Rural Transit in Oregon: Current and Future Needs

Final Report

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By:

Jennifer Dill, Ph.D.
Margaret B. Neal, Ph.D.

with

Ray Delahanty
Talia Jacobson
Darin Lund

Portland State UNIVERSITY

College of Urban and Public Affairs
Institute on Aging
Center for Transportation Studies
Population Research Center
P.O. Box 751
Portland, OR 97207-0751

For:

Association of Oregon Counties

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Executive Summary

Background

The purpose of the research reported here was to identify the current status and needs for general public transportation in Oregon's rural areas, as well as opportunities and barriers (e.g., funding, governance issues, and leadership) to expanding services over a 20-year period.

Oregon is a largely rural state. This lack of density poses problems for the provision of public transit, whether through fixed route or demand response service. For the purposes of this report, any area outside of an Urbanized Area designated by the U.S. Census is considered rural. The Urbanized Areas include Portland, Eugene-Springfield, Salem-Keizer, Medford, Bend, and Corvallis. Although well over 90% of the land area of Oregon is rural under this definition, only about 43% of Oregon residents live in rural areas. The vast majority of rural Oregon has a density of less than one housing unit per acre. Only about one-tenth of one percent of rural Oregon's area has a density of at least one housing unit per acre (Table I). This area does, however, include 24% of Oregon's rural population, with the remaining 76% living in areas with less than one housing unit per acre.

Table I: Area and Population by Housing Density, Rural Oregon (2000)

Housing Density	Land Area (sq. miles)		Population	
0-0.99 units/acre	96,116	99.9%	1,123,100	75.7%
1-1.99 units/acre	876	0.1%	160,840	10.8%
2-2.99 units/acre	34	0.0%	121,810	8.2%
3.-3.99 units/acre	8	0.0%	40,570	2.7%
4 or more units/acre	6	0.0%	36,870	2.5%
Total	96,240	100.0%	1,483,180	100.0%

Note: Calculations are based upon Census block groups. Population figures are rounded to the nearest ten. Some block groups have portions both inside and outside the urbanized area. Block groups that extend outside of the urbanized area are included within the urbanized area in this table if the block group's centroid is within one-half mile of the area's boundary.

People living in rural areas and who lack cars and access to public transportation are at a strong disadvantage. With no access to these transit resources, they may be limited to relying on friends, family, or associates for travel. This reliance may severely limit the flexibility of travel and limit those individuals' independence. When transit is not available, older adults and people with disabilities, in particular, experience more restrictions on their ability to travel and must rely more heavily on informal networks or formal

supportive services to meet their needs. Rural public transit also plays a vital role for agricultural workers. The importance of public transportation in rural areas also has been demonstrated by the key role it has played in the implementation of welfare reform *(Stommes and Brown 2002)*.

Rural transit also faces other challenges that may not be present in urban areas. The USDOT *(2001)* lists some of these challenges as:

- A dispersed system with high unit costs for service delivery, operations and maintenance;
- Geographical issues such steep grades and mountain passes;
- More dramatic weather events and effects on road conditions;
- A lack of federal spending that goes to public transportation in rural areas; and
- Transit that is funded and maintained by multiple levels of government and is often a system of disparate parts.

The last point is particularly salient, because transit service in rural areas is often poorly linked, compared to transit in urban systems. For example, passengers living in a rural area and seeking a ride to work or a medical facility in a neighboring county or area may not be able to connect seamlessly between providers. This may impede the ability of rural residents to maintain employment or manage other important necessities of daily life. **The lack of transit options in rural areas, therefore, leaves many rural citizens at a tremendous economic as well as social disadvantage.**

Study Methods

The analyses used several data sources:

- 2000 Census data at the *block group level* were used to determine the characteristics of the population currently served by transit.
- 2000 Census and 2006 American Community Survey (ACS) data were used to develop county-level population projections for 2010, 2015, and 2030. The methodology and details of these projections are described in an earlier report, "Needs, Costs, and Funding Alternatives for Transportation Services for Older Adults and People with Disabilities in Urban and Rural Oregon: Final Report" *(see Dill et al. 2008)*.

