered with a reservation-based scheduling system. The purchase price of a vehicle may be financed or incrementally paid through a rent-to-own program; however, a more cost-effective option would be to purchase the vehicle in advance of operations, likely with funding from a grant. The organization or group of organizations that owns the vehicle would be responsible for the full cost of operations, including driving, fueling, maintenance, cleaning, and storage, as well as program administration.

3.7.4 Frequency of use

Three categories of low, medium, and high service help to classify the frequency of use of a shared-use passenger vehicle. All levels of service assume seasonal operation to reflect the most popular times of year for visiting the Forest: three months in the winter and four months in the summer/autumn.

Low service includes a trip every two weeks during operating months. The total number of trips is 14 over the entire year.

Medium service includes one trip per weekend day during the summer and winter for a total of 56 trips in a year.

High service includes one trip per day in the summer and winter for a total of 196 trips per year.

3.7.5 Financial information

Table 14 illustrates the cost of acquiring and/or operating a passenger vehicle and its relationship to the frequency of vehicle use. Low-, medium-, and high-level demand are further organized into annual costs, cost per trip, and cost per passenger. Should multiple organizations participate, these costs would be divided among those organizations using the vehicle.

For ad-hoc and seasonal program models, the costs in Table 14 indicate both acquisition and operating costs. For purchase program models, Table 14 indicates operating cost only. This reflects the most likely scenario for each shared-use model; if an organization or group of organizations purchases a vehicle, the assumption is that it would be paid for upfront by a grant that covers the full cost of the vehicle.

As Table 14 illustrates, for organizations that are not able to own a vehicle and intend to use a vehicle infrequently, ad-hoc rentals and charters are the most cost effective program model. This model is only slightly more expensive than operating a vehicle that is owned outright, and does not require any upfront capital expenditures.

If an organization or group of organizations were to receive funding to purchase a vehicle and have the means to operate it, then the purchase model makes the most sense, regardless of frequency of use.

Finally, if only limited capital funding is available, the seasonal or month-to-month lease model can prove cost effective if participating organizations are able to use it to the maximum extent possible.

Table 14: Shared-use Vehicle Program Financial Comparison

Business Model	Vehicle Type	Vehicle capacity	Approximate Cost per Year			Approximate Cost per Trip			Approximate Cost per Passenger			CDL required?
			Low Service	Medium Service	High Service	Low Service	Medium Service	High Service	Low Service	Medium Service	High Service	
Ad-hoc Rental ⁷	Van	15	\$3,166	\$12,663	\$44,322	\$226	\$226	\$226	\$20	\$20	\$20	No
Ad-hoc Charter ⁸	Small bus	30	\$4,722	\$18,886	\$66,101	\$337	\$337	\$337	\$15	\$15	\$15	N/A
Ad-hoc Charter ⁹	Large bus or coach	50	\$8,022	\$32,088	\$112,308	\$573	\$573	\$573	\$12	\$12	\$12	N/A
Seasonal Lease ¹⁰	Van	15	\$18,326	\$20,384	\$27,244	\$1,309	\$364	\$139	\$87	\$24	\$9	No
Seasonal Lease ¹¹	Small bus	30	\$26,917	\$29,016	\$27,244	\$1,923	\$518	\$184	\$64	\$17	\$6	Yes
Purchase ¹²	Van	15	\$3,372	\$5,806	\$14,840	\$221	\$104	\$76	\$15	\$7	\$5	No
Purchase ¹³	Small bus	30	\$4,019	\$7,489	\$23,268	\$287	\$134	\$119	\$10	\$5	\$4	Yes

⁷ Costs developed using a range of quotes from local rental companies.

⁸ Costs developed using a range of quotes from local charter companies on busrates.com

⁹ Costs developed using a range of quotes from local charter companies on busrates.com

¹⁰ Costs developed using a range of quotes from national commercial lease providers

¹¹ Costs developed using a range of quotes from national commercial lease providers

¹² Costs from The Volpe Center's Bus Lifecycle Cost Model. The purchase price is \$20k-\$35k, approximately \$3-10k/year over seven year lifespan.

¹³ Costs from The Volpe Center's Bus Lifecycle Cost Model. The purchase price is \$125k-\$175k, approximately \$22-25k/year over seven year lifespan.

