

Transit Demand Estimates

INTRODUCTION

In order to evaluate various service alternatives for the Big Sky study area, it is important to have a methodology to estimate transit demand for transit trips in the area. This chapter describes the development of a transit demand model for the Big Sky Resort area that can be used in the evaluation



of future scheduled services. The chapter introduces several methodologies for estimating transit demand in the area. Big Sky is a unique area in terms of its permanent population and visitor populations which must be served. There exists a winter peak seasonal demand and an off-peak seasonal demand. These estimates must take into account the skier populations in the winter peak months as well as the permanent residents of Big Sky and commuter employees who either commute from Belgrade/Bozeman or vice versa from Big Sky to these areas. Methodologies used to estimate resort demand include reviewing current markets as well as possible future markets, commuter demand in and out of Big Sky, and a qualitative assessment of current and future needs. This chapter also discusses the mode-split methodology.

These methodologies yield estimates of the potential transit demand that could be expected given an extremely high level of transit service. The estimates represent an “upper bound” for an idealized transit service that could serve all the needs of the community and resort. In reality, no service can efficiently serve 100 percent of this potential demand.

Target Markets

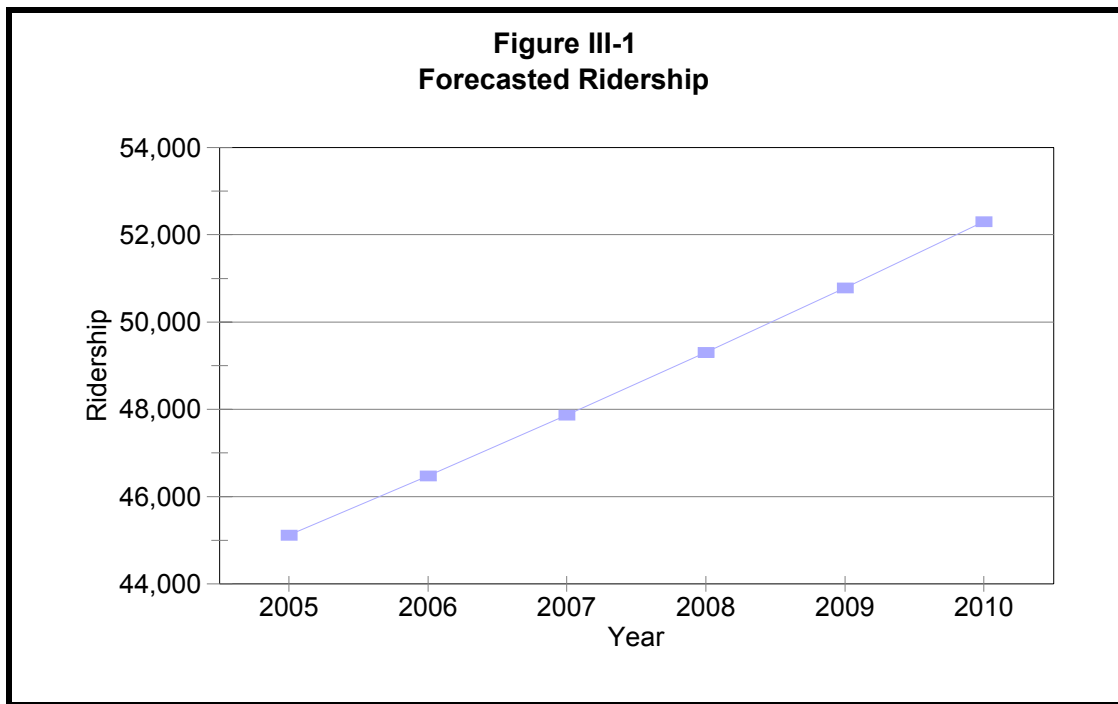
There are several target market segments for Snow Express. Snow Express is designed for the peak winter season visitor who comes to the area for skiing. However, there are several other markets which need careful examination. First, there is a local demand for permanent residents. This is year-round demand and is not

based on the visitor population which either comes to the area for a day of skiing or stays in a second home or condominium for a length of time. The second market which is important to examine is the employment demand, which is also seasonal in nature. This demand could represent a large portion of ridership during the winter months. Finally, there is a commuter market both to and from the Big Sky areas and the Bozeman/Belgrade area. Future markets may include the summer visitor, which is currently not being served by Snow Express transit service. All these markets combined give an estimate of transit needs in the Big Sky area and will be discussed in this chapter.