- The National Transit Database (NTD) provided data on transit ridership, service provision, costs, and funding sources for fiscal year 2007 for many of the Oregon providers, as well as over 1,200 agencies nationally.
- The Oregon Department of Transportation (ODOT) provided quarterly data on ridership, service, and costs for transit providers reporting to the agency. Ridership and cost data from the reports were used when NTD data were unavailable.
- In 2008, ODOT conducted a survey of transit providers in Oregon *(Oregon Department of Transportation (ODOT) 2008)*. Questions focused on current and projected service and funding needs and gaps. In addition to some quantitative data, providers' volunteered comments offered qualitative insights into the issues facing transit providers.
- A separate data gathering effort was mounted to learn more specifically about the various sources through which Oregon's rural transit providers are obtaining funding.

To assess the levels of transit service currently provided to Oregon's rural residents, it was necessary to know the geographic service areas for the rural transit systems. To perform the analyses, the service areas needed to be in a geographic information system (GIS) that allows the merging and layering of various geographic data, such as population characteristics from the Census and transit service areas. Unfortunately, no single source having all the required information exists. Therefore, the project team mapped the existing rural transit service throughout Oregon by acquiring route maps from transit agency web sites or by calling agencies directly.

Oregon's Rural Transit Service Today

Service Provided

In 2009, there were at least 48 agencies providing regular transit service to the general public in rural Oregon. This includes intercity service (e.g., Amtrak, Greyhound), fixed route service (including deviated fixed route), and demand response service open to the general public. Fixed route service is provided by a number of agencies based in rural Oregon, in addition to a few of the urban providers who have routes that extend from an urbanized area into rural areas.

For this analysis, five level of service (LOS) categories developed to categorize current Oregon rural transit operators with respect to the local fixed route service:

- LOS 1: < 5 days/week, no weekend service
- LOS 2: 5 days a week, no weekend service, more than 60-minute headways
- LOS 3: 5 days a week, no weekend service, 60-minute headways or better
- LOS 4: 6 or more days a week, less than 12 hours of service per weekend day
- LOS 5: 6 or more days a week, 12+ hours of service per weekend day

About 22% of the rural population is served only by demand response service (Table II). **Only about 7% of the rural population is served by fixed route transit at a level of service (LOS) of 4 or 5, the levels which include weekend service.**

Table II: Transit Service Available in Rural Oregon

	Population		Area: Square miles	
No service *(see note)*	951,126	60.0%	87,259	90.7%
Intercity only	8,704	0.5%	21	0.0%
Demand Response only	344,019	21.7%	8,748	9.1%
Demand Response & Intercity only	9,694	0.6%	9	0.0%
Fixed route LOS 1, no intercity	6,014	0.4%	5	0.0%
Fixed route LOS 2, no intercity	49,564	3.1%	49	0.1%
Fixed route LOS 3, no intercity	68,493	4.3%	33	0.0%
Fixed route LOS 4, no intercity	78,072	4.9%	69	0.1%
Fixed route LOS 5, no intercity	16,892	1.1%	26	0.0%
Fixed route LOS 1 & intercity	476	0.0%	1	0.0%
Fixed route LOS 2 & intercity	19,783	1.2%	6	0.0%
Fixed route LOS 3 & intercity	17,120	1.1%	6	0.0%
Fixed route LOS 4 & intercity	8,813	0.6%	3	0.0%
Fixed route LOS 5 & intercity	5,605	0.4%	3	0.0%
Total	1,584,375	100.0%	96,239	100.0%

NOTE: As noted in the Study Methods section, service for at least three small providers was not included in this analysis due to insufficient information. Therefore, this estimate of "no service" may by slightly inaccurate.