3.7.6 Working with existing shared-vehicle programs

King County Metro Transit is the largest owner and operator of commuter vans in the region. As described in the I-90 Existing Conditions Report (Appendix B) and explored as a Case Study (Appendix C), Metro Transit's Rideshare program is available to King County residents who are not served by fixed-route transit. Metro Transit offers several related services using their fleet, primarily focusing on weekday commuters.

Early in the project, the project team identified King County Metro Transit as a potential partner to help provide shared-use vehicle service to the Forest. This identification was based on the organization's large fleet and long history as one of the most successful and experienced rideshare operators in the nation. Based on initial discussions, however, Rideshare program staff felt that this type of service is not currently in agreement with Metro's mission of serving the weekday commuter market.

King County Metro Transit is the only public operator of a shared-vehicle program in the Puget Sound region. While shared-vehicle partnerships might be possible with private transportation operators, King County Metro Transit currently provides several services through the Rideshare program that may be of interest to organizations considering some type of shared-use vehicle program. A description of three such services is provided below.

Community Vans

King County Metro Transit has created a program for which a van is provided to a local community to be used for community purposes. Although the program is young and few municipalities have successfully implemented it, the opportunity may exist for a town to use a Rideshare van to travel to recreation areas.

Van purchasing

King County Metro Transit has more than 1,000 vans in its fleet, and at any given time, several used Rideshare vans are usually available for purchase directly from the agency. Prices for these vehicles come at a significant discount to similarly used vehicles, and most of the miles on these vehicles have been accrued from highway driving. Metro donates a limited number of vehicles to non-profits through a program coordinated with the elected King County Council.

Lease-to-own vans

King County Metro Transit's lease-to-own program is another acquisition opportunity that reduces capital expenses while giving an organization access to a van immediately. However, the lease-to-own option will not accommodate variations in seasonal use, so it is likely that payments would still need to be made during months when the van is not being used.

3.8 Evaluation of Alternatives

This section offers an evaluation of the alternatives presented above. The items discussed in the evaluation tie directly to the project team's recommendations, which follow in Section 3.10. The evaluation consists of discussion for each group of alternatives (winter circulator, summer circulator, MBSNF shuttle, shared-use vehicle program, I-90 recreation shuttle plus community circulators) for a series of criteria, including:

- *Solutions to problems:* How well do these alternatives address the Forest's transportation goals as identified at the onset of the transit feasibility study (see Table 1)?
- *Cost:* What will it cost to sustain these kinds of programs? Which alternatives are the most cost-effective in terms of providing solutions to identified problems?
- *Convenience:* How well do the alternatives meet the needs and expectations of the visitor?
- *Connectivity:* How do the alternatives contribute to the development of a more integrated transportation system? Where are future opportunities for connectivity?
- *Partnerships:* Who might be interested in helping MBSNF spearhead this transportation service? Who does the Forest need in order to make an alternative a viable solution?
- *Constraints and concerns:* Beyond the ever-present question of funding, what are the obstacles to implementation of the alternatives? What issues will need to be resolved in order to improve short-term feasibility and, where appropriate, ensure long-term sustainability?

3.8.1 Winter Circulator

Solutions to problems

Each winter circulator alternative helps to address access issues at several of the snow play areas on Snoqualmie Pass. Alternative 2 provides access to the fewest destinations and, as a result, serves the fewest potential passengers. Alternative 1A serves the most destinations, and thus has higher ridership potential.

Parking at the Hyak Sno-Park, served by Alternatives 1 and 1A, is currently regulated. Access management is less of a concern, as long as the capacity of the parking facility is aligned with that of the snow play area. At Gold Creek Sno-Park and Gold Creek Pond, parking is not managed, congestion can be a problem, and snow-covered shoulders create unsafe conditions for pedestrians trying to access a snow play area or trail. A solution for improving access to these unregulated sites is likely more important in the near term.

Cost

Like any transit model, operating costs are directly tied to the desired vehicle headways, the number of stops, and the overall length of the trip. In the case of the winter circulator

alternatives, a 15-minute headway allows the Summit Shuttle to maintain its current level of service. As the overall distance of this service increases, there is a need for additional vehicles. Operating more vehicles equates to higher operating costs (fuel, insurance, driver compensation, etc.).

An important aspect of the Summit Shuttle is that it is a free courtesy service to skiers. The free shuttle service is part of the entire experience for visitors, and introducing a fare to ride the shuttle is likely not a desirable option for the Summit. Furthermore, distinguishing between sno-park users and skiers would be challenging, and the added burden on the driver of managing a fare box might result in diminished performance.

