

CHAPTER 4

Assessment of Transit Needs

INTRODUCTION

A key step in developing and evaluating transit plans is a careful analysis of the mobility needs of various segments of the population and the potential ridership of transit services. The analysis presented below segments the potential ridership for transit services into four categories:

- Commuter demand
- Elderly/disabled trips not associated with a social service program
- Trips associated with social service programs in the Redwood Coast region
- Intercity transit services (service between two or more cities)
- Visitor demand

This analysis yields estimates of the demand that could be expected given a high level of transit service for each category of ridership, and for each portion of the study area. It represents an “upper bound” for an idealized transit service that could serve all of the needs of the community, if a very high level of service could be provided. In reality, no service can efficiently serve one hundred percent of this potential demand. Table 1 in Chapter 2 presents the estimated 2005 demographic information that will be used, in part, to estimate the upper bound demand for transit in the Redwood Coast region.

EMPLOYEE TRANSIT DEMAND

One element of the total demand for transit services in the region is commuter services. This element has become an important “market” for other transit systems. One quantitative source on which to base an analysis of commuter demand is provided by the *2000 Census Transportation Planning Package* from the Bureau of Transportation Statistics, U.S. Department of Transportation. The total number of employed Redwood Coast residents in 2005 is an estimated 2,988. Approximately 94 percent of employees in Mendocino County work outside of the home, therefore it is reasonable to estimate that approximately 2,808 employees work outside of the home in the Redwood Coast region, as indicated in Table 19.

In evaluating a reasonable maximum commuter mode split for transit services, it is necessary to consider those factors that impact the feasibility of transit service in the regional commuter market. In light of observed transit commuter mode split in other similar areas, a maximum feasible mode split of 2.0 percent of all commuter travel is appropriate. Typically, each employee makes two trips approximately 250 days per year; thus, the 2,808 commuters in 2005 would have made a total of approximately 1,404,140 commuter trips per year. Applying the 2.0

TABLE 19: Estimated General Public Employee Transit Demand

Census Tract & Block Group	Area Description	Employees ¹	Annual One-Way Trips	
			Total	Transit
Mendocino County				
110.6 (partial)	Elk	159	79,370	1,590
	111.1 Manchester/Irish Beach	285	142,410	2,850
	111.2 Pt. Arena - Iverson Rd.	520	259,910	5,200
	111.3 Gualala - Anchor Bay	945	472,350	9,450
	Total	1,908	954,040	19,090
Sonoma County				
1543.01 BG 1	Sea Ranch / Annapolis	650	324,770	6,500
1543.01 BG 2	Stewarts Pt. / Fort Ross	251	125,330	2,510
	Total	900	450,100	9,010
Redwood Coast Total		2,808	1,404,140	28,100

Note 1: Employees Working outside the home, within the Redwood Coast Region.
Source: LSC Transportation Consultants, Inc.

percent mode split suggests a total commuter demand for transit trips on the order of 28,100 one-way transit passenger-trips per year:

$$\begin{aligned}
 2,808 \times 2 \times 250 &= 1,404,140 \text{ total annual one-way person trips} \\
 1,404,140 \times 2.0\% &= 28,100 \text{ annual one-way transit trips}
 \end{aligned}$$

This information is presented for each block group in Table 19.

RURAL NON-PROGRAM-RELATED TRANSIT DEMAND

The demographic data analyzed in Chapter 2 were applied to a series of analytical techniques to provide estimates of the various types of transit demand. These estimates were then considered as a whole to develop overall estimates of total transit demand. An important source of information regarding demand generated by programs is the *Transit Cooperative Research Program (TCRP) Project A-3: Rural Transit Demand Estimation Techniques*. This study, completed by SG Associates, Inc., represents the first substantial research into demand for transit service in rural areas and small communities since the early 1980s. Study documents present a series of formulae relating the number of participants in various types of programs with the observed actual demand for service, based upon a database of 185 transit agencies across the country. The TCRP analytical technique uses a “logit model” approach to the estimation of

transit demand, similar to that commonly used in urban transportation models. This model incorporates an exponential equation that relates the quantity of service and the demographics of the area.