One of the main reasons that levels of transit service in rural areas are lower than in urban areas is the lack of population density to support more service, given the available funding. Only about 5% of Oregon's rural population lives in a block group with a density considered necessary by some sources to provide regular fixed-route bus service (i.e., three or more housing units per acre). Of residents living in areas with a density of four or more units per acre (2% of Oregon's rural population), at least 80% currently have some form of fixed route transit nearby (Table III). Another 3% of the rural population lives in an area with a density of 3-3.99 units per acre, and over 70% of these have some form of fixed route service. Under 60% of people living at a density of 2-2.99

units per acre have fixed route service. Availability drops off significantly when density falls below two units per acre.

Table III: Transit Service Availability and Housing Density

Type of transit service available in block group	Percent of population living in a block group with this housing density					
	0-0.99 units/acre	1-1.99 units/acre	2-2.99 units/acre	3-3.99 units/acre	4 or more units/acre	Total
No service mapped	72%	34%	17%	7%	16%	60%
Intercity only	0%	1%	2%	1%	1%	1%
Demand Response only	23%	16%	21%	16%	3%	22%
Demand Response & Intercity only	0%	1%	3%	2%	0%	1%
Fixed route LOS 1, no intercity	0%	1%	3%	1%	0%	0%
Fixed route LOS 2, no intercity	1%	10%	9%	9%	6%	3%
Fixed route LOS 3, no intercity	1%	13%	15%	17%	29%	4%
Fixed route LOS 4, no intercity	1%	14%	16%	28%	13%	5%
Fixed route LOS 5, no intercity	1%	3%	2%	5%	1%	1%
Fixed route LOS 1 & intercity	0%	0%	0%	0%	0%	0%
Fixed route LOS 2 & intercity	0%	1%	5%	6%	15%	1%
Fixed route LOS 3 & intercity	0%	3%	4%	5%	8%	1%
Fixed route LOS 4 & intercity	0%	1%	3%	2%	4%	1%
Fixed route LOS 5 & intercity	0%	1%	1%	2%	4%	0%
Total	100%	100%	100%	100%	100%	100%
Total estimated population (2007)	1,203,960	170,080	129,000	42,720	38,620	1,584,380
% of rural population living in this density category	76%	11%	8%	3%	2%	100%

NOTE: Density is based upon 2000 Census data.

A survey conducted by ODOT Public Transit Division staff in 2008 asked transit providers whether service levels had been increased or decreased in fiscal year 2007-08. Of the 20 rural providers that answered the question and who provide service to the general public (not just service for older adults and people with disabilities), 12 (60%) said that service had been increased, and none said that service had been decreased. This is in contrast to the seven[1] urban providers, where only two had increased service and one had decreased service. Increasing the service area was the most common type of service expansion (Table IV).

[1] There are 6 urban areas and 7 urban area transit providers, because of Wilsonville Smart. Corvallis is considered an urban area in all of the calculations.

Table IV: Changes in Service by Oregon's Rural Transit Providers, 2007-08

	n	%
No change	8	40%
Decrease in service	0	0%
Increase in number of days per week	3	15%
Increase in number of hours per day	6	30%
Increase in service area coverage	8	40%
Increase in number of seats/size of vehicle	2	10%
Increase in number of volunteers/employees	6	30%
Total number of rural providers responding to question	20	

Source: ODOT Public Transit Division survey (ODOT 2008).

The findings that a majority of the providers responding had increased their level of service and none reported decreasing the level of service that year may be seen as positive: although rural transit providers are dealing with shrinking budgets as demand increases, they still found ways to increase the level of service. At the same time, it seems likely that further increases in level of service with less or even stable funding will not be likely, as providers feel they are already "getting blood out of a turnip."

Overall, lack of funding and the need to rely on grants or other assistance were prevalent themes in the comments of the rural providers responding to the Public Transit Division's survey. Taken together, the findings of the survey indicate that an increase in demand for service yet limited funding will make it challenging to increase, or even maintain, the current level of transit service in rural Oregon in the future.