In addition to the current price of operating the Summit Shuttle, the minimum cost for the least expensive Alternative 2 is more than \$8,000 per ski season, based on the Summit's current operating costs. Should operating costs increase to something more in line with traditional transit service, the cost of operating Alternative 2 could rise to more than \$20,000 per season.

Convenience

Parking in the winter months can be stressful, regardless of regulations. Snowy surfaces and mounds of plowed snow limit where cars and pedestrians can travel. It is reasonable to think that some portion of drivers would be content to park in a safe area and rely on shuttle transportation to get to the final destination. In the case of Hyak Sno-Park, parking is limited to the number of spaces, so remote parking in conjunction with a shuttle service may provide a new option for visitors on busy days.

Connectivity

If implemented today, the winter circulator would not connect to any fixed-route transit system. However, several private transportation companies currently offer service to the Summit ski area. As an extension of the Summit Shuttle, the winter circulator would be able to provide a connection for private shuttle passengers looking to explore beyond the ski areas.

Partnerships

To implement any of the winter circulator alternatives, MBSNF will have to work closely with the Summit at Snoqualmie (operations) and Washington State Patrol (parking restrictions), and WSDOT (snow removal).

Constraints and concerns

Currently, Washington State Parks requires sno-park visitors to purchase one-day or season passes. Since passes are an important source of income, Washington State Parks will likely not want to risk a decline in their sales. It will be important to identify an alternative means to generate funds.

While snow is common, snow play and skiing are more popular activities after significant storms. It is impossible to predict when these occur. If weekend weather is generally not conducive to high numbers of visitors, the shuttle ridership would also be low and running the service may possibly be deemed unnecessary.

3.8.2 Summer Circulator

Solutions to problems

The summer circulator primarily aims to help manage access in the Denny Creek area, one of the most popular areas in the I-90 corridor for summer activities. The Denny Creek area also lacks sufficient parking, as demand for all major trailheads exceeds parking capacity on an average summer weekend day (see Appendix B). At the Denny Creek/Franklin Falls trailheads along FR 5830, haphazard parking conditions result in vehicle congestion and unsafe pedestrian access in an area with many children. Alternative 3 gives the most attention to this area.

Uphill from the Denny Creek area, the Snow Lake and Pacific Crest trailheads, as well as the Gold Creek Pond picnic area, are also popular, but based on an assessment of current conditions, parking is either abundant (Snow Lake) or adequate (Pacific Crest and Gold Creek Pond). As a result, there are fewer opportunities for managing access at these sites unless the number of parking spaces is significantly reduced.

Cost

Similar to the winter circulator, the cost of a summer circulator depends on the number of vehicles necessary to provide adequate service to visitors. Based on a 60-minute headway used for each alternative, the operator would need at least two vehicles in service at all times. Alternative 3, which with a 54-minute runtime only requires two vehicles, is the least expensive route to operate while concentrating on destinations that are most in need of access management improvements. While Alternatives 4 and 5 offer service to more destinations, the travel distance is long enough that additional vehicles would be required.

Convenience

Based on existing conditions, a lack of parking does little to deter visitors to the Denny Creek and Franklin Falls trailheads. In order for the summer circulator to be considered a feasible alternative, driving must be less convenient and/or less enjoyable. Therefore, a comprehensive access management strategy will have to be deployed in conjunction with transit. Examples include restricting parking on roadsides, eliminating parking in certain areas altogether, or making parking more expensive in certain areas. All would need to be enforced to maintain viability.

A summer circulator may be convenient for hikers and cyclists who do not want to backtrack. They could begin a hike at one trailhead and end at another, using a circulator service for transportation back to the starting point.

Connectivity

If implemented today, the summer circulator would not connect to any fixed-route transit system.

Partnerships

All summer circulator alternatives are based on a model that uses Summit Shuttle vehicles and rely on successful partnership between the Forest and the Summit at Snoqualmie ski area. Opportunities may exist for the Summit at Snoqualmie to assume full operations of the circulator service.

Constraints and concerns

While expanding the parking facility at Denny Creek is an important improvement, the added parking spaces will limit the near-term success of transit. However, the expansion does allow for the long-term development of the Denny Creek area as a transportation hub for summer recreation in the Forest.