As with any other product or service, the demand for transit services is a function of the level of supply provided. To use the TCRP methodology to identify a feasible maximum demand, it is necessary to assume a high supply level, as measured in vehicle-miles of annual transit service per square mile of service area. For rural areas such as the Redwood Coast, a reasonable maximum level of service would be to serve every portion of the Coast with four round trips of transit service daily, Monday through Friday. This equates to approximately 7,200 vehicle-miles of transit service per square mile per year. However, due to the dispersed nature of the population in the Redwood Coast, this level of service is not feasible. As a point of comparison, the current services provided by MTA are equivalent to approximately 176 annual vehicle miles per square mile.

Employing this service density to the population of the Redwood Coast region yields the estimated elderly/disabled non-program transit demand presented in Table 20 below. As indicated, a total of 13,140 one-way passenger-trips would be generated by elderly persons, and 920 one-way passenger-trips by persons with mobility limitations. Combined, this equates to 14,060 annual one-way passenger-trips for elderly/mobility limited persons if a very high level of service could be provided. The TCRP methodology can also be applied to general public non-work trips for the county. As indicated in Table 20, a total demand of 4,830 annual non-program passenger-trips is estimated for the study area if a very high level of service could be provided.

Block Group	Tract Description	Estimated Annual Passenger-Trip Demand				Estimated Daily Transit Demand
		Elderly	Mobility-Limited	General Public	TOTAL	
Mendocino County						
110.6 (partial)	Elk	410	30	180	620	2
	111.1 Manchester/Irish Beach	1,480	110	780	2,370	9
	111.2 Pt. Arena - Iverson Rd.	1,500	260	1,850	3,610	14
	111.3 Gualala - Anchor Bay	3,460	210	290	3,960	16
	Total	6,860	610	3,080	10,550	42
Sonoma County						
1543.01 BG 1	Sea Ranch / Annapolis	5,140	180	950	6,270	25
1543.01 BG 2	Stewarts Pt. / Fort Ross	1,140	130	790	2,060	8
	Total	6,280	310	1,750	8,340	33
Total	Redwood Coast	13,140	920	4,830	18,890	76
Note: Demand estimated based on the methodology presented in "TCRP Report 3: Workbook for Estimating Demand for Rural Passenger Transportation."						

SOCIAL SERVICE PROGRAM-RELATED TRANSIT DEMAND

In most rural areas transit trips made by residents to and from specific social programs (such as senior nutrition, job training, or sheltered workshops) typically comprise a large part of the total transit demand. However, within the Redwood Coast region there are almost no social services, and therefore little transit demand associated with social services. Nonetheless, demand associated with the nutrition program can be estimated using the *TCRP Project A-3: Rural Transit Demand Estimation Techniques*. There are an estimated 60 participants in each of the congregate meal sites, or 120 total participants. The TCRP equation uses a factor of 248 times the number of participants for a five-day program. Because meals are only offered twice a week in Point Arena and once a week in Gualala, these numbers have been reduced to 99 and 50 respectively. Multiplying these factors times the number of participants gives the following estimated demand:

Point Arena: 99 TCRP factor x 60 meal site participants = 4,950 annual one-way trips
Gualala: 50 TCRP factor x 60 meal site participants = 3,000 annual one-way trips

There is an estimated demand for 7,950 annual one-way trips to and from the congregate meal sites. Again, the reader is cautioned that this number reflects the demand if a *very high level of service* was possible to every portion of the county.

INTERCITY TRANSIT DEMAND

In order to estimate demand for intercity bus service, a model was used from the report “*Planning Techniques for Intercity Transportation Services*.” In general, the model considers the following input factors: the number of passengers traveling one way on a given route is a function of the frequency of service, the population served, the cost to the rider, and the distance for the trip. The model that proved to be appropriate is of the following format:

$$\text{PASS/MO} = \text{CONST} \times \text{RTFREQ}^a \times \text{SERVPOP}^b \times \text{FARE/MI}^c \times \text{DIST}^d$$

where:

PASS/MO = the number of one-way passengers boarding per month for the route segment specified.

CONST = a constant specifically derived for this equation.

RTFREQ = scheduled round trips per week on the route.

SERVPOP = the population served: defined as the sum of the populations of villages, towns, and cities directly along the route, divided by 100.

FARE/MI = fare per mile in cents, found by dividing the cost of a one-way fare between the end points of each route by the one-way distance between the end points of the route.