Ridership Trends

One approach to looking at short-term transit demand is to evaluate recent trends in ridership. This approach is valid in areas where there are existing transit services. Figure III-1 shows the ridership projections based on a straight three percent increase in ridership per year for Snow Express through 2010. The LSC Team would like to clarify that this section is based on the existing ridership and is projected to year 2010. The ridership trends and projections do not estimate the transit need within the study area. Recent trends have shown a decrease in Snow Express ridership; however, after adjustments are made to account for transfer activity, ridership appears to be slowly increasing.

Much of the transit demand pertains to the increase in population and visitors for the study area. Transit ridership for year 2010 is estimated at approximately 52,305 annual trips for Big Sky at a three percent annual increase.



Mode Split Methodology

There are two methods used to estimate the potential transit trip demand in the Big Sky area which rely on permanent residents and employment transportation. The first is an estimate of the total demand for transit trips by all permanent residents of Big Sky through an analysis by total transit modal split. This demand specifically looks at persons who reside in Big Sky year-round.

The second method results in an estimation of transit demand for commuters out of the Big Sky area.

Big Sky Local General Public Transit Demand by Modal Split

One method of estimating demand that is commonly accepted in the transit community is analysis by total transit modal split. This method relies on the national percentage of all trips (as opposed to employee work trips) made by public transit as a mode. National statistics indicate that between 0.5 (for new service) and 1.2 percent of all trips are made on public transit where it is available, and each person makes an average of 3.5 one-way trips per day. Considering the avail-

Transit Demand Estimates

able modal split data of the community, the optimal modal split for the Big Sky area is estimated to be 1.0 percent.

The general public demand by modal split, based upon the 2000 Census for the area, can be estimated at 1,083,495 annual one-way trips with transit trips accounting for 10,835 trips, as shown:

$$\begin{aligned} & \mathbf{1,214\ persons * 255\ days\ per\ year * 3.5\ trips/day =} \\ & \mathbf{1,083,495\ total\ annual\ one-way\ person-trips} \\ & \mathbf{1,083,495 * 1\% = 10,835\ annual\ local\ one-way\ trips\ per\ year} \end{aligned}$$

This demand is based upon all residents living and working in Big Sky, and this is not the case. Therefore, this is an unrealistic transit demand. This demand should be adjusted to be based upon only residents who work in Big Sky. If these adjustments were made, a demand would be approximately 368,000 trips, of which 3,680 trips may be expected at a 1.0 percent mode split.

Resident Employee Commuter Transit Demand

Commuter demand in Big Sky is of great importance. There is a small demand for permanent residents who travel to Belgrade/Bozeman for employment, but of increasing importance is commuters who work in Big Sky but reside in other areas of Gallatin County, particularly the number of commuters on State Highway 191. One quantitative source on which to base an analysis of commuter demand is provided by the 2000 Census Bureau.

There are several ways to estimate employee commuter demand for Big Sky. First is to determine the Big Sky resident commuter trips out of the area. Of the 761 permanent residents who are employed, approximately 350 worked outside of Big Sky. If we assume 90 percent of the residents work in the Bozeman/Belgrade area, this would equate to 315 resident commuters to that area.

In light of these facts and observed transit commuter mode splits in other similar areas, a maximum feasible mode split of 3.0 percent of all commuter travel is appropriate. Typically, each employee makes two trips approximately 250 days per

year; thus, the 315 commuters in 2000 would have made a total of approximately 157,500 commuter trips per year. Applying the 3 percent mode split suggests a total commuter demand for transit trips on the order of 4,725 one-way transit passenger-trips per year:

$$\begin{aligned} 315 * 2 * 250 &= 157,500 \text{ total annual one-way person-trips} \\ 157,500 * 3\% &= 4,725 \text{ annual one-way transit-trips} \end{aligned}$$