Although recreation facilities in the Denny Creek area are already crowded, many sites, parking notwithstanding, are still in a position to accommodate more visitors. Frontcountry attractions (Asahel Curtis Nature Trail, Asahel Curtis Picnic Area, Franklin Falls Trail, Denny Creek Campground) should be managed and promoted to accommodate crowds; this would help to alleviate overcrowding concerns at popular wilderness sites.

3.8.3 I-90 Recreation Shuttle

Solutions to problems

In contrast with the winter and summer circulator alternatives, the I-90 Recreation shuttle aims to provide access to the Forest from surrounding communities for those who are unable or prefer not to drive.

Alternative 6B has the best opportunity to meet this criterion, as it serves the largest population center and has the most stops en route. Alternative 6B is also the most expensive alternative considered. Alternative 7, which starts at Issaquah Transit Center, relies on existing transit service to reach underserved populations in and around Seattle. It is difficult to predict how many riders would be willing to take for the first leg of their trip between Seattle and Issaquah only to transfer to another transportation mode, but with schedule coordination, layover time can be minimized. Alternative 8, which travels from North Bend to the Forest, serves the smallest potential population base.

Cost

All fixed-route shuttle alternatives will come at a cost, and it is clear based on the analysis of expenses that adding stops increases operating expenses. Theoretically, route distance should not impact the per-vehicle operating cost because the vehicles should be carrying passengers all day. The addition of stops increases the travel time, however, and more

vehicles need to be added in order to meet the desired 60-minute headway. It should be noted that the base costs of Alternative 6 and Alternative 7 would be similar if the number of vehicles remained constant.

Convenience

Alternative 6, the direct, long-distance shuttle from Seattle to the Forest, is relatively convenient, assuming the shuttle is taking passengers to their preferred destination in the Forest (or providing convenient connecting service). The time of travel would not be dramatically greater than what it takes to drive, even with stops in Issaquah and/or North Bend (Alternatives 6 and 6B).

In terms of accessing the shuttle at the International District, convenience varies based on passenger needs. For passengers who rely solely on alternative transportation (including tourists), the International District is convenient to downtown accommodations and is served by many different local and regional transit services. For passengers who wish to drive to the shuttle, the International District is much less convenient due to a lack of inexpensive parking. Alternative 6A seems to provide the best of both worlds: a high level of transit access at the International District and ample, free parking at the Issaquah Transit Center. Other park and ride facilities closer to Seattle may be considered, but as more stops are added to a route, the more expensive it gets.

Connectivity

All MBSNF Shuttle alternatives provide strong multimodal connections in downtown Seattle. Alternative 6B offers an opportunity to connect to community circulators discussed in Section 3.6.6. While the additional stops in North Bend and Issaquah will lengthen the total travel time, they also create higher ridership potential with a range of recreation options available to passengers. The additional stop in North Bend necessitates an additional vehicle in service, raising the operating costs of Alternative 6B considerably when compared to Alternatives 6 and 6A.

Alternative 6A provides a potential park and ride opportunity and local bus connections to the eastern Seattle suburbs. It also creates potential connections to existing King County Metro Transit service to Lake Sammamish.

Partnerships

Each MBSNF Shuttle alternatives present opportunities to work with organizations interested in participating in shuttle operations/management or even leading the entire effort. The most likely candidates include:

King County Metro Transit

The MBSNF shuttle would operate entirely within the operational jurisdiction of King County Metro Transit. At the same time, it should be acknowledged that King County Metro Transit has recently been reducing services in eastern King County.

Mountains to Sound Greenway Trust

As an advocate for environmental conservation and landscape enhancement for the entire I-90 corridor, the MBSNF shuttle could help to support many of the organization's projects and programs.

Other public lands agencies

Washington State Parks, Washington State DNR, King County Department of Natural Resources and Parks, and the City of Seattle are all potential partners with transportation needs similar to those of MBSNF.

Corporate sponsors

REI is a large outdoor goods company based in Seattle. The company likely has an interest in exposing as many as people as possible to outdoor recreation. Microsoft, based in Bellevue, currently offers transit service to its employees. Several other large corporations are headquartered in Seattle and may be interested in supporting programs that improve the quality of life for their employees.