DIST = one-way distance between the endpoints on the route.

^a = the exponent for round trip frequency

^b = the exponent for service population

^c = the exponent for fare per mile

^d = the exponent for one way distance

The specific model that was used for the estimation of demand in this study was chosen based on the route distance of the study area. The final equation used for this study was designed for route distances of between 20 and 200 miles.

$$\text{PASS/MO} = 6.871 \times \text{RTFREQ}^{1.093} \times \text{SERVPOP}^{0.409} \times \text{FARE/MI}^{-0.352}$$

Distance was left out of the final equation because this formula was designed specifically for distances of between 20 and 120 miles one way. Intercity trips of different lengths are quite different in terms of trip purpose and frequency.

This equation can be applied to estimate the potential demand for services between the Redwood Coast and an urban area such as Fort Bragg, Ukiah, or Santa Rosa. Assuming one round trip per day throughout the year, and a fare equivalent to \$0.10 per mile (an industry standard), the total demand for intercity service can be calculated to equal 4,060 one-way passenger-trips per year, or approximately 5.5 passengers per one-way trip. Again, this figure represents an upper bound, as discussed above.

VISITOR TRANSIT DEMAND

As a tourist destination, the Redwood Coast region has the potential for visitors (particularly overnight visitors) to generate demand for transit services. One potential transit market is patrons of campgrounds and RV resorts along the coast. Experience in other summer resort areas, such as Jackson, Wyoming, and Mammoth Lakes and South Lake Tahoe, California indicates that campers – and particularly RV owners – have a high potential to use transit services, if convenient to their site. Once camps are established, RV owners without "tag-along" vehicles find it inconvenient to pack all their belongings to make a local trip. In addition, many overnight travelers – whether they have a car or not – find it enjoyable to use an attractively-marketed transit service as an "excursion," since they are more willing to adjust their activities to the transit schedule than are commuters or other local travelers.

Table 21 provides an analysis of summer visitor transit demand. (Winter and off-season demand is unlikely to generate enough demand to be considered.) An inventory of campgrounds, lodging units, and vacation rentals is provided for areas of the Redwood Coast. Based on observed traffic generation, it is estimated that each unit generates an average of three vehicle-trips per day for local trips (excluding the trips into and out of the region that would not be served by a local visitor transit program). Further, a typical visitor vehicle occupancy of three persons per vehicle is assumed. Multiplying these factors gives an estimated number of daily vehicle trips. A transit mode split was estimated based on experience in Mammoth Lakes, California, where 0.8 percent

of local person-trips generated by lodging of all types are made on the summer trolley. Multiplying this factor by the total local person-trips yields an estimated daily transit trips of 80. The total summer demand (assuming a 90 day season) would be 7,550.

SUMMARY

A summary of the various elements of transit demand in the Redwood Coast region is presented in Table 22 below. As indicated, total transit demand for all trip purposes within the region is estimated to equal 66,550 annual one-way passenger-trips *if a very high level of service could be provided*. The largest portion of estimated demand is generated by employee demand (42.2 percent), followed by non-program-related elderly and disabled demand (21.2 percent), social service program-related transit demand (11.9 percent), visitor demand (11.3 percent), non-program-related general public demand (7.3 percent), and intercity demand (6.1 percent), as also illustrated in Figure 12. It should be emphasized, however, that these numbers represent a maximum potential under optimal service conditions throughout the Redwood Coast region. It is not financially feasible to expect that the transit systems that serve the Redwood Coast could ever approach this level of service.

ANALYSIS OF THE DEMAND ESTIMATES: MET VERSUS UNMET NEEDS

Table 23 presents the unmet needs for the Redwood Coast region by Census Tract Block Group. The unmet need is calculated by subtracting the actual ridership numbers for the area providers from the demand estimates. The ridership numbers are reviewed in the chapter on existing providers. Note that these ridership figures include persons carried on both the MTA South Coast Routes, CRC's volunteer service, and SCS service, but exclude the school transportation systems.