Rural Transit Ridership and Performance

Rural transit agencies in Oregon provided over 2.6 million rides to the general public in fiscal year 2007, including about 2.13 million rides on fixed route and intercity service, and about 524,000 rides on demand response service open to the general public. The number of annual fixed route trips per capita ranged from under 0.5 to nearly 40. The average was 8.5 rides per person per year, and the median was 5.0. There were eight providers that averaged over 10 trips per person per year. Seven of those providers shared one thing in common: most of their routes operated six or more days per week. Three of those providers are also located just outside the Portland urban area. The number of general public demand response trips per capita ranged from under 0.1 to over 11. The average was 2.0, and the median was 1.2.

Common measures of transit performance are passenger trips per revenue hour and per revenue mile. These measures give a sense of how intensely the services are being used. For fixed route service, Oregon's rural providers averaged one-half of a passenger trip per

revenue mile (median = 0.4). This is the same as the average for nearly 400 rural providers nationwide. The median number of trips per revenue hour for Oregon was 6.8, which is higher than the national median of 5.1. These numbers (trips per revenue hour and mile) are well below the standards for many urban systems *(Center for Urban Transportation Research 2009)*. For demand response systems, the median number of trips per revenue hour was 4.0, and the median number of trips per revenue mile was 0.3. Because the NTD does not indicate whether the demand response service is for the general public or limited to older adults and people with disabilities, the national averages are not provided for comparison.

It is generally assumed, and often observed, that higher levels of service will lead to higher ridership. Figure I shows a positive relationship between trips per capita and revenue miles per capita at the state level, nationally.