In addition to shuttle operations, the community circulators discussed in Section 3.6.6 provide additional partnership opportunities. SVT may entertain the idea of a weekend recreation circulator with service to Mount Si and Rattlesnake Ridge. Civic organizations (such as the City of Issaquah or a local Chamber of Commerce) and volunteer groups (such as the Mountaineers, Washington Trails Association, and the Issaquah Alps Trails Club) may offer additional support.

Constraints and concerns

The biggest challenge and potential constraint for the MBSNF shuttle is solving the question of who might assume operations for this type of service.

King County Metro Transit seems to be the best suited agency for operating the MBSNF shuttle, but the project team believes this type of service is not high on the agency's priority list given current trends in service reduction. If it were to provide the service, King County

Metro Transit may consider formally incorporating this route into its current service portfolio, possibly consolidating similar routes and services.

In partnership with other major stakeholders and corporate interests, it is possible that King County Metro Transit would entertain the recreation shuttle concept, especially if the service was coordinated with connecting services.

3.9.4 Shared-use Vehicle Program

Solutions to problems

The shared-use vehicle concept (Alternative 9) presents some of the best opportunities for targeting user groups who are underrepresented in the demographic profile of Forest visitors. By working directly for organizations that represent these populations, a shared-use program may help to engage potential visitors who would never have considered visiting the Forest in the first place. Based on feedback from potential shared-use organizations, their members prefer traveling in groups and following an organized program. They are less inclined to search for transit opportunities on their own.

Cost

Cost of the shared-use vehicle program varies significantly based on who owns the vehicle and how often it is used, but almost every option requires fewer operating dollars than long distance fixed-route service. Program management responsibilities, however, would raise the cost of the program, with administrative needs and vehicle cleaning, maintenance, and storage.

Convenience

The convenience of the shared-use vehicle program depends on the user. It is quite convenient for those passengers who are affiliated with the organizations that provide the service. Conversely, for those not affiliated with the organizations, taking advantage of this service, if possible at all, is likely not to be convenient.

Connectivity

A shared-use vehicle program places less emphasis on the need to connect to other transit services. Still, organizations interested in pursuing a shared-use vehicle program will want to ensure that trip origins are accessible by alternative transportation, assuming at least a portion of those members do not have access to a car.

Partnerships

Partnerships are at the heart of the shared-use vehicle program concept, although they do not necessarily involve MBSNF. Rather, partnerships would consist of organizations with similar transportation needs that might be able to benefit from sharing one vehicle (or a fleet of vehicles). Rules, roles, and responsibilities would be established in a partner agreement, for which MBSNF can offer guidance. The Forest can also help to supply

programming information to shared-vehicle program participants, as well as provide traveler information to participants.

Constraints and concerns

The most significant potential constraint for the shared-use vehicle program is the Forest's special-use permitting process. As discussed earlier in this report, the current moratorium on special-use permits may not pose a hindrance to large vehicle access by shared-use program participants (due to MBSNF flexibility for non-profit and educational institutions); however, special-use permitting guidance should be reformed with the shared-use vehicle concept (and other transit considerations) in mind.

3.10 Recommendations

Based on the evaluation of alternatives and in conjunction with all efforts performed as part of the I-90 Transit Feasibility Study, the project team presents a series of recommendations for the Forest (summarized in Table 15. The expected timeframe for implementation is not specific in terms of when the recommended actions should occur; rather, phasing implies the order in which strategies should occur to optimize feasibility.

Table 15: I-90 Transit Feasibility Recommendations

	Project	Description	Pilot Duration
Phase 1	MBSNF Winter Circulator	Expansion of existing Summit Shuttle transportation service on Snoqualmie Pass to Gold Creek Sno-Park.	Two winter seasons
Phase 2	Shared-vehicle Program	Multi-organization partnership in which a passenger vehicle or fleet of vehicles is shared among participating organizations, using a reservation system.	N/A
Phase 3	I-90 Recreation Shuttle (winter)	Winter fixed-route transit service along I-90 to Snoqualmie Pass.	Pilot 1: One winter season Pilot 2: Two winter seasons
Phase 4	I-90 Recreation Shuttle (summer)	Summer fixed-route transit service along I-90 to Denny Creek.	Three summer seasons
	MBSNF Summer Circulator	Summer circulator service in the Denny Creek area, including Denny Creek Trail, Franklin Falls, Pratt Lake, Granite Mountain, Asahel Curtis Nature Trail and Picnic Area, and the Denny Creek Campground.	
Phase 5	Issaquah Circulator North Bend Circulator Middle Fork Circulator	Examples of transportation services that could connect to the I-90 Recreation Shuttle and provide service to recreation destinations in the vicinity.	As needed in order to collect best available

For all phases (and pilot projects in particular), it will be essential for organizations to demonstrate success or failure based on established metrics. For example, the operator should monitor costs, collect ridership data, assess user feedback, and analyze system performance. Regardless of its role in operations, MBSNF should contribute to the process of developing metrics that will help the Forest, stakeholders, and general public understand why decisions are made to either expand, reduce, or cut transit service.

