Transportation Management Alternatives

I-70 Mountain Corridor

Draft Environmental Impact Statement

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Overview

Transportation Management focuses on reducing Corridor congestion and improving overall mobility on the existing I-70 facility. This alternative includes an integrated package of Transportation Management strategies that maximize the operational efficiency and person-moving capacity of the Corridor by better balancing the demand for travel on I-70 with the capacity of I-70 to handle travel demand. Many of these strategies rely heavily on public-private partnerships to achieve desired results.

Transportation Management includes the coordinated implementation of transportation demand management (TDM), transportation system management (TSM), and intelligent transportation system (ITS) strategies. As an introduction, the following brief definitions are provided:

- **Transportation Demand Management (TDM).** TDM is designed to most efficiently use existing transportation facilities by managing the actual "demand" placed on these facilities. Using integrated strategies that maximize available travel-mode choices, increase vehicle occupancy, reduce travel distances, and shift peak-period demand to non-peak periods, TDM programs extend the useful life of transportation facilities and enhance mobility options.
- **Transportation System Management (TSM).** TSM measures involve operational improvements to existing transportation facilities that maximize their person-moving capacity, reduce the severity and duration of temporary (for example, crash and weather) delays, and improve safety.
- **Intelligent Transportation Systems (ITS).** ITS involves the application of advanced technologies and communications to optimize the efficiency of transportation systems. ITS applications are often an integrated support element of both TDM and TSM strategies.

The Transportation Management strategies summarized in this section include TDM, TSM, and ITS strategies as part of an integrated package. Transportation Management can be implemented as a standalone alternative or integrated as a complement to other "build" alternatives.

I-70 Transportation Management Existing and Forecast Conditions Assessment

Introduction

Transportation Management strategies attempt to reduce the severity and duration of congestion and to enhance overall mobility by improving the balance between the demand for travel on I-70 with the capacity of I-70 to handle travel demand. These strategies recognize that both travel demand and facility capacity can vary under a variety of circumstances.

Transportation Management strategies generally exclude extensive infrastructure investments aimed at expanding roadway capacity. Instead, these strategies focus on:

1. Management of travel demand to reduce the severity and duration of circumstances where travel demand exceeds existing roadway capacity. Modifications to travel demand can include adjustments to travel time (by time-of-day and/or day-of-week), travel route, trip distance (through changes in trip origins and destinations), and vehicle occupancy.
2. Management of existing Corridor capacity to address locations where relatively minor improvements to the roadway network or highway operations will help address temporary or long-term capacity bottlenecks. Temporary bottlenecks include those caused by incidents, weather, and construction factors.

Development and implementation of Transportation Management strategies along Colorado's I-70 Mountain Corridor must be tailored to fit the unique recreation-based nature of trip-making in the Corridor. Although the national base of experience in Transportation Management is more extensive for urbanized areas, recreation-centered corridors can be particularly appropriate for Transportation Management strategies because they often have highly predictable travel patterns, significantly increased travel demand during specific peak-periods, and relatively concentrated travel destinations. Additionally, corridors with a high volume of recreational trips often have high environmental amenity values tied to both the travel route and the trip destination, increasing the value of transportation strategies with lower environmental impacts.

The coordinated management of both demand and capacity fosters greater efficiency from existing transportation facilities, maximizing their overall person-moving and goods-moving capacity. Well-designed, well-coordinated Transportation Management strategies can provide win-win solutions to transportation challenges in recreation-centered corridors by improving the overall visitor experience, enhancing economic vitality, and reducing (or delaying) the need for major transportation infrastructure investments with potentially high economic and environmental costs.

Challenges for Transportation Management on I-70

The following factors present challenges to the development of Transportation Management strategies in the I-70 Mountain Corridor.

- **Lack of a coordinating organization for I-70 "functional area."** The I-70 Mountain Corridor represents a single functional area. Defined by common geographic characteristics and tourism-related economic generators and united by I-70 as a major transportation connector, residents and visitors live, work, and play throughout the entire I-70 Mountain Corridor, from west Denver to Glenwood Springs. This common "functional area" includes five counties, more than ten municipalities, multiple public and private transit operators, and one regional airport. However, there is no existing organization to coordinate activities that impact transportation across jurisdictions. This is a challenge because the development and implementation of many Transportation Management strategies rely on enhanced coordination between transportation providers and between the public- and private-sector organizations. In many corridors around the country, Transportation Management Associations (TMA) have been created. These associations bring the diverse interests along the corridor together to help implement Transportation Management strategies.
- **Transportation Management less proven in recreation-centered corridors.** There is significant experience and understanding of Transportation Management strategies within urbanized areas, particularly for commute-trips. There has been less experience with these strategies for recreation trips. Nonetheless, the last few years have seen a surge in interest in and implementation of Transportation Management measures in tourism environments, with the National Park Service leading the charge in parks like Acadia and Yosemite. The development of Transportation Management strategies for the I-70 Corridor is based on a review and analysis of 11 similar corridors throughout North America, from Lake Tahoe to Cape Cod (see **Appendix A**).
- **Currently high average vehicle occupancy.** The average number of passengers per vehicle in the I-70 Mountain Corridor today is approximately 2.4, considerably higher than national averages for all trips types but normal for recreation-centered corridors. Incremental increases in average vehicle occupancy (AVO) are often more difficult in areas where AVO rates are already high.

Opportunities for Transportation Management on I-70

The following factors present opportunities for the development of successful Transportation Management strategies in the I-70 Mountain Corridor.

- **Strong network of local transit systems and pedestrian-friendly communities.** Eagle County Transit, Summit Stage, localities, and ski areas

currently operate successful, and free, transit services in a large percentage of the primary destination areas along the Corridor. Additionally, many of the primary destination communities along the I-70 Corridor feature pedestrian-friendly central areas. These services are a critical element for the success of many Transportation Management strategies, as they provide a background network of transportation infrastructure for those arriving without a vehicle.

- **Distinct and predictable trip types and patterns.** Recreation trips along the I-70 Corridor, particularly those originating from the Front Range, are largely distinct (in terms of trip purpose) and predictable (in terms of travel patterns and departure times). Additionally, travel route options are limited, and destinations concentrated. Winter destinations are more concentrated than summer destinations. Compared to the varied and disperse nature of urban commute-trips, trip-making in recreation-centered corridors like I-70 is more focused, which allows more effective targeting of Transportation Management strategies to specific travel markets.
- **High value on travel experience among recreation, "choice" trips.** The *1999-2000 I-70 User Study* found that 63 percent of travelers on I-70 (Winter 2000) made "similar trips" on I-70 once a month or less. For trips taken less frequently, particularly recreation trips (which are typically optional, or "choice" trips), travelers often place a higher value on travel "experience." Other factors such as travel cost and travel time, while still relevant, are often less of a priority than they would be for trips like commute-trips that are undertaken much more frequently. When the travel destination is recreation/enjoyment, transportation to the destination becomes part of the overall experience. As such, there are opportunities for Transportation Management strategies to tailor travel options that stress convenience and enjoyment (even over travel time and travel cost factors).
- **Peak-shifting is already occurring.** Travel patterns along I-70 have already shifted to off-peak hours in response to growing traffic congestion during peak-periods. While this shift in demand provides a degree of congestion relief, these shifts are occurring in response to a "negative" influence: peak-period congestion. There is reason to believe that some trips are eliminated altogether from the I-70 Corridor, which has a detrimental impact on economic vitality for both private- and public-sector interests in the Corridor. There is an opportunity to "control the message" and begin to shift the influential factors from negatives (congestion, difficult driving conditions, etc.) to positives (convenient travel options, off-peak travel incentives, etc.).
- **Incremental improvements mitigate/delay the need for investments with high economic and environmental costs.** Transportation Management measures target-specific roadway locations and time periods where demand exceeds capacity. As such, to be effective, these strategies do not need to achieve large-scale shifts in corridor-wide travel behavior. Relatively small shifts in demand can "smooth the peak" and improve overall operations and

efficiency. Additionally, even minor shifts in demand (and reductions in temporary delays) can delay the need for major infrastructure investments by getting more out of existing facilities.

Comparable North American Case Studies and Best Practices

The following section provides an overview of best practices from 11 North American case studies researched for this project to establish a context for the development and evaluation of Transportation Management strategies for the I-70 Mountain Corridor. **Appendix A** provides a full description of these case studies.

Case Study Locations

1. The Lake Tahoe Region, California/Nevada
   - Various corridors including Nevada State Route 28, California's I-80, California Highway 50
2. Whistler-Blackcomb, British Columbia
   - Highway 99
3. Cape Cod National Seashore, Massachusetts
   - Route 6
4. Florida Keys
   - US 1, from Miami to Key West
5. US National Parks
   - Great Smoky National Park - Cades Cove Loop
   - Acadia National Park
   - Grand Canyon National Park
   - Zion National Park
   - Yosemite National Park
6. Washington State
   - I-405 corridor
7. I-93: Salem to Manchester, New Hampshire

Best Practices Overview

Despite the unique geographic features, level of planning efforts and differing political environments, the case study research identified the following specific programmatic and marketing best practices for the implementation of Transportation Management strategies in high recreation-travel corridors:

Programmatic and Institutional Best Practices

- **Regional coordination:** Coordinate with local and public planning agencies (including departments of transportation, parks departments, city and county jurisdictions, metropolitan planning organizations, etc.), businesses (including tourist agencies, resorts, ski resorts, etc.), and residents (including peak-season and year-round residents) when planning Transportation Management strategies.
- **Integration of commute-oriented strategies:** Include commute-oriented employee mobility strategies within the overall tourism-focused Transportation Management plan.
- **Incentives over disincentives:** Focus on incentives over disincentives to increase vehicle occupancy and encourage off-peak travel as a means to maintain or improve the visitor experience for recreational-oriented trips.
- **Affordability, convenience, and enjoyment:** Make transportation choices easy to use, affordable, and fun for visitors. Non-auto-oriented travel options should be fully integrated into the overall visitor experience.