Seasonal Demand Estimation

As stated, with Big Sky attracting more seasonal visitors, and in turn, more seasonal employees, a larger demand exists within the peak winter months from November through April. This again represents several demand segments, each of which represents an important element in the total seasonal demand for Big Sky. The following seasonal demand market segments were used to estimate total demand:

- Seasonal Big Sky Visitor Demand
- Seasonal Employee Commuter Demand
- Seasonal Visitor Commute Demand

Seasonal Big Sky Visitor Demand

Seasonal Big Sky Visitor Demand is based upon the peak season visitor population from November through April. In 2003-2004, approximately 293,665 skier visits were observed. Based upon this number of peak winter visitors, a seasonal local transit demand could be expected to be approximately 58,800 one-way transit trips. This is based upon a 10 percent transit usage of all visitors during the peak-season.

$$\begin{aligned} 294,000 \text{ visitors} * 2 &= 588,000 \text{ total annual one-way person-trips} \\ 588,000 * 10\% &= 58,8000 \text{ annual one-way transit-trips} \end{aligned}$$

Seasonal Employee Commuter Demand

As mentioned, an increasing concern on SH 191 is the large number of commuters traveling between Big Sky and the Bozeman area. While many of these trips are pass-by trips—that is, trips going to Yellowstone National Park—a number of these

trips are commuters for employment at Big Sky. Based upon a commuter employment of approximately 500 jobs from residents who do not reside in Big Sky, this represents a seasonal commuter demand of approximately 250,000 trips. If two percent were to use transit, this represents a transit trip demand of approximately 5,000 one-way trips.

$$\begin{aligned} 500 \text{ employees} * 2 * 250 \text{ days} &= 250,000 \text{ total annual one-way trips} \\ 250,000 * 2\% &= 5,000 \text{ annual one-way transit-trips} \end{aligned}$$

Seasonal Visitor Commute Demand

Very similar to the demand for employment, this demand is visitors who commute to Big Sky, but do not stay in the area. This is a difficult demand to estimate, but based upon an analysis of estimated housing occupancy and skier visits throughout the peak season, a commuter demand can be estimated. Based upon a seasonal visitor commuter percentage of all skier visits, approximately 25 percent can be expected to commute from the Bozeman/Belgrade area. This is based upon survey data from 2004 which asked Snow Express patrons where they primarily reside. Twenty-five percent responded that their primary residence was the Bozeman/Belgrade area. Sixty percent responded that their primary residence was Big Sky. If this percentage were to hold true for all skier visits, a seasonal commuter demand of approximately 147,000 one-way trips could be expected, assuming one person per vehicle. If three percent were to use transit, this represents a transit trip demand of approximately 4,400 one-way trips.

$$\begin{aligned} 294,000 \text{ visitors} * 25\% * 2 &= 147,000 \text{ total annual one-way trips} \\ 147,000 * 3\% &= 4,410 \text{ annual one-way transit-trips} \end{aligned}$$