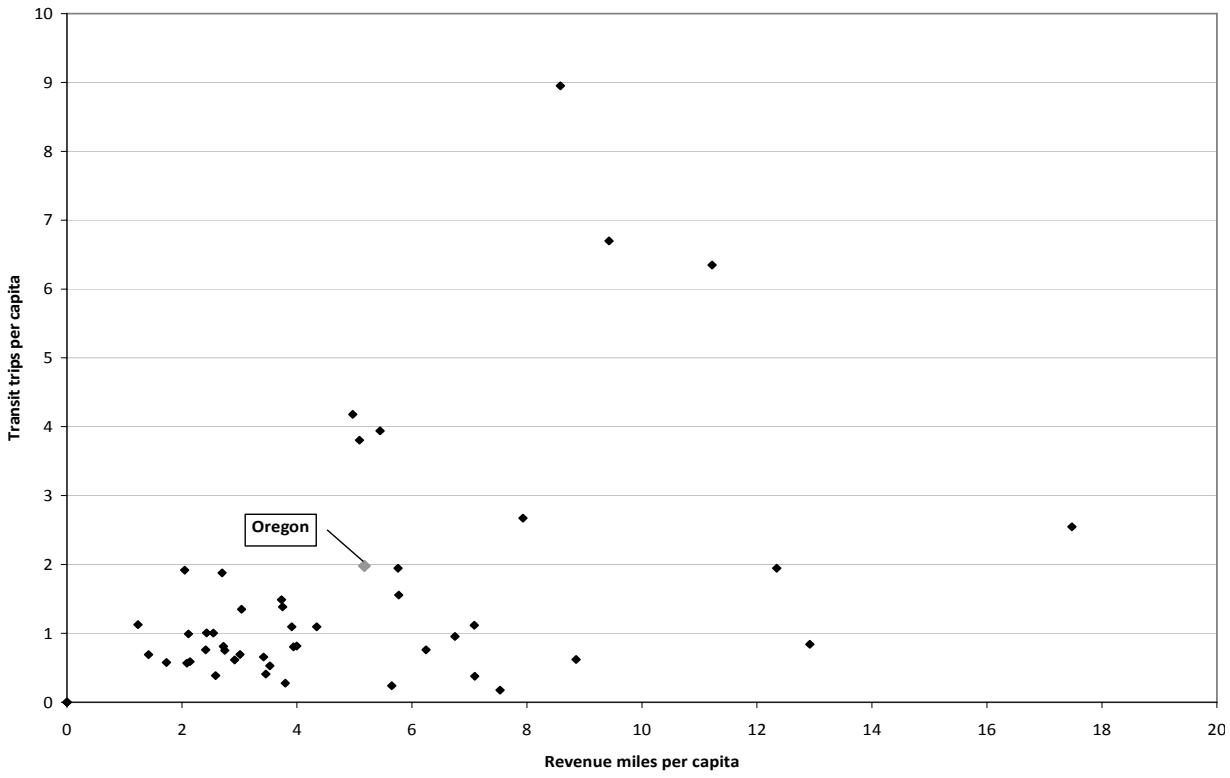


Figure I: Rural Transit Trips per Capita and Miles of Service per Capita, by State

Ridership per capita appears to increase significantly when providers include at least one day of weekend service, along with service Monday through Friday (Figure

II). The higher ridership is probably not due entirely to the additional weekend service, however. Rather, providers that have weekend service are also more likely to have higher frequency service during weekdays, which will increase ridership.