Marketing and Information Best Practices

The case study research revealed the importance of marketing and information programs to the effectiveness of Transportation Management programs:

- **Information early and often:** Market TDM and Transit programs at every level of the visitor's experience. The visitor should be aware of transportation options from when they start planning their trip to when they arrive. Provide detailed, easy-to-understand information to visitors regarding their travel choices and how to use them.
- **Take advantage of technology and existing information channels:** Use the Internet, tourist and travel agencies, and resort marketing programs to market both recreation and transportation messages.
- **Tailor messages to key target markets:** Include marketing efforts targeted at two distinct visitor audiences: those who arrive car free and those who drive.

Development of Transportation Management Strategies

The following issues are central to the development of all of the alternatives:

1. **Understand travel market segments and target travel markets with the best ability to solve the problem.** While there are a tremendous number of trip types using the I-70 Corridor, Transportation Management strategies designed to address specific transportation problems must (1) target the primary target markets contributing to these problems and (2) design travel options that appeal to these target markets. Program development should be focused, not scattershot. As such, market segmentation research should be a key precursor to the development of travel alternatives and marketing messages. Examples of very general market segments using the I-70 Corridor might include:
    a. Front Range Winter Day-trippers
    b. Front Range Winter Overnighters
    c. Out-of-town Winter Overnighters
    d. Front Range Summer Day-trippers
    e. Front Range Summer Overnighters
    f. Out-of-town Summer Overnighters
    g. I-70 Employees/Daily Commuters
2. **Focus on a positive visitor experience.** The Transportation Management strategies focus on incentives over disincentives in the design and promotion of recreation-oriented travel choices and non-peak-period travel.
3. **Capture trips before they enter the I-70 Corridor.** Strategies to promote high-occupancy travel options (whether private carpools/vanpools, private shuttles, or public transportation) should capture trips from Colorado's Front Range and Denver International Airport (DIA) before entering the I-70 Corridor. For example, development of park-n-rides for Front Range travelers should occur close to trip origins within the Front Range, rather than along the I-70 Corridor itself. Benefits include maximizing vehicle occupancy on the I-70 Corridor and reducing parking demand at constrained destinations.

Transportation Management Strategies – Description and Assessment

1. Peak-Spreading and Vehicle-Occupancy Incentives

Brief Description: The use of incentives to shift travel demand by time of day and day of week and to increase average vehicle occupancy. Incentives include financial incentives, travel time and convenience incentives, and reward/point program incentives ("frequent flier points").

Consider demand/capacity relationships across all impacted sectors. While travel demand and available roadway capacity on the I-70 Corridor are important to understand, designing an effective Transportation Management program must consider demand/capacity relationship in other business sectors that influence the demand for travel on I-70. Examples include ski lift seats, resort/community parking spaces, lodging beds, restaurant seats, campground spaces, car rental seats, airline seats, etc. A successful Transportation Management program must consider ways that the demand/capacity balance in each of these areas interacts to shape the visitor experience and affect transportation demand on I-70. This analysis will form the basis for win-win public-private partnerships where mutually beneficial overlaps in these demand/capacity ratios exist.

Overview of Strategies:

1. "Colorado Mountain Plus" Club
2. "Colorado Mountain Plus" Smart Card
3. Alternative Recreation Schedule Arrangements
4. Travel Industry Partnership Program
5. Marketing and Education Campaigns
6. "Try Another Way" Challenge Campaigns

Estimated Cost Range:

- Basic Implementation:
  - Start-up: $250,000 - $500,000
  - Annual: $300,000 - $1,500,000
- Aggressive Implementation:
  - Start-up: $500,000 - $750,000
  - Annual: $1,500,000 - $3,000,000

Estimated Effectiveness Range (reduction in peak-period travel demand):

- Basic Implementation:
  - Summer: 2 – 4%
  - Winter: 4 – 8%

- Aggressive Implementation:
  - Summer: 3 – 6%
  - Winter: 6 – 10%

Detailed Description of Strategies:

1. **"Colorado Mountain Plus" Club.** Development of an I-70 Mountain Corridor rewards program, based on concepts similar to "frequent flier" rewards programs (called the "Colorado Mountain Plus" program for discussion purposes in this document). A corridor-wide rewards program provides an array of benefits and efficiencies for the implementation of peak-spreading and vehicle-occupancy incentives, as well as other Transportation Management strategies. The program would likely be managed by a group like a Transportation Management Association (TMA), such as the proposed "Colorado Mountain Corridor TMA," described in the previous section. Program elements/benefits include:
   - Accrual of reward points and/or direct financial incentives for off-peak travel and increased vehicle occupancy. Managed at either trips origins (for example, airports) or trip destinations (for example, ski resorts).
   - Creates a consolidated "user group" for targeted communications related to transportation issues, incentive programs, travel packages, trip planning, emergency communications, etc. Potentially including:
     - Advanced traveler information services providing traffic updates and recommendations of preferred travel times.
     - Information on lodging discounts available for nights that encourage off-peak travel.
   - Provides advertising "market" for private-sector partners (one of the incentives for private-sector participation) and offers the potential for revenue generation.
   - Program used to integrate several other strategies described in the following sections.
   - Could include development of "organization-based" Colorado Mountain Plus memberships. Special programs and incentives for bulk participation of organized groups. Working through organized groups provides a natural complement for ridesharing promotion, allows leveraging of organization-owned parking spaces along the Front Range (see parking strategies), and provides for targeted marketing and education programs. Groups could include:
     - Companies
     - Youth/school/sports groups
     - College/university/alumni groups
     - Faith groups
     - Out-of-state "ski clubs"

2. **"Colorado Mountain Plus" Smart Card.** Development of integrated smart card technology that could serve as a:

   - Lift ticket or ski pass
   - All-providers transit pass (even for "free" services)
   - "Colorado Mountain Plus" debit card for rewards

   The development of the Colorado Mountain Plus Smart Card provides tremendous flexibility for the implementation of a Colorado Mountain Plus rewards program, and other incentive-based strategies identified in this plan. As a debit card (using Visa, MasterCard, or other systems), the system would allow the accumulation of credits (in dollars) from incentive programs that could be used for lift tickets, lodging, dining, equipment rentals, campground reservations, car rentals, etc.

3. **Alternative Recreation Schedule Arrangements.** Working closely with ski resorts, recreations areas, lodging groups, and others to explore alternative hours of eligibility for daily and multiday lift tickets, campground reservations, check-in and check-out times, etc., to facilitate off-peak travel patterns. Also includes exploring potential travel packages that combine lodging and activities in an arrangement that allows (or even bundles in) off-peak travel between I-70 destinations and the Front Range or DIA.

4. **Travel Industry Partnerships.** Working closely with travel industry stakeholders to explore potential off-peak travel and high-occupancy vehicle incentives, including:

   - Car rental rideshare/non-peak incentive program. Upgrade costs, as well as any administrative costs, partially compensated by free advertising through Colorado Mountain Plus program. Examples:
     - Free comp one-class upgrades for 3+ cars
     - Free upgrade and ski racks for 4+ cars
     - Free upgrade to SUV/Van for 5+ groups, with weekday pickup and return.
     - Free additional day for those returning on Monday.
   - Partnerships with Airlines, Lodging, Restaurant Groups. Targeted to out-of-town visitors. Work to bundle transportation between DIA and Mountain Corridor destinations into travel packages. Provide off-peak incentives. Work with lodging groups to provide incentives for stays that do not start/end during peak travel days (for example, free Sunday night stay).
   - Partnership with Travel Agencies. Work with travel agents booking Colorado vacations to bundle transportation into traveling planning services. Provide incentives for those arriving and departing at non-peak times (for example, free lift tickets, car rental days, lodging nights).

Provide incentives for larger groups to book high-capacity vehicles. Provide all those that book with prepackaged travel information and CO Mountain Plus Smart Card.

5. **Marketing and Education Programs.** Marketing and education programs are essential to the effectiveness of all Transportation Management programs, including marketing of the "Colorado Mountain Plus" rewards programs, of travel choices and how they work, and of the benefits of "off-peak" travel. Education programs can inform travelers of forecast off-peak "travel opportunities." Integrated marketing of travel destinations and of transportation choices is critical.
6. **"Try Another Way" Challenge Campaign.** A key barrier to use of various travel choices is often that travelers have not ever tried other options. This program includes twice a year "try another way" challenge campaigns to encourage travelers to try a different travel option on a specific day or week. This program would be tied to the Colorado Mountain Plus program and include rewards for participation, a significant prize giveaway for each campaign, links to organization-based Colorado Mountain Plus members.