3.10.1 Phase 1: Winter Circulator Pilot, Alternative 2

Since the Summit Shuttle already exists on Snoqualmie Pass, the winter circulator is the most straightforward implementation opportunity. Essentially, it is an extension of service for the current shuttle system. A two-year pilot project will allow stakeholders to develop the new service, market it to potential users, test the performance, and make adjustments during the second year if necessary, all while limiting significant investment in the system.

The Transit Feasibility team recommends Alternative 2 because it addresses a major concern for the Forest (parking/access issues at Gold Creek Sno-Park) yet requires only one vehicle be added to the existing Summit at Snoqualmie fleet. Alternative 2 also addresses more of the Forest's concerns associated with roadside parking, safety, and congestion near the Gold Creek Sno-Park.

Prerequisites

- Parking agreement with Summit at Snoqualmie at Summit East
- Circulator operations by Summit at Snoqualmie
- Parking restrictions along roadways near Gold Creek Sno-Park
- Passenger vehicle acquired and introduced into Summit vehicle fleet

Forest involvement

- MBSNF may be able to assist with implementation and funding of a pilot project for two winter seasons.
- Beyond the pilot project, MBSNF may be able to apply for non-operational funding that could support the winter circulator's operator, including:
 - Vehicle acquisition/improvement
 - Facilities acquisition/improvement

Obstacles

- The ski area would likely only want to donate parking and expand circulator service if reimbursements and/or incentives cover 100 percent or more of the increase in operating costs.

- If operating in partnership with MBSNF, the Summit Shuttle might not meet Federal requirements for safety, accessibility, etc.
- If parking is restricted at Gold Creek Sno-Park, Washington State Parks may lose income generated from their winter pass program. Alternative methods of payment should be considered for access to the facility, or the cost of a pass could be raised.
- Fare is currently not required to ride the Summit Shuttle and would be difficult to introduce for the extension.

General steps for implementation

- MBSNF further engages Summit at Snoqualmie and Washington State Parks to assess interest in extending current service to Gold Creek Sno-Park.
- MBSNF further engages Summit at Snoqualmie to assess interest in making parking available at Summit East to sno-park visitors.
- Determine Summit at Snoqualmie's needs in terms of vehicles and/or facilities.
- MBSNF applies for funding to support winter circulator pilot project for two winter seasons.
- MBSNF engages Washington State Parks to develop plan for recouping lost funds due to restricted parking at Gold Creek Sno-Park.
- MBSNF installs signage that restricts parking on roadsides roads near Gold Creek Sno-Park during winter months.
- MBNSF enforces parking restrictions
- MBSNF and partners publicize new circulator system to the general public, to local and regional stakeholders, and to private bus companies that may be interested in connecting to the service.

3.10.2 Phase 2: Develop guidance for shared-use vehicle program

Though a shared-use vehicle program does not support complete access for all, it does have the potential to be the most effective solution to eliminating a transportation barrier for underserved populations while providing an alternative transportation connection to the Puget Sound region. In developing guidance for how this type of program might work without Forest involvement, organizations can learn about ways to create a new program in partnership with organizations that have similar needs. They may also use this guidance to improve the cost effectiveness of programs that they currently offer.

Prerequisites

- Knowledge of potential partnering organizations

Forest involvement

- MBSNF can help potential organizations by developing a guidance document with information about resources, destinations, and costs and benefits.
- In order to increase partner interest, MBSNF will want to ensure that programs and facilities on the Forest meet the needs of the participating organizations and their members.
- MBSNF can conduct outreach to interested organizations and assist them with identifying partners, forming partnerships, acquiring vehicles, and implementing a shared-use vehicle program.