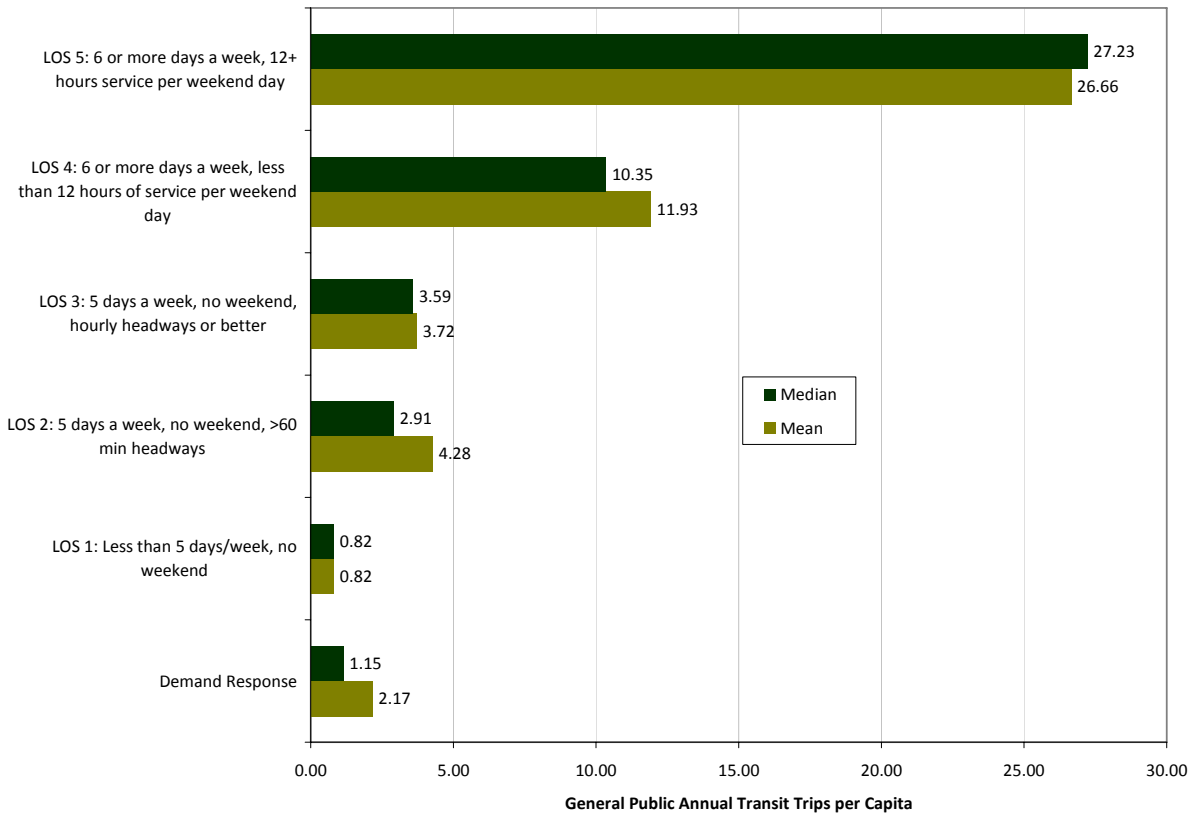


Figure II: Trips per Capita by Level of Service, Oregon Rural Providers

Rural Transit Service Costs

Transit providers report operating and capital costs as part of the NTD system and to ODOT. However, costs are not separated out between fixed route and demand response service. Therefore, it is difficult to accurately assess service costs by type of service. For example, systems providing fixed route service usually also provide complementary paratransit service for eligible riders. These costs typically are much higher than fixed route costs. Table V shows the operating costs per passenger trip, per revenue mile, and per revenue hour for Oregon's rural providers. The table shows the mean, median, and range of costs. Because of some outliers, the median cost figures may be a more accurate representation of typical costs. **Costs are generally higher for agencies that provide only demand response service.** In general, the Oregon agency performance data are

similar to the national data from the rural NTD, although comparisons are difficult because of differences in the data collected.

Table V: Operating Cost Performance Measures, Oregon Rural Transit Providers

	Mean	Oregon Median	Range
Operating Cost per unlinked passenger trip			
Fixed route only (includes complementary paratransit, if provided)	$12.80	$7.79	$2.34-$57.39 (n=17)
General public demand response only	$15.41	$13.13	$4.34-$39.84 (n=8)
Fixed route and general public demand response	$11.38	$12.40	$4.15-$16.62 (n=7)
All services	$13.14	$8.20	$2.34-$57.39 (n=32)
Operating Cost per revenue mile			
Fixed route only (includes complementary paratransit, if provided)	$3.42	$2.91	$1.41-$11.80 (n=17)
General public demand response only	$7.63	$2.98	$0.92-$35.05 (n=8)
Fixed route and general public demand response	$2.62	$2.79	$1.27-$4.34 (n=9)
All services	$4.20	$2.92	$0.92-$35.05 (n=34)
Operating Cost per revenue hour			
General public fixed route only (includes complementary paratransit, if provided)	$58.22	$46.54	$6.21-$217.79 (n=17)
General public demand response only	$53.41	$55.76	$17.03-$90.97 (n=8)
Fixed route and general public demand response	$38.06	$34.56	$18.42-$64.54 (n=8)
All services	$52.17	$44.97	$6.21-$217.79 (n=33)

Governance and Funding Sources

The analyses conducted revealed several findings about funding rural transit service in Oregon:

- **Oregon's rural transit providers are highly dependent upon local sources of operating funds, somewhat more so than rural operators in most other states.** Statewide, about half of the rural transit service provided to the general public in Oregon is generated locally, either through fares (about 10%) or other local sources (about 40%). Only seven of 47 states with data generated a larger share of operating funds from local sources. Federal sources make up about 35% of operating

revenues, while state subsidies represent about 15%. The Special Transportation Funds, a formula program operated by the Oregon Department of Transportation, made up over two-thirds of the state funds.