2. Enhanced Traveler Information

Brief Description: The provision of enhanced traveler information services designed to allow travelers to make "smart" travel mode and travel time (by time-of-day and day-of-week) decisions before departing. Also includes programs to notify travelers of incident- and weather-related delays during their travels and to provide advanced public transportation schedule and routing information.

Provide integrated traveler information before the trip begins. Too often, advanced traveler information programs focus on providing travel information (regarding alternative modes, off-peak travel opportunities, weather/incident delays, etc.) to travelers during their trip. However, unless relevant information is received before departure, opportunities for modifications in travel behavior are more limited (particularly due to the limited nature of alternative routes along I-70). Additionally, traveler information and resort marketing programs should be integrated to maximize opportunities for comprehensive travel planning (integrating choices regarding travel dates, destinations, and duration with choices regarding travel mode and departure time). The "messaging" of resort marketing and travel information should be coordinated and unified.

Overview of Strategies:

1. "Colorado Mountain Plus" Website and Personalized Travel Information
2. "Colorado Mountain Plus" Travel Information and Operations Center
3. Intelligent Public Transportation Systems

Estimated Cost Range:

- Basic Implementation:
  - Start-up: $100,000 - $250,000
  - Annual: $100,000 - $400,000
- Aggressive Implementation:
  - Start-up: $500,000 - $5,000,000
  - Annual: $400,000 - $2,500,000

Estimated Effectiveness Range (reduction in peak-period travel demand):

- Basic Implementation:
  - Summer: .25 – 1%
  - Winter: .5 – 1.5%
- Aggressive Implementation:
  - Summer: 1 – 2%
  - Winter: 2 – 3%

Detailed Description of Strategies:

1. "**Colorado Mountain Plus" Website and Personalized Travel Information.** A website that provides users with consolidated trip planning resources (integrating transportation into total trip planning). The website becomes the central resource for advanced traveler information systems, centralizing travel information (including incident/weather updates, congestion reports, etc.) and allowing user personalization (creation of "My Mountain Plus" homepage). Registered users would be able to receive critical travel updates by cell phone or email. Advanced travel planning features would allow integrated planning for transportation connections (along I-70 and at the destination, both public and private), parking information, ski area and other recreation passes, lodging, dining, etc. This site would build on existing services, such as the "Colorado Trip" website developed by CDOT.
2. **"Colorado Mountain Plus" Travel Information and Operations Center.** Development of a consolidated travel planning reservation and information center that integrates the services of a "travel agent" and the services of a "mobility manager." Colorado Mountain Plus "customer service agents" would be available to provide trip planning information for all phases of a trip, including information on various I-70 transportation options and information on special off-peak travel packages. Information on using transportation options during the actual visit (for example, how to use the in-town transit services) could also be available.
3. **Intelligent Public Transportation Systems.** Investment in advanced vehicle locator and other GPS technologies to improve the availability of real-time information for many of the Corridor's local transit systems. Includes integration of this technology with web and other communications technologies.

Breckenridge Main Street Shuttle

3. Park-n-Rides

Brief Description: Utilization of public, private, and joint-venture park-n-ride / intermodal-transfer facilities to facilitate high-occupancy travel options for trips originating from the Front Range.

Overview of Strategies:

1. Front Range Park-n-Ride Joint Development
2. Public and Private Park-n-Ride Partnerships

Estimated Cost Range:

- Basic Implementation:
  - Start-up: $1,000,000 - $2,500,000
  - Annual: $50,000 - $150,000
- Aggressive Implementation:
  - Start-up: $3,000,000 - $10,000,000
  - Annual: $100,000 – $500,000

Estimated Effectiveness Range (reduction in peak-period travel demand):

- Basic Implementation:
  - Summer: .25 – .5%
  - Winter: 1 – 3%
- Aggressive Implementation:
  - Summer: 1 – 3%
  - Winter: 3 – 6%

Detailed Description of Strategies:

1. **Front Range Park-n-Ride Joint Development.** Phased development of 5 to 15 Front Range park-n-ride/intermodal-transfer-center projects customized for trips bound for the Mountain Corridor. Pursued as "joint developments" between a potential Colorado Mountain Corridor TMA, public transportation organizations, recreational gear rental companies, ski resorts, gaming companies, restaurateurs, and private transportation providers. Intermodal pickup and drop-off locations would serve private van and shuttle providers, lodging shuttles, gaming shuttles, and public transit vehicles. Facilitates bundling of transportation services with total travel planning ("free shuttle service from the Front Range with any seven night stay"). A portion of the parking capacity can be leased to Front Range public transit providers during off-peak periods. Additionally, incentives based on departure time and vehicle occupancy would be offered at these locations. Incentive programs should be marketed as part of overall trip planning programs and integrated with Colorado Mountain Plus program. Examples could include:
   - Rewards program dollars given by vehicle occupancy
   - Rewards program dollars given for non-peak departures
2. **Public and Private Park-n-Ride Partnerships.** Many Front Range parking facilities are used primarily during the work week. This program would facilitate partnerships with organizations that manage parking facilities along the Front Range to promote "private mini-park-n-rides." Partnering organizations could include private parking companies (for example, Lanier Parking), employers, schools, colleges/universities, etc. Partnerships between private parking companies and the Colorado Mountain Plus program could provide free parking and Colorado Mountain Plus Rewards for high-occupancy vehicles or those leaving at non-peak times. With the exception of the private parking facilities, use of the parking at other organizations would be targeted to the groups that typically use these spaces (for example, company employees would use their company's parking spaces on weekends), and ridesharing incentives would be facilitated through Organization-based Colorado Mountain Plus members.

4. Parking Operations and Incentive Plan

Brief Description: Programs to manage existing and future parking facilities at major I-70 Mountain Corridor destinations.

Overview of Strategies:

1. Priority Parking Access
2. Long-term Management of Parking Capacity

Estimated Cost Range:

- Basic Implementation:
  - Start-up: $50,000 - $200,000
  - Annual: $75,000 - $200,000
- Aggressive Implementation:
  - Start-up: $50,000 - $400,000
  - Annual: $300,000 – $600,000

Estimated Effectiveness Range (reduction in peak-period travel demand):

- Basic Implementation:
  - Summer: .5 – 1%
  - Winter: 1 – 3%
- Aggressive Implementation:
  - Summer: .5 – 2%
  - Winter: 4 – 15%

Detailed Description of Strategies:

1. **Priority Parking Access.** Coordinated program at ski resort lots, mountain community municipal lots, public recreation area lots, and other managed parking lots along the Mountain Corridor. Incentives include a combination of direct financial incentives, priority access to destinations, and the Colorado Mountain Plus rewards program. Incentives could be tied to both off-peak arrival times and high-occupancy vehicle targets. Examples could include:
   - Access to priority parking areas allowed for arrival before 7:00 AM
   - Access to priority areas provided for 4+ HOVs
   - Rewards points provided for 5+. Examples (illustrative only):
     - $5 on Colorado Mountain Plus debit card for each person in a car with more than 5 people
     - $7.50 for each person in 6+ vehicle
     - $10 for each person in 8+ vehicle
2. **Long-term Management of Parking Capacity.** Coordination between recreation areas and cities/counties in the Corridor to manage the long-term growth of parking capacity at recreation destinations. Continued expansion of unmanaged parking facilities at recreation destination will continue to facilitate growth in overall travel demand along I-70. Reductions in the future growth of parking capacity, coupled with improvements in transportation alternatives to and within Corridor destinations, provide a significant opportunity for reductions in the forecast growth of future travel demand.

5. Bicycle Improvements

Brief Description: Improvements to bicycle connectivity and safety within I-70 Mountain Corridor communities, including investments in bicycle facilities and road-crossings and improvements in bikes-on-transit infrastructure.

Overview of Strategies:

1. Municipal Bicycle Planning and Infrastructure
2. Bikes-on-Transit Investments

Estimated Cost Range:

- Basic Implementation:
  - Start-up: $0
  - Annual: $50,000 - $500,000
- Aggressive Implementation:
  - Start-up: $0
  - Annual: $500,000 - $1,000,000

Estimated Effectiveness Range (reduction in peak-period travel demand):

- Basic Implementation:
  - Summer: 0 – .5%
  - Winter: 0 – .25%
- Aggressive Implementation:
  - Summer: .5 – 1%
  - Winter: 0 – .5%

Detailed Description of Strategies:

1. **Municipal Bicycle Planning and Infrastructure.** Enhanced investment in local and regional bicycle facilities, including planning and construction.
2. **Bikes-on-Transit Investments.** Investments in transit-related bicycle facilities, including bike racks on buses, bike lockers at transit stops, etc.

6. Ramp Metering

Brief Description: The control of vehicles input into a freeway system by the use of traffic lights at on-ramps. Its objective is to achieve maximum flow and prevent the onset of congestion. This strategy has to be interactive with the changing demand patterns throughout the day (and week). Also, it has to react to incidents or lane closures and if its presence at a location changes the demand pattern, the metering should track and change accordingly.

Overview of Strategies:

1. Eastbound-on at Empire Junction
2. Eastbound-on at East Idaho Springs
3. Eastbound-on at SH 103

Estimated Effectiveness Range (reduction in peak-period travel demand):

Studies in the nation suggest an improvement in travel time of up to **7%**.