A review of this table indicates the following overall conclusions:

- Total transit demand in the study area is estimated to equal 66,550 one-way passenger-trips per year.
- Overall, existing transit services are meeting 29.4 percent of the transit demand in the study area. There is a higher percentage of demand met in Sonoma County (33.3 percent) than in Mendocino County (27.4 percent).
- Employee trip demand is the highest of all trip types. It is not known what percentage of the MTA ridership serves employees, but this is likely the highest unmet demand.
- Approximately 5,475 non-program elderly and disabled trips are provided annually, which meets 39.0 percent of total estimated demand. In comparison, only an estimated 285 program-related trips are made, which equates to 4.0 percent of demand met.

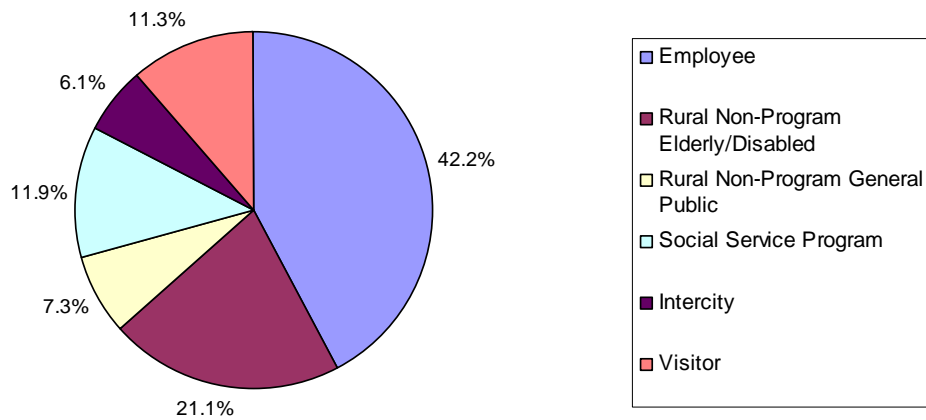
In general, this comparison of demand and ridership on current services indicates a need for additional employee and program transportation in the Redwood Coast region.

TABLE 22: Total Transit Demand on the Redwood Coast

Type of Demand	One-Way Passenger Trips		
	Average Daily	Annual	% Of Total
Employee	112	28,100	42.2%
Rural Non-Program Elderly/Disabled	56	14,060	21.1%
Rural Non-Program General Public	19	4,830	7.3%
Social Service Program	32	7,950	11.9%
Intercity	11	4,060	6.1%
Visitor	84	7,550	11.3%
Total	230	66,550	100.0%

Note: Annual figures assume maximum level of transit service is provided.

Figure 12: Redwood Coast Transit Demand by Type



Source: LSC Transportation

Redwood Coast Demog.xls

TABLE 23: Unmet Demand on the Redwood Coast

Block Group	Tract Description	Estimated Annual Transit Demand					Annual Transit Provided ²	Annual Unmet Demand	% Met	
		Employee	Non- Program	Social Service	Intercity ¹	Visitor				TOTAL
Mendocino County										
110.6 (partial)	Elk	1,590	620	--	158	350	2,718	657	2,061	24.2%
	111.1 Manchester/Irish Beach	2,850	2,370	--	447	1,410	7,077	2,010	5,067	28.4%
	111.2 Pt. Arena - Iverson Rd.	5,200	3,610	4,950	778	520	15,058	3,810	11,248	25.3%
	111.3 Gualala - Anchor Bay	9,450	3,960	1,500	1,052	2,240	18,202	5,318	12,884	29.2%
	Total	19,090	10,560	6,450	2,435	4,520	43,055	11,795	31,259	27.4%
Sonoma County										
1543.01 BG 1	Sea Ranch / Annapolis	6,500	6,270	1,500	1,103	1,480	16,853	5,653	11,200	33.5%
1543.01 BG 2	Stewarts Pt. / Fort Ross	2,510	2,060	--	522	1,550	6,642	2,171	4,470	32.7%
	Total	9,010	8,330	1,500	1,625	3,030	23,495	7,825	15,671	33.3%
Total Redwood Coast		28,100	18,890	7,950	4,060	7,550	66,550	19,620	46,930	29.5%

Note 1: Assumes intercity service is proportional to population.

Note 2: Assumes SCS service is 30% Sea Ranch, 30% Gualala, 30% Point Arena, 10% Manchester; CRC service is 40% Sea Ranch, 40% Gualala, 10% Point Arena, and MTA is proportional to the area population.