Obstacles

- Currently, MBSNF has a moratorium for issuing special use permits for outfitting guides and other organizations that provide group outings on the Forest. While there has been shown to be some flexibility for public/non-profit organizations in the past, the system of special use permitting will ideally be resolved to ensure shared-use vehicle program participants are compliant with Forest regulations.

General steps for implementation

- MBSNF develops guidance document for shared-use vehicle program.
- MBSNF distributes document to local and regional stakeholders; conducts meeting to offer details and answer any additional questions.
- MBSNF serves as liaison for local and regional stakeholders who wish to partner with organizations that share similar transportation needs.

3.10.3 Phase 3: Winter Shuttle from Seattle, Alternative 6

In order to complement the winter circulator, a long-distance shuttle from Seattle will help to transport skiers as well as those looking to spend a day at one of the snow play areas. Assuming the winter circulator (see Phase 1) is operating, long-distance shuttle passengers should be able to reach a variety of destinations at MBSNF.

With appropriate Forest programming, the long-distance winter shuttle can serve both car-free and car-less populations. Without programming tailored to the car-less population and guaranteed access to snow-play areas beyond the Summit at Snoqualmie ski areas, a long-distance winter shuttle will be no different than any of the existing private ski shuttles and would have a difficult time competing.

The Transit Feasibility team recommends two pilot projects:

- Pilot 1: Managed and implemented by the Forest, the first pilot project will help to determine how this type of service will compete with existing winter shuttle

services. It will include four to six chartered bus trips during one winter season, for which passengers reserve seats in advance.

- Pilot 2: If seats sell out for Pilot 1, MBSNF can use the momentum to develop a more extensive two-year pilot project that operates on all winter weekends under agreement with a private contractor or other transportation provider. Demonstrated success will help to garner stakeholder support, which is crucial to the long-term sustainability for this type of service.

Ultimately, the winter shuttle and summer shuttle could operate as a single transportation entity. For more details regarding opportunities for large-scale sponsors, see Phase 5.

Prerequisites

- Operational winter circulator as described in Phase 1
- Operations agreement with private contractor or other transportation provider for Pilot 2
- Funding assistance from local and regional stakeholders for Pilot 2

Forest involvement

- Pilot 1 will be organized by MBSNF and funded solely by MBSNF or in partnership with other stakeholders. Since buses will be chartered through private transportation companies, the Forest will not be responsible for programming and/or vehicle operations.
- MBSNF will participate heavily in marketing and promotion of both pilot projects and will also work to create programs on the Forest that are suitable to potential transit riders.
- MBSNF will assist with developing performance metrics to ensure all relevant data is collected during Pilot 2.

Obstacles

- Logistically, there are no major obstacles to implementation of Pilot 1. The biggest concern is a lack of interest by the public in this type of transportation service, especially since several private companies provide a similar service.

General steps for implementation

- MBSNF to secure funding for Pilot 1.
- MBSNF to implement Pilot 1 with strong marketing and outreach, documenting results.

- MBSNF to foster support from stakeholders, including some of the major organizations in the region whose backing and financial support would be required to support this type of system longer term.

3.10.4 Phase 4: Comprehensive Summer Transit Service, Alternatives 3 and 6A

Different from the winter recommendations, the implementation of summer service is more complicated. Since no summer service currently exists and there are significant measures that would need to be taken to make it viable, the implementation will be a significant undertaking. Furthermore, the project team believes the summer circulator will need the long-distance shuttle (and vice versa) in order to fully realize the service's potential. Therefore, the Phase 4 recommendation is that Alternative 3 and Alternative 6A are implemented simultaneously.

Given the larger effort of implementing both a circulator service and a long-distance shuttle together, implementation of Phase 4 will require more significant capital investment. Still, the project team recommends beginning with a three-year pilot project. By extending the length of the pilot project, transportation providers will have an opportunity to adjust services, monitor growth, and produce more extensive data to measure the system's performance over time.

Prerequisites

- Parking restrictions near Denny Creek/Franklin Falls trailheads
- Parking restrictions at Pratt Lake and Granite Mountain
- Parking restrictions at Annette Lake/Asahel Curtis Nature Trail
- Adequate transit facilities (bus stops and shelters) at expanded Denny Creek parking facility
- Circulator operations by Summit at Snoqualmie
- Shuttle operations by independent contractor or existing transportation provider

Forest Involvement

- MBSNF will be responsible for working with the Summit at Snoqualmie to carry out the summer circulator.
- MBSNF will work with regional partners to implement the shuttle from Seattle to MBSNF.
- MBSNF will promote the transportation service to stakeholders and the general public.