Detailed Description of Strategies:

1. Ramp metering at the eastbound on-ramp at Empire Junction could help mitigate the congestion caused by the merge. Public opinion could be a potential problem due to the increased delay at the on-ramp.
2. The eastbound on traffic at East Idaho Springs, if metered, could possibly prevent congestion on I-70. The presence of the frontage road as an alternate route would make it even more effective.
3. Metering at SH 103 would have a similar effect as at East Idaho Springs. The frontage road could serve as an alternate route here as well.

Conclusions:

Ramp metering is a viable solution only if there is some route choice for the traffic entering the highway. Adding a ramp meter at Empire Junction is not a reasonable alternative. If traffic entering eastbound I-70 from US 40 was limited to the amount of available capacity on I-70, the resulting queues would stretch for miles on US 40 and extreme increases in travel time for traffic coming from Berthoud Pass would result. The only alternative to waiting through the ramp meter would be to go west on I-70 and get onto I-70 at an unmetered location or take one of the frontage roads in this area. If traffic diverts to unmetered locations, then the I-70 traffic flow improvements would not be realized. The frontage roads in this portion of the Corridor are already heavily traveled during peak hours and pass through heavily populated areas. Encouraging traffic to travel on them is contrary to the goals of this study.

Ramp metering at the two Idaho Springs interchanges could be a viable alternative, if appropriate changes were made to provide an alternate route between Idaho Springs and the base of Floyd Hill. The necessary changes include five elements, as listed below, from the Minimal Action alternative:

- SH 103 interchange
- East Idaho Springs interchange
- Improve frontage road from East Idaho Springs to Hidden Valley
- Build new frontage road, with bike path, from Hidden Valley to the base of Floyd Hill/US 6
- Base of Floyd Hill/US 6 interchange

The primary purpose of the ramp metering would be to limit the traffic feeding on at the East Idaho Springs interchange. This traffic input, when combined with the eastbound flow already on I-70, is a prime contributor to the heavily congested traffic conditions often observed between Empire Junction and Idaho Springs.

The location at SH 103 would serve to limit traffic diverting from the East Idaho Springs interchange. The benefits of this alternative include:

- Improve mainline I-70 travel conditions
- Provide an alternate route to I-70 in this area
- Has very low existing population along the frontage road
- Resolve safety and capacity issues at the interchanges

7. Slow-Moving Vehicle Plan

Brief Description: Increase capacity on I-70 for peak-hour, peak-direction travel by limiting the left lane to those vehicles that could maintain a specified minimum speed throughout the steep grades that are present on this highway. The slower traffic will be restricted to the right lane to achieve the higher capacity. Additional facilities that would help improve slow-moving vehicle travel at all times, such as chain-up, rest area, WIM and AVI facilities, would also be proposed as part of this alternative.

Overview of Strategies:

1. Climbing lanes
2. Parking/chain up or down facilities for trucks

Estimated Cost Range:

- Basic Implementation:
  - Start-up: $4,000,000 – $6,000,000
  - Annual: $75,000 – $200,000

Detailed Description of Strategies:

1. Lane restrictions (slower vehicles in the right lane only) at the following locations could improve the traffic conditions on I-70: Dowd Canyon to West Vail, Bakerville to EJMT (westbound), EJMT to Herman Gulch (eastbound), Downieville to Empire Junction (eastbound), and Georgetown to Silver Plume (westbound). These lanes will also improve safety by decreasing accidents caused due to high-speed differentials between vehicles. Adequate signing will also be provided to ensure that the lane restrictions are conveyed to the roadway users. Adequate enforcement would be an essential element of this plan, without which the benefits could not be achieved.
2. Chain up or down and parking/rest areas for trucks will help in improving operations of these heavy vehicles by improving their performance.

8. Enhanced Incident Management

Brief Description: Mitigation of adverse effects of incidents on I-70 through real-time congestion and incident information for dispatchers, incident response vehicles, coordinated response to incidents with local agencies, dynamic routing of emergency vehicles based on current traffic conditions, computer aided

dispatch system and wireless communication equipment for emergency response, and automated incident detection.

9. Winter Park Ski Train

Brief Description: The ski train is an effective way of going to the Winter Park ski resort. It runs on tracks owned and operated by the Union Pacific Railroad and therefore, is subject to their requirements. Currently, one ski train a day goes to Winter Park on Fridays, Saturdays, and Sundays. Given the requirements of Union Pacific Railroad, at most one more trip could be added to each of these days.

Detailed Description of Strategies:

1. The added trip could be potentially helpful to many people, but its limitations in number of trips and locations does not make it a very effective alternative for I-70 recreational traffic.

10. Buses/Shuttles in Mixed Traffic

Brief Description: Provision of support for rolling stock purchases and implementation of minimum revenue guarantees for private transportation providers providing connections between Denver International Airport and Front Range locations and the I-70 Mountain Corridor.

Overview of Strategies:

1. Capital Investments and Subsidies for Private Transportation Services

Estimated Cost Range:

- Basic Implementation:
  - Start-up: $50,000 - $75,000
  - Annual: $500,000 - $2,000,000
- Aggressive Implementation:
  - Start-up: $100,000 - $200,000
  - Annual: $2,000,000 - $6,000,000

Estimated Effectiveness Range (reduction in peak-period travel demand):

- Basic Implementation:
  - Summer: .25 – 1%
  - Winter: 1 – 3%
- Aggressive Implementation:
  - Summer: .5 – 2%
  - Winter: 2 – 4%

Detailed Description of Strategies:

1. **Capital Investments and Subsidies for Private Transportation Services.** Explore support for rolling stock purchases and minimum-revenue guarantees for private transportation providers serving long-range trips between DIA and

the Front Range and I-70 Mountain Corridor destinations. Private provider partners would participate in Colorado Mountain Plus programs.

11. Limited-Access Frontage Road

Brief Description: Limit travel on the frontage roads between Hidden Valley and Bakerville to usage by transit vehicles and Clear Creek County residents during peak travel hours. Electronic card-controlled access gates would control access. This would be an effort to increase transit usage in the Corridor by decreasing transit vehicle travel times.

Detailed Description of Strategies:

1. The limited access to the frontage road between Hidden Valley and Bakerville, it is hoped, would encourage the use of transit and thereby reduce traffic on I-70. This alternative would provide some encouragement to Corridor travelers to take transit, but the other mode choice variable that would be affected would be the travel time. Other important considerations, such as cost, frequency, and connectivity, would not be affected. It is unclear if this strategy would provide any net benefit.

Summary of Transportation Management Strategies

COST SUMMARY	BASIC		AGGRESSIVE	
	Start-Up	Annual	Start-Up	Annual
Peak-spreading and Vehicle-occupancy Increases	$250,000 - $500,000	$300,000 - $1,500,000	$500,000 - $750,000	$1,500,000 - $3,000,000
Enhanced Traveler Information	$100,000 - $250,000	$100,000 - $400,000	$500,000 - $5,000,000	$400,000 - $2,500,000
Park-n-Rides	$1,000,000 - $2,500,000	$50,000 - $150,000	$3,000,000 - $10,000,000	$100,000 - $500,000
Parking Operations Plan	$50,000 - $200,000	$75,000 - $200,000	$50,000 - $400,000	$300,000 - $600,000
Bicycle Improvements	$0	$50,000 - $500,000	$0	$500,000 - $1,000,000
Slow-moving Vehicle Plan	$4,000,000 – $6,000,000	$75,000 – $200,000		
Buses in Mixed Traffic	$50,000 - $75,000	$500,000 - $2,000,000	$100,000 - $200,000	$2,000,000 - $6,000,000

EFFECTIVENESS *(reduction in peak period travel)*	BASIC		AGGRESSIVE	
	Summer	Winter	Summer	Winter
Peak-spreading and Vehicle-occupancy Increases	2 – 4%	4 – 8%	3 – 6%	6 – 10%
Enhanced Traveler Information	.25 – 1%	.5 – 1.5%	1 – 2%	2 – 3%
Park-n-Rides	.25 - .5%	1 – 3%	1 – 3%	3 – 6%
Parking Operations Plan	.5 – 1%	1 – 3%	.5 – 2%	4 – 15%
Bicycle Improvements	0 - .5%	0 - .25%	.5 – 1%	0 - .5%
Slow-moving Vehicle Plan	NA	NA	NA	NA
Buses in Mixed Traffic	.25 – 1%	1 - 3%	.5 – 2%	2 – 4%

Recommended Transportation Management Strategies

Alternatives that have the capability to help respond to the purpose and need of the PEIS in an efficient manner include the following:

1. Peak-spreading and vehicle-occupancy incentives
2. Enhanced traveler information
3. Park-n-rides
4. Parking operations and incentive plan
6. Ramp metering
8. Enhanced incident management

We recommend that the following alternatives be screened out, as they do not have the capability to help respond to the purpose and need of the PEIS, in an efficient manner in:

5. Bicycle improvements
7. Slow-moving vehicle plan
9. Winter Park Ski Train
10. Buses/shuttles in mixed traffic
11. Limited-access frontage road

Implementation Considerations

The distinction between *designing* Transportation Management strategies for the I-70 Mountain Corridor and *implementing* these strategies should not be overlooked. Unlike many "build" strategies, the development, implementation, and management of many Transportation Management strategies rely heavily on the fully integrated involvement of the private sector. Resort organizations, major employers, developers, building managers, business associations, retailers, and others have tremendous influence over the traveling habits of employees, visitors, and shoppers. Public sector organizations responsible for transportation and planning in an area can make travel options available and more convenient, but the demand for these facilities and services is largely determined by operational policies set by the private sector. The synergism of multiple organizations and individuals banding together can often accomplish more than any one government agency, employer, developer, or resident could do alone.