TRANSIT DEMAND SUMMARY

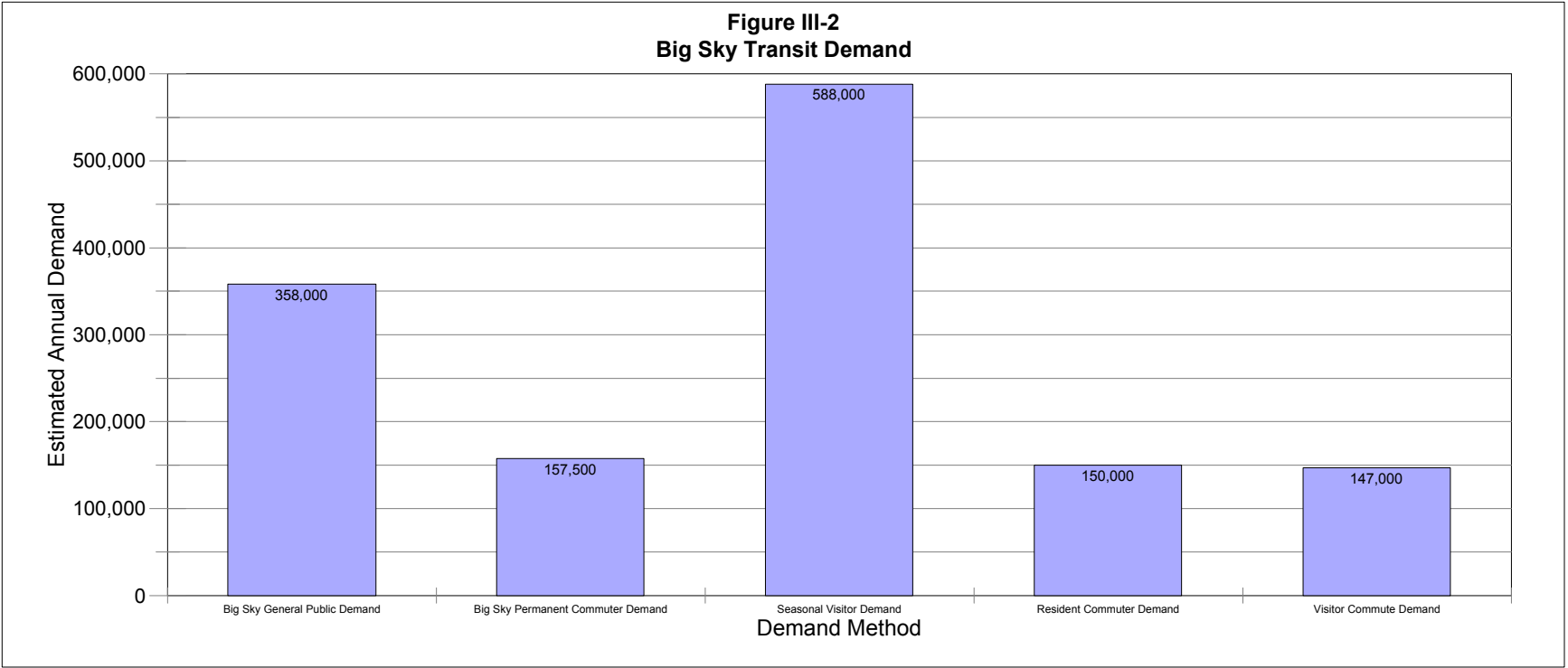
This chapter presents the methodologies for estimating the demand for public transportation services in the Big Sky study area. Several methods are presented for both peak local demand and commuter demands, as well as employee transit demand estimates. Table III-1 and Figures III-2 and III-3 present a summary of these demand estimates. These techniques give a picture of the various needs and estimations in the area. These models are useful for evaluating various alternatives

to meet the needs of the community. The transit demand models will be used by the LSC Team for developing and evaluating the service alternatives presented in subsequent reports.

As shown in Table III-1, a total estimated person-trip demand of approximately 1,410,500 annual one-way trips are estimated for the area. Of this demand, approximately 74,615 transit trips are estimated, which is approximately five percent of the total trips.

Table III-1 Big Sky Transit Demand Summary				
Demand Estimation Method	2005 Estimated Demand	% of Total Demand	2005 Estimated Transit Trips	% of Total Trips
Big Sky General Public Demand				
<i>General Public Adjusted</i>	368,000	26.1%	3,680	4.93%
Subtotal Big Sky General Public Demand	368,000	26.1%	3,680	4.9%
Big Sky Commuter Demand				
<i>Resident Employee Commuter Demand</i>	157,500	11.2%	4,725	6.33%
Subtotal Commuter Demand	157,500	11.2%	4,725	6.3%
Seasonal Demand				
<i>Big Sky Visitor Transit</i>	588,000	41.7%	58,800	78.80%
<i>Resident Commuter Demand</i>	150,000	10.6%	3,000	4.02%
<i>Visitor Commute Demand</i>	147,000	10.4%	4,410	5.91%
Subtotal Seasonal Demand	885,000	62.7%	66,210	88.7%
Total Demand	1,410,500		74,615	5.3%
<i>Total Snow Express Trips Provided</i>			45,119	
<i>Source: LSC, 2005.</i>				

**Figure III-2
Big Sky Transit Demand**



**Figure III-3
Estimated Transit Trips**