Obstacles

- The biggest obstacle to Phase 4 is the number of prerequisites that need to be fulfilled in order to pilot the new service. Physically, there are no major obstacles to implementation. Logistically, however, many different fundamental pieces will need to come together in order to provide a valuable service to the Forest visitor.

General steps for implementation

- MBSNF to develop partnerships for three-year pilot project.
- MBSNF works with Summit at Snoqualmie to implement Alternative 3.
- Regional stakeholders and transportation providers work to implement Alternative 6.
- MBSNF will assist with developing performance metrics to ensure relevant data is collected during pilot project period.

3.10.5 Phase 5: MBSNF Shuttle plus Community Circulators

Prerequisites

- All pilot projects from previous phases completed; data from pilots collected and analyzed to demonstrate success and proceed with full implementation.
- Partnerships with funding support from organizations such as Mountains to Sound Greenway, Puget Sound Regional Council, Washington State Parks, Washington State DNR, King County Metro Transit, etc.
- Partnership with funding support from large corporate sponsor
- Agreement from smaller local organizations and transportation providers that local circulator service will be developed to connect to the recreation bus.

Forest Involvement

- While MBSNF will play a significant role in developing and preparing for the implementation of this concept, once it is implemented, MBSNF will focus on its work with the Summit at Snoqualmie to ensure connectivity with the recreation bus while providing safe and reliable circulator service in the Denny Creek area.

Obstacles

- The major obstacle for Phase 5 will be getting more agencies to participate in the recreation bus program and establish connections to the service. Without support in Issaquah and North Bend to connect to some of the state's most popular places to visit, the service will be difficult to sustain.

General steps for implementation

- Again, Phase 4 will have addressed many of the implementation considerations, particularly pertaining to MBSNF.
- Weekend recreation-based connecting service will need to be established in Issaquah.
- Weekend recreation-based connecting service will need to be established in North Bend.
- Future recreation-based connections could be created, including service to the Middle Fork, service to Snoqualmie Falls, and service to destinations east of Snoqualmie Pass.

IV. Next Steps

Several immediately implementable actions are available to MBSNF and will help to continue the momentum in its pursuit of alternative transportation.

Parking Management Impact Assessment

A prerequisite for all transit recommendations is that the Forest implements a system to manage parking at trailheads and other destinations within the I-90 corridor. Before this can happen, MBSNF leadership will need to understand the costs and benefits of implementing parking management measures. Areas of interest include:

Tools for Managing Parking

- Physical improvements, such as well-defined parking spaces where parking is allowed and barriers to block access to areas where parking is prohibited
- Signage to identify areas where parking is allowed/prohibited
- Large-scale closures
- Active staffing (and electronic solutions) to monitor parking availability and enact temporary area closures
- Enforcement, such as ticketing and towing
- Transit, to mitigate loss/reduction of vehicular access

Benefits and Opportunities

- Visitation management
- Facility maintenance
- Safety
- Visitor experience

Current Revenue

- From Northwest Forest Pass
- From ticketing

Potential Revenue

- From Northwest Forest Pass
- From ticketing
- From transit fares

MBSNF Website Improvements

The project team supplied the Forest web development team with sample HTML code that shows road and trail status on a Google Maps base. MBSNF can add this feature to the website as the first step in providing more dynamic and accurate information to Forest visitors.

Outreach to Potential Partners

Throughout the transit feasibility study process, several potential partners emerged and, in some cases are integral to the project team's recommendations. These partners were engaged by the project team at multiple points throughout the study, and it will be important to maintain communication with the following organizations as the Forest takes steps toward transit implementation. The project team will provide a detailed list of all contacts to MBSNF upon final delivery of this report.

- Summit at Snoqualmie Ski Area
- Snoqualmie Valley Transportation
- King County Metro Transit
- Mountains to Sound Greenway Trust
- Private/corporate entities

General Stakeholder Outreach

Continued engagement of stakeholders is critical to transit feasibility. Therefore, it is important to ensure stakeholders are aware of the MBSNF Alternative Transportation Feasibility Study Phase II findings. By inviting all stakeholders to participate in a web meeting, those familiar with the project will ideally remain engaged during subsequent efforts.