Transportation Management Associations. Currently, there is no organization within the I-70 "functional area" (see page 4) with responsibility or investment in coordination and funding of Transportation Management strategies. The feasibility of a Transportation Management Association (TMA) should be explored to engage both public- and private-sector stakeholders in program design, funding, and implementation.

Transportation Management Associations – An Overview

Communities throughout the United States have struggled with many of the issues discussed above. Responding to the need to foster long-term public-private partnerships designed to implement Transportation Management programs and projects, many communities across North America and Europe have formed organizations called Transportation Management Associations (TMAs). There are currently six TMAs in the state of Colorado and more than 150 across North America.

What is a TMA? TMAs generally exist as independent, non-profit organizations, funded by key public- and private-sector stakeholder groups (for example, government agencies, major employers, developers, business/resort associations, public and private transportation providers, etc.). Representatives from each key stakeholder group form the TMA's steering committee, with a professional staff of one to four people responsible for planning and implementing Transportation Management programs (either alone or in partnership with other organizations). The independent nature of the TMA allows stakeholders to formulate an action plan that reconciles various individual interests and provides various tangible benefits to each participating organization.

Colorado Mountain Corridor Transportation Management Association (CMC-TMA)

A TMA serving the I-70 Mountain Corridor (referred to in this section, for discussion purposes, as the "CMC-TMA") could cover the I-70 Corridor between west Denver and Vail/Glenwood Springs, along with several of the communities with close ties to I-70 from an access perspective (for example, Breckenridge, Winter Park, etc.). CMC-TMA members would likely include all major public- and private stakeholder organizations that affect, and are affected by, transportation dynamics on I-70. For example, participants could include:

- Chambers of commerce and resort associations
- Ski resorts
- Lodging companies and associations
- City and counties
- Colorado Department of Transportation (CDOT)
- Public transportation providers (for example, Summit Stage, Eagle Transit, Regional Transportation District, etc.)
- Private transportation providers
- National Forest and State Park representatives
- Travel agency/travel planning representatives
- Airline and car rental representatives

- Gaming representatives
- Others

Potential Roles for a CMC-TMA

The following items represent potential roles and responsibilities for a Colorado Mountain Corridor TMA:

- **Transportation Service Coordination.** Providing a forum for coordination and collaboration among key transportation providers in the Corridor (for example, CDOT, Summit Stage, Eagle County Transit, ski resort transit systems, lodging shuttles, private transportation providers, etc.). Coordination would focus on achieving economies of scale and simplifying travel choices for visitors.
- **Coordinated Marketing and Education.** Integration of marketing for I-70 destinations with marketing of travel choices to and within the Corridor. Production of coordinated schedule/route maps that incorporate multiple transit providers. Development of advanced traveler information systems and integration of these systems with visitor information distribution channels.
- **Advocacy.** Collective advocacy for continued transportation and economic development investments throughout the Corridor, including advocacy at the national level for federal and foundation funding. Public-private partnerships with diverse stakeholder representation can be very effective in this regard.
- **Employee Mobility Programs.** Working closely with major employers in the Corridor to develop employee mobility programs to improve access to labor markets in response to the jobs-housing imbalance issues facing many resort communities along I-70. Programs could include employee shuttles, vanpools, and carpools coordinated among multiple employers in an area, and the development of enhanced transportation information for employees (including multi-lingual transit maps/schedules that cover all transit providers in an area).

TMA Development – Next Steps

Forming a TMA is similar to starting a new business. Before getting off the ground, extensive research should confirm the viability of the business concept. A TMA Feasibility/Formation Study (often sponsored by public-sector seed funding) typically includes evaluation of:

- the overall level of need, and logical boundaries, for a TMA,
- the types of services a TMA could provide,
- the level of support for a TMA from key stakeholder groups, and
- the availability of adequate financial commitments to support a TMA (both initially and over time).

Appendix A: North American Case Study Research

The following section details case studies from 11 North American case studies researched for this project to establish a context for the development and evaluation of Transportation Management strategies for the I-70 Mountain Corridor.

Case Study Locations

1. The Lake Tahoe Region, California/Nevada
   - Various corridors including Nevada State Route 28, California's I-80, California Highway 50
2. Whistler-Blackcomb, British Columbia
   - Highway 99
3. Cape Cod National Seashore, Massachusetts
   - Route 6
4. Florida Keys
   - US 1 from Miami to Key West
5. National Parks
   - Great Smoky National Park - Cades Cove Loop
   - Acadia National Park
   - Grand Canyon National Park
   - Zion National Park
   - Yosemite National Park
6. Washington State
   - I-405 corridor
7. I-93: Salem to Manchester, New Hampshire

Case Studies

1. Lake Tahoe Area

Multiple entry points to Lake Tahoe's popular skiing, casinos, and outdoor recreation activities allow an influx of visitors to the two main business centers within the basin. Travel on seven of the main access routes increased 20 percent from 1981 to 1995 and an additional 8.85 percent from 1995 to 1999. Various regional and local organizations within the Tahoe Basin have been involved with developing strategic Transportation Management strategies targeted to the visitor. Additionally, multiple corridor-oriented strategies have been developed.

General Regional Strategies

1. **Ski Resort Bus Service:** Heavenly Resort on South Lake Tahoe provides a free shuttle bus for skiers. The bus system picks skiers up at various lodging establishments and shuttles them to Heavenly Ski Resort. These buses are operated by the public bus system but exclusively for Heavenly Resort. North Lake Tahoe ski resorts offer similar shuttle services. The ski resort shuttles are advertised on various websites, both resort-oriented and general Tahoe visitor information oriented websites.
2. **Casino Transit:** Tahoe Casino Express operates luxury bus transit service from the Reno Airport to Lake Tahoe casinos. Last winter, the fee per rider one way was $19.00. Casinos initially subsidized the bus service, but it is currently self-sustaining and operated by a private company. The Casino Express provides ample room for ski and snowboard gear. A similar casino-oriented luxury bus service is currently being discussed for the Sacramento to Tahoe corridor.
3. **Internet Information:** As mentioned, ski resorts advertise their free shuttles on various Tahoe travel and informational websites. In addition, the Tahoe Transportation District's website provides information on a car-free Tahoe vacation and links to both private and public transportation options within and to the Tahoe basin.
4. **South Lake Shuttle**: The South Lake Tahoe Transportation Management Association (TMA) found that 90 percent of bus ridership was resident and only 10 percent tourist/visitor. Focusing on a general philosophy that any visitor-oriented transit options should be fun, easy, and innovative, the TMA looked to Disneyland for models of visitor mobility. They initiated a seasonal trolley system within the city and marketed it toward visitors. After a year of operation, a ridership survey revealed that 90 percent of trolley riders were tourists/visitors and 10 percent were residents. Furthermore, overall ridership has increased each year until 2001.
5. **North Shore Trolley**: Similar to the South Lake Shuttle, the North Shore Trolley is a summer-only form of public transportation marketed toward visitors. A recent ridership survey found that 60 percent of users were visitors

to the area and 50 percent of them had access to cars. The Trolley, which was initially operated by the Truckee/North Tahoe TMA (TNTTMA), is currently managed by the county and paid for by private businesses.

6. **Ski Resort Coalition**: Recognizing the direct interest the ski resort community has in ensuring efficient and accessible transportation options in the North Lake Tahoe area, the TNT/TMA convened a ski resort coalition. This coalition has been involved with improving and enhancing public and private transit for employees and visitors. Together, they advocated and paid for expanded service along SR 89 during the winter, which resulted in increased ridership. In addition, the ski resort coalition takes on some responsibility for funding innovative and enhanced transportation options. Although the ski resorts in North Lake Tahoe are involved in the regional employer rideshare program, each ski resort offers employees unique incentives for taking public transportation. For example, some provide discounted meal tickets while others provide recreation-related incentives.

Corridor Specific Strategies

1. **State Route 80:** SR 80 is the main corridor connecting the Sacramento and San Francisco Bay Area with the Lake Tahoe region.
   - **Proposed Rail:** Numerous I-80 corridor studies have been conducted including a study to determine the feasibility of developing rail service between Sacramento and Reno via Lake Tahoe. The California Department of Transportation (CalTrans) found that 80 percent of the 2.1 million travelers to Lake Tahoe are skiers and, therefore, tailored the rail study to address skier-oriented travel. Annual ridership on the I-80 corridor rail service was estimated to be approximately 230,000. Due to political and economic reasons, the plan was not approved.
   - **Choke-Point Management:** Currently, CalTrans is working on improving inter-regional travel (such as that to Lake Tahoe) by focusing on improving mobility through choke points in urban areas and enhancing bus service. CalTrans is starting to focus more on TDM strategies and their consequential modal shift, but much of the analysis is currently being completed and unavailable.
2. **Highway 89:** Highway 89 connects I-80 with Lake Tahoe. Recreation-inspired congestion on SR 89 is a concern, yet due to the high cost of environmental mitigation, highway expansion is not possible.
   - **Bicycle Trail:** A new bike trail takes cyclists off Hwy 89, designed partly with the intent of giving visitors a viable alternative to automobile once at Lake Tahoe. This trail will connect cyclists with a newly constructed trail that circumnavigates the Lake.
3. **State Route 28:** SR 28 is a popular winding scenic two-lane highway in East Lake Tahoe linking major destination areas in the Tahoe Region while

providing access to popular beaches, trails, and vistas. Recently, parking along SR 28 demand exceeded supply causing visitors to park on the fragile, "prone to erosion" shoulders. The combined effect of erosion and access limitations lead to the development of a Recreational Traffic Management study with the goal of managing recreational traffic along State Route 28 to US Highway 50. The Tahoe Regional Planning Agency (TRPA), the Truckee-North Tahoe Transportation Management Association (TNT/TMA), and the Nevada Department of Transportation (NDOT) partnered to design a plan that would:

- Minimize the environmental impact of recreational travel along the corridor
- Manage recreational traffic to reduce visitor impact on natural resources, encourage alternative modes of transportation
- Reduce the impact of recreational traffic and parking on the capacity and level of service of SR28.

Using traffic analysis data, resident and visitor surveys, and field observances, the study identified key facts regarding recreational travel on SR 28. These facts drove the creation of four main alternatives and the selection of the preferred alternative. The table below outlines the recommended alternative, costs, and effectiveness of the alternative.

SR 28 Recreational Traffic Management
Study Recommendations, Costs, and Effectiveness

Parking	Eliminate all shoulder parking Construct new lots where possible near destinations Construct new lots to be served by a peak season shuttle
Shoulder Parking Control	Use physical barriers such as guardrails and sign posts
Shuttle	Operate during peak periods Serve intercept lots and new lots
Enforcement Program	Two full-time seasonal parking control officers
Informational/Educational Program	Inform drivers accessing the area before they arrive Regional advertisements Brochure AM radio, highway signage
Total Construction Costs	$1,705,100
Total Annual Operating Costs	$204,900
Parking Revenues	$25,550
Parking Violation Revenues	$100,000
Daily VMT Reduction	Approximately 1,434 VMT, or 9.6 percent
NOx Reduction	2,681 grams per day or 0.01 percent of the estimated average summer day emissions

The plan concluded with detailed information regarding establishing an East Shore Recreation Traffic Oversight Committee. This committee would include members from key local, state, and federal organizations and would be responsible for developing an evaluation and monitoring plan. In addition, the plan recommends that a managing entity be assigned daily operational responsibilities of the plan. A local transit district was suggested as the managing entity.

Sources:

1. Nevada State Route 28 Recreational Traffic Management Study. 1995. http://tahoe.ceres.ca.gov/lsc/tbl_con.html
2. South Lake Tahoe TMA Executive Director, Dick Powers. Phone conversation November 1, 2002.
3. Virtual Tahoe transportation information. www.virtualtahoe.com
4. CalTrans. Mark Dinger and Karen Peneschi. Conversations October 27 and October 30.
5. Tahoe Transportation District Car-Free website. http://www.virtualtahoe.com/playground/GettingAround/TTD/TTD.html

2. Whistler-Blackcomb British Columbia, Canada

The two-lane Highway 99, otherwise known as the Sea to Sky Highway, is a popular tourist route. One of the most popular spots along the route is the Whistler-Blackcomb ski area; the largest ski area in North America with more than 7,000 acres of skiable terrain. In addition to its popularity as a ski resort, the area is well known for its mountain biking, hiking, and other non-winter activities. Congestion on Highway 99 and in the Village of Whistler during peak winter afternoon periods is excessive, and year-round congestion on Highway 99 is growing. Thus, Whistler is looking at various tourist- and employer-oriented strategies to improve travel times. In addition, Whistler, British Columbia, is in the bid process for the 2010 Winter Olympics.

Strategies

1. **Shuttle:** The Village of Whistler sponsors a free shuttle within the town of Whistler with service to the Blackcomb Mountain Base Lodge.
2. **Public Transportation:** The local transit provider, WAVE, provides public transportation around the greater Whistler area. WAVE serves more than 2 million riders on 23 buses and operates from 5:00 AM to 3:30 AM. Buses are equipped with ski racks in the winter and bike racks in the summer. Passes are available in various increments (1 or 30 days and/or 5, 10, or 20 rides). Free transit rides are provided on important days such as World Earth Day, Clean Air Day, International Car Free Day, and New Year's Eve. Wave provides service from Vancouver, British Columbia, and Vancouver Airport ($160 and $180 respectively) to Whistler.
3. **Preferential Parking:** Whistler Village provides priority parking to carpools and vanpools.
4. **Comprehensive Transportation Strategy:** The Transportation Advisory Group (TAG), a public-private partnership tasked with addressing transportation issues in Whistler, created a Comprehensive Transportation Strategy that, in addition to outlining new land use policies, transit enhancements, and roadway improvements, includes innovative TDM and parking management and strategies.

TDM Strategies

- **Skier Program:** Manage travel demands on peak skier days with a Peak Day Program that encourages alternative modes and discourages use of the private automobile by
  - Providing free transit service
  - Implementing pay parking strategies
- **Hours of Operation:** Explore modification of mountain operating hours on peak days to spread out traffic peaks along with more flexible ticketing options.

- **Commute Trip Reduction:** Establish and promote an Employer Trip Reduction Program. Research the possibility of combining a transit pass and lift pass for employees who use the bus.
- **Visitor Rideshare Program:** Organize a rideshare program for Whistler day visitors. Provide a van/shuttle service from Vancouver to Squamish, Pemberton, and Whistler.

Parking Management Strategies

- Limit skier parking to existing levels; no net gain in parking capacity except efficient parking operations.
- Expand pay parking.

Effectiveness

Effectiveness, either planned or resulting from the defined TDM strategies, was unavailable. Important to note is that the TAG recommends that TDM programs and enhancements to transit and non-motorized modes should occur before any roadway enhancements or construction occurs. They have set a flexible goal of a 15 percent reduction of automobiles in peak hours (reduction based on projected growth in traffic volumes as if no TDM measures were in place).

Sources:
Information gathered primarily from the following documents:

1. Comprehensive Transportation Strategy. Summary Report. The Transportation Advisory Group. http://www.whistler.ca/reading/documents/Transport%20Strategy.pdf
2. The Vancouver-Whistler 2010 Olympic bid: Transportation Solutions for the Winter 2010 Olympics . Buehrmann, Sebastian. http://www.sfu.ca/~geo449/transportation/Technologies%20and%20Solutions.pdf

3. Cape Cod National Seashore

The Cape Cod National Seashore and the unique 15 towns that line Route 6 draw thousands of visitors every year to explore and relax. Unfortunately, seasonal traffic congestion has decreased mobility along Route 6 for visitors and year-round residents. The Cape is known as a car-dependent area because of various factors including the lack of transportation service coordination, coupled with an overall lack of knowledge regarding public transportation options among residents and visitors. In an effort to recognize and respond to the growing congestion problems, the Cape Cod Transit Task Force is proposing a 25-year transportation plan that outlines a system-wide approach that focuses on public bus transportation. The Task Force is working toward a solid vision statement:

"I CAN get there from here WHEN I want to go."

Strategies

Key elements of the plan aimed at both recreational users and year-round residents of the Cape Cod area include:

- **Coordination:** Improve the coordination between the large numbers of transportation providers on the Cape.
- **Education:** Increase public awareness of transportation options available on and to the Cape including accessibility by bus, ferry, bike, rail, and road.
- **Efficiency:** Increase efficiency of transportation system and decrease duplication where it exists.
- **Exclusiveness:** Identify and address service gaps.

Increasing the frequency of the Cape Cod Regional Transportation Authority's bus service, including expanding to year-round Sunday service and adding services to both underserved areas and whale watch departure points, and building a new bus-only lane on Route 6 from Sandwich to Sagamore Bridge are two specific elements of the Task Force's proposal. The development of hub transportation facilities that serve as multimodal centers is also a key piece of the proposal.

Effectiveness:
Because the Cape Cod Task Force is in the planning stages and the alternatives are currently being analyzed, effectiveness (including proposed effectiveness) measures for the TDM strategies are unavailable.

Cost and Funding:
Estimated costs for entire program:

- Capital improvements: $41 million
- Operating improvements: $19.5 million

In addition to accessing traditional local, state, and federal funding sources, the Task Force includes the provision of additional revenues through the following ways:

- New tax revenues from Barnstable County.
- Adjustment of federal formulas to base Cape's funding on seasonal population.
- Use of dedicated revenue from new, seasonal, or year-round user fees on rooms, sales and/or gasoline.

Sources:
Information gathered primarily from Internet research including access to the following documents:

1. Cape Cod Five-Year Transportation Plan 2002-2007
2. Cape Cod Regional Transportation Authority; http://www.capecodtransit.org/

4. US 1 from Miami to Key West

Popular Key West and the Florida Keys are accessible by road via US 1 from Miami. With the exception of congestion along an 18-mile stretch of US 1, the four-lane signalized highway seems to handle capacity well. Discussions with individuals from Broward County and the Florida Department of Transportation resulted in the discovery that no TDM strategies have been planned or considered for US 1. Two reasons were given for this: (1) a perception that there is no need for TDM on the corridor and (2) TDM would require coordination between the numerous jurisdictions on the Florida Keys. Building consensus between these jurisdictions has proved difficult.

Main Sources:
Information gathered primarily from Internet research and phone conversations including:

1. Phone conversations with Ken Jeffries at FLDOT and Ernesto Polo at Broward County
2. South Florida Regional Planning Council. http://www.sfrpc.com/
3. Strategic Regional Policy Plan for South Florida. http://www.sfrpc.com/ftp/pub/srpp/srpp0895.pdf

5. National Parks

Each of the following case studies describes traffic issues within a National Park governed by the National Park Service. Given this governance structure, each case study shares the National Park Service's transportation mission to "preserve and protect resources while providing safe and enjoyable access within the National Parks by using sustainable, appropriate and integrated transportation solutions."[1] Each park is responsible for developing a General Management Plan, with the exception of congressionally mandated projects and emergency rehabilitation. These plans are to be linked with local land use and transportation planning efforts to the highest extent possible. To achieve the transportation mission, the National Park System is currently gathering and analyzing alternative transportation system (ATS) effectiveness data and traveler/visitor data. The data will be analyzed in fiscal year 2003 to determine effectiveness of the various ATS strategies implemented.

a. Great Smoky National Park- Cades Cove Loop

Receiving more than 2.5 million visitors a year, the Cades Cove Loop, located in the Great Smoky Mountains National Park, is one of the park's most popular tourist destinations. Visitors enjoy rare glimpses of wildlife, multiple national historical sites, and spectacular natural beauty. The annual number of vehicles on the 11-mile one-way loop has quadrupled since 1970. Heavy visitor use is damaging the natural and cultural resources of the park while impeding on the quality of the visitor's experience. Most travel on the Cades Cove Loop is auto oriented, and on days when the traffic is light, the 11-mile loop is an hour's drive. Yet, during busy seasons (such as summer and the month of October), this increases to an average drive of 3 hours.

Strategies

In partnership with the regional Metropolitan Planning Organization (MPO), the Great Smoky National Park is currently developing the Cades Cove Opportunities Plan (CCOP). This plan will outline key transit and transportation demand management (TDM) strategies, all consistent with National Park Service goals, policies, and procedures, aimed at increasing accessibility of Cades Cove and mobility options for visitors. Visitor experience and the preservation of the Cove are key to the CCOP. The CCOP lists various core technology alternatives including:

- Light rail
- Cog railway
- Open-air tram
- Conventional bus

[1] National Park Service Transportation Alternatives Department. http://www.nps.gov/transportation/alt/fotstatus.htm

- Electric shuttle bus
- Articulated bus
- Over the road coach

Each technology alternative was measured against the following criteria:

1. Operational (Will the strategy fit easily into existing infrastructure? Do proven applications exist? Will efficient loading and unloading of passengers occur?)
2. Impact on visitor's experience
3. Ability to meet visitor demand
4. Resource issues
5. Infrastructure requirements

Demand management strategies are also included in the CCOP as complementary strategies to the technology strategies listed above.

Traffic Management Strategies Considered in the CCOP

Access restrictions: Limit the number of cars permitted to enter the cove at any give time with the intent of ensuring the volume of cars in the Cove is less than capacity allowed.

ITS: Consider ATIS to inform visitors about wait time, parking availability, and/or roadway and weather conditions

Bike and Pedestrian Modes: Include bike racks on the chosen transit vehicles, improve access to sites and the Loop, and encourage the use of these modes through expanding onsite rental facilities and ranger bike tours and a public information campaign. Currently, the road is closed to motor vehicles Saturdays and Wednesdays from early May to late September until 10:00 AM to enable bicyclists and pedestrians to travel the loop safely.

Effectiveness

Because the CCOP is in the planning stages and the alternatives are currently being analyzed, effectiveness (including proposed effectiveness) measures for the TDM strategies are unavailable. The TDM strategies are designed to complement and enhance the preferred technology alternative, which is yet to be determined.

Main Sources:
Information gathered primarily from Internet research including access to the following documents:

1. Cades Cove Technology Assessment (August 2001); Regional Transportation Alternative Committee. www.knoxtrans.com/rtap/index.htm

2. Cades Cove Opportunities Plan website. http://www.cadescoveopp.com/
3. Park Announces Experimental Cades Cove Traffic Measures. www.nps.gov/grsm/gsmsite/newscovetraffic.html

b. Acadia National Park

Visitors to Acadia National Park located in Maine, just 6 hours north of Boston, enjoy rocky Atlantic shoreline and beaches, mountainous terrain and numerous wilderness lakes and ponds. Unfortunately, auto use in the park has begun to negatively impact both the park's natural resources and the visitor's experience. The park has made multiple efforts to reduce visitor auto dependency by initiating a few innovative and effective programs.

Strategies

1. **Shuttle Service:** In an effort to provide mobility to visitors and decrease the usage of automobiles within the park, in 1999 Acadia initiated a free shuttle service, the Island Explorer. The Island Explorer provides service between campsites, beaches, the main town, and hiking trailheads. Annual ridership surveys report increasing ridership and overall customer satisfaction. Currently, the shuttle is a seasonal service provided by a private concessionaire and is used by commuters, residents, and visitors.

Island Explorer Ridership

Year	*Riders*
1999	142,000
2000	193,057
2001	239,971

2. **Online Trip Planner:** Visitors planning a trip to Acadia National can access various alternative transportation options and information online. The online trip planner provides future visitors information regarding access to and within Acadia National Park, including the "8 Car-Free Ways to Get to Acadia" brochure, and a link to the free Island Explorer Shuttle service.
3. **Car-Free Day:** Every fourth Sunday in April Acadia sponsors a "car-free day."

Effectiveness

Annual surveying of shuttle riders provides information on the shuttle experience and ridership. These surveys report overall rider satisfaction and increasing usage, yet they do not include information regarding modal shift resulting from the shuttle service. As mentioned earlier, the National Park Service is currently gathering and analyzing ATS effectiveness data and traveler/visitor data.

Main Sources:
Information gathered primarily from Internet research including access to the following documents:

1. Acadia National Park Trip Planner. http://www.nps.gov/acad/planner.htm
2. Volpe Center- National Park Projects. http://www.volpe.dot.gov/index.html
3. Information provided by contact at Volpe Center regarding overall National Park System TDM and Transit effectiveness study efforts.

c. Grand Canyon National Park

Visitors to the Grand Canyon often experience a long wait at each of the park entrance stations. Each year, 5 million visitors make their way to Grand Canyon, resulting in overcrowding and traffic congestion particularly during spring, summer, and fall. The Grand Canyon's General Management Plan outlines the following strategies to combat congestion.

Strategies

1. **Proposed Rail:** The 1995 General Management Plan initially called for the development of a rail system within the park to meet visitor demand. Upon further research into visitor projections, the rail alternative was replaced by enhanced transit options.
2. **Shuttle System:** A free shuttle at the Canyon's South Rim transports visitors to various popular viewpoints along the South Rim. The Grand Canyon plans on enhancing the shuttle, which currently runs at 15-minute frequencies from 7:30 AM to sunset, and less frequently 1 hour before and after sunrise/sunset. The shuttle will eventually operate year-round, feature an evening taxi service, and be able to respond more flexibly to visitor needs.
3. **Parking Management:** Most day visitors to the Grand Canyon will soon need to leave their cars outside the park and ride the enhanced shuttle system within the park. In addition, the General Management Plan includes plans to better integrate internal park shuttle service and parking.
4. **Private Shuttles:** Greyhound provides private bus service from Flagstaff and Williams to the canyon.
5. **Online Travel Information:** Visitors anticipating a trip to the Grand Canyon can use the online trip planner. This trip planner clearly warns day-use visitors of congestion and parking problems within the park and encourages visitors to plan on long delays, use the shuttle, or plan their trip during less congested times.

Effectiveness

As mentioned earlier, the National Park Service is currently gathering and analyzing ATS effectiveness data and traveler/visitor data. Initial reports point to improved air quality within the Canyon since the inception of the policy.

Main Sources:
Information gathered primarily from Internet research including access to the following documents:

1. Grand Canyon National Park Trip Planner.
2. Volpe Center- National Park Projects. http://www.volpe.dot.gov/index.html
3. Grand Canyon National Park General Management Plan. www.nps.gov/grca/gmp/index.htm
4. Information provided by contact at Volpe Center regarding overall National Park System TDM and Transit effectiveness study efforts.

d. Zion National Park

Strategy

In spring 2000, Zion National Park, located in Utah, initiated an aggressive alternative transportation plan within the scenic and popular 6.5-mile Zion Canyon. From April through October, the Zion Canyon Scenic Drive is accessible only by shuttle bus or tram. Visitors intent on viewing the canyon must park their vehicles at the visitor center or outside the park in the nearby town of Springdale. The shuttle system connects with the nearby town of Springdale in a manner that discourages congestion in the town. Bike racks are available on the shuttle, which is free and operates at a 6-minute frequency.

Effectiveness

As mentioned earlier, the National Park Service is currently gathering and analyzing ATS effectiveness data and traveler/visitor data. Initial reports point to improved air quality within the park since the inception of the policy.

Main Sources:
Information gathered primarily from Internet research including access to the following documents:

1. Zion National Park Trip Planner. http://www.nps.gov/zion/trans.htm
2. Volpe Center- National Park Projects. http://www.volpe.dot.gov/index.html
3. Information provided by contact at Volpe Center regarding overall National Park System TDM and Transit effectiveness study efforts.

e. Yosemite National Park

Strategy

Similar to Zion National Park, Yosemite National Park has instituted aggressive alternative transportation policies. Parking for day-use and overnight visitors is available but limited. Once the parking lots are full, visitors must park outside the park and board free shuttles. A fee-for-service hiker bus is also available providing service to multiple trailheads throughout the park.

Effectiveness

The National Park Service is currently working to establish a traffic information system to improve its ability to understand visitor travel patterns and modal shift opportunities. Nevertheless, areas that institute policies such as the Yosemite and Zion policies often experience improved air quality immediately.

Main Sources:
Information gathered primarily from Internet research including access to the following documents:

1. The Yosemite Valley Plan SEIS, Volume II, Appendix G. www.nps.gov/yose/planning/yvp/seis/vo_II/appendix_g.html
2. Yosemite National Park trip planner. http://www.nps.gov/yose/trip/

6. Washington State I-405 Corridor

Located in Washington State, Interstate 405 is a 30.3-mile bypass to the east of Seattle known throughout the region for its congestion. Due to population and job growth in the cities of Bellevue, Renton, Redmond, and Kirkland, drivers "suffer 12 hours in gridlock a day in the Renton area."[2] Traffic and congestion primarily result from commute, freight movement, and travel to and from Seattle for special events. The Washington State Department of Transportation (WSDOT) gathered the jurisdictions and decision makers affected by the I-405 congestion to create a corridor improvement plan. Transportation demand management advocates in the area worked diligently to educate the various jurisdictions on the merits of TDM. After much research, analysis, and partnership building, the I-405 Final EIS included TDM as a sole alternative and as an integral part of each of the other three alternatives.

The Final EIS presents the preferred alternative, which includes the following solutions:

- Implement an enhanced transportation demand management (TDM) program.
- Expand capacity of the existing bus transit system.
- Implement new rapid bus transit.
- Implement new HCT within the corridor.
- Expand the capacity of the existing corridor.
- Expand capacity and improve the continuity of the adjacent arterial network.

[2] http://www.wsdot.wa.gov/projects/I-405/

TDM Strategies

1. **Vanpooling:** Maximize vanpooling in the corridor by increasing the vanpool program 100 percent and initiating the use of new "value-added" incentives (for example, frequent flyer miles for vanpoolers).
2. **Public Information, Education and Promotions Program:** Establish an ongoing public education and awareness program specific to the corridor (focus on issues and transportation alternatives). Provide personalized trip planning assistance.
3. **Employer-Based Programs:** Increase work choices such as telecommuting. Provide incentives to employers to offer work choices (for example, tax credits). Develop parking cash-out program incentives.
4. **Land Use TDM:** Support compact, mixed-use, non-motorized, and transit-friendly (re) development, such as transit oriented-development (TOD), in target areas (urban centers, suburban clusters, key arterials, transit station areas, transit centers, park-and-ride lots). Develop new parking management programs.
5. **Other Miscellaneous TDM Programs:** Including innovative transit and vanpool fare media, incentives, demonstrations, matching funds, etc. Non-commute trips TDM programs (research and demonstrations).
6. **Expanded TDM Package:** Include consideration of the range of regional pricing strategies including:
    a. Region-wide congestion pricing (RCP);
    b. Fuel taxes (revenue = RCP);
    c. Fuel taxes (revenue = 50% RCP);
    d. Mileage charge (revenue = RCP);
    e. Parking charges;
    f. High occupancy toll lanes

The expanded TDM package is considered an add-on piece to the other TDM strategies listed and requires further analysis and public and political support.

Effectiveness and Cost

The table below reflects the estimated reduction in travel demand at various times of the day. The second table demonstrates the estimated cost for each TDM element.

I-405 TDM Program Effectiveness

TDM Element	Estimated Reduction in Daily Travel Demand[3]	Estimated Reduction in AM Peak Period Travel Demand[4]	Estimated Reduction in PM Peak Period Travel Demand
Vanpooling	.9%	2.7%	1.6%
Public Information	.25-.75%	1.0-2.0%	.7%
Employer-Based	.5-1.0%	2.0-3.5%	1.5-2.5%
Land Use as TDM	1.0-2.5%	3.5-5.0%	2.0-3.5%
Miscellaneous Programs	.5-1.0%	1.25-2.5%	.75-1.25%
Total Estimated Travel Demand	3-6%	10-15%	7-10%
Pricing	15%	10-15%	7-10%
Total Estimated Travel Demand Reduction	***18-21% (Note: May include some double-counting of benefits)***	***Not Estimated***	***Not Estimated***

Table 3.12-12 from the I-405 Corridor Program Final EIS

Interstate 405 Funding (20 year; 2000 dollars)

TDM Package Elements	Percentage of Funding	20 Year Funding (2000 $$$)
Core Program*	4%	$19,650,000
Vanpooling	27%	$121,680,000
Public Information and Education	8%	$33,750,000
Employer-Based Strategies	30%	$135,800,000
Land Use	21%	$95,500,000
Other TDM Programs	10%	$45,620,000
TOTAL	***100%***	***$452,000,000***

Nevertheless, despite the inclusion of a TDM package in each of the four alternatives and the Preferred Alternative, the Final EIS clearly states TDM quantification as a concern:

> "The I-405 Corridor Program studied inclusion of a TDM program within the I-405 corridor. The empirical estimates of the TDM program's effectiveness were included in the documentation of impacts on travel demand within the study area. These effects could not be fully integrated into all of the transportation results due to limitations in the travel forecasting procedures. The Puget Sound Regional Council (the area's MPO) is conducting additional research to include more TDM effects into future versions of the model. Research to date suggests that the expanded program contained in the Preferred Alternative represents one of the most extensive corridor-based

[3] Results measured in terms of percent reduction in vehicle miles traveled (VMT)
[4] Pricing is included in Alternative 1 only. Regional congestion pricing effects have been studies as part of the PSRC's 2001 Update Metropolitan Transportation Plan (PSRC, 2000)

demand management and trip reduction programs anywhere in the United States."[5]

A series of Phase I priority improvements for the $1.77 billion in state transportation funds to be allocated for I-405 if voters approve Referendum 51 have been identified. The Phase I plan is based on a "worse first" approach that includes a rebuilt and reconfigured Interstate 405/SR-167 connection and adding new lanes through the Renton area, fixing the urban congestion hot spots along the corridor.

Main Sources:
Information gathered from Internet research, conversations with I-405 staff including access to the following documents:

1. I-405 Corridor Program Final EIS. http://www.wsdot.wa.gov/projects/I-405/feis/
2. Phone conversation with John Shadoff of Washington Department of Transportation (TDM coordinator for the I-405 FEIS).
3. I-405 Project website. http://www.wsdot.wa.gov/projects/I-405/default.htm

7. I-93 Salem to Manchester, New Hampshire

In an effort to improve transportation efficiency and reduce safety problems along a 19.8-mile section of Interstate 93, the New Hampshire Department of Transportation (NHDOT) recently completed a draft environmental impact statement (DEIS). The DEIS presented six alternatives, which included separate TSM, TDM, and alternative modes of transportation alternatives.

Transpirations System Management Alternative: The TSM alternative included three major strategies designed as short-term, moderate cost solutions to I-93 congestion.

1. ITS: Including variable message boards, highway advisory radio, website information, and emergency reference markers.	Incorporated into overall improvements of corridor. Planning efforts to ensure I-93 ITS complements current regional and statewide efforts.
2. Shoulder Lane Usage: Use of shoulder during peak periods.	Requires widening a 3.9-mile corridor to provide minimum 12-ft. shoulder. Requires widening four bridges. Due to high construction costs, this strategy was not pursued.

[5] Summary pp.14.

3. Ramp Metering	Due to the limited number of alternative routes and the limited impact of ramp metering, this alternative was not pursued.

Transportation Demand Management Alternative: The TDM alternative included three major strategies to combat I-93 congestion.

1. ITS: Including variable message signs, highway advisory radio, website information, and emergency reference markers.	Incorporated into overall improvements of corridor. Planning efforts to ensure I-93 ITS complements current regional and statewide efforts.
2. Employer Based Measures: Recognize the greatest success of TDM is through employers .	Most work-related travel is to workplaces in Massachusetts; therefore, these measures need to be implemented largely in Massachusetts by employers, government jurisdictions, and/or TMAs.
3. Congestion Pricing	Because peak-period congestion lasts 3 hours and because of the need for public support, this alternative was not pursued.

Alternative Modes of Transportation Alternative: The provision of alternative transportation modes was also considered.

1. Park and Rides: Build new park and rides to accommodate growth in transit usage.	Three new park-n-ride lots are included in the locally preferred alternative.
2. Bus Expansion: Expand current bus service. Connect service directly with new park and rides.	Included in the preferred alternative, particularly as a means to provide commuters with options during construction.
3. Bus Enhancement: Provide new access between New Hampshire employment centers on I-93 and those in Northern Massachusetts.	Included in the preferred alternative, particularly as a means to provide commuters with options during construction.
4. Congestion Pricing	Because peak-period congestion lasts 3 hours and because of the need for public support, this alternative was not pursued.

5. HOV Lanes: Shift lanes to HOV.	A New Hampshire only HOV lane does not produce sufficient ridership on buses or in carpools to warrant further testing.