- **The sources of local funds are diverse. However, few of Oregon's rural transit providers have a dedicated source of local funding**, such as a payroll or property tax. This may lead to less stability in service provision and greater difficulties in making long-term investments. Aside from fares, the largest of the local sources of operating revenues were human service agencies, followed by property taxes imposed by the transit district (about 7%). The remaining local sources of operating assistance were other dedicated local taxes for transit (such as levies and payroll taxes), the Business Energy Tax Credit, general fund contributions, program revenue, donations, and other miscellaneous sources.
- **Fare revenues are not a significant source of funding for rural transit either in Oregon or nationally**, although there is variability. Standard fares for most of Oregon's rural transit agencies range from free to $3.00. The agencies collect an average of $1.10 in fares per trip; the median is $0.82. These figures include fare revenue from all passenger trips, including complementary paratransit, because the data do not distinguish which services generate the fares. The average fare collected in Oregon is lower than the national average of $1.20, but the median ($0.82) is higher than the national median of $0.70. The median is a better measure, as there are a few agencies nationally that reported very high fare revenues relative to total trips, thus skewing the mean. Agencies providing fixed route service tend to generate a higher share of their revenues from fares.

With respect to governance, there are seven primary political jurisdictions or governance types: city (10 providers), county (7 providers), a transit district formed under ORS 267 (8 providers), a non-profit organization (4 providers), a county service district formed under ORS 451 (4 providers), a government formed under ORS 190 (2 providers), and a tribe. Only a few rural providers are located within local taxing jurisdictions that impose transit-specific taxes or fees. Specifically, these taxes or fees include an ad valorum tax (Basin Transit Service, Sunset Empire Transportation District and Tillamook County Transportation District), an employer payroll tax (Canby Area Transit-CAT, South Clackamas Transportation District, City of Sandy-SAM Trans), a three-year revolving levy (City of Milton-Freewater), and a local property tax (Hood River County Transportation District/Columbia Area Transit). Lincoln County Transportation Service District also collects a dedicated transit tax. With respect to other local government contributions, 11 rural transit providers receive funding from their local government's general fund.

Future Needs and Costs

Service Gaps

Identifying gaps in transit service requires some criteria for what minimum level of transit service should be provided. Given limited resources, the criteria for providing a minimum level of transit service should consider the economic feasibility of providing that service. It is generally more cost-effective to provide service in denser areas, since most potential riders will live within a reasonable distance of the service. Some sources suggest that fixed route transit service is feasible only at densities of three or more units per acre. The distribution of existing levels of transit service among different housing densities was shown in Table III.

Using those data, Table VI identifies some potential service gaps. The table assumes that fixed route LOS 4 or 5 is an adequate for a minimum level of service for areas with at least three housing units per acre. The analysis revealed the following:

- If service were to be provided at a minimum of fixed route LOS 4 (6-7 days a week, hourly headways or better) in areas with a density of at least three units per acre, an additional 57,800 rural residents would be served (3.7% of Oregon's rural population).
- If service were to be provided for areas with at least one unit per acre, an additional 83,900 rural residents were be served (5.3% of the total). This service might be demand response or extensions of existing, nearby fixed route services.
- Providing demand response service everywhere that does not currently have service (demand response or fixed route) would require providing service to an additional 862,600 people beyond those identified above (54.6% of the total).

Table VI: Identifying Rural Transit Service Gaps

<table>
<tr><th rowspan="2">Type of transit service available in block group</th><th colspan="5">Percent of Oregon's rural population</th></tr>
<tr><th>0-0.99 units/acre</th><th>1-1.99 units/acre</th><th>2-2.99 units/acre</th><th>3-3.99 units/acre</th><th>4 or more units/acre</th></tr>
<tr><td>No service</td><td rowspan="2">54.6% (~866,200)</td><td colspan="2" rowspan="2">5.3% (~83,900 people)</td><td colspan="2" rowspan="4">3.7% (~57,800 people)</td></tr>
<tr><td>Intercity only</td></tr>
<tr><td>Demand Response only</td><td colspan="3" rowspan="4">Already served by demand response or fixed route: 34.9%</td></tr>
<tr><td>Demand Response & Intercity only</td></tr>
<tr><td>Fixed route LOS 1 or 2[1]</td><td colspan="2" rowspan="3">Already served: 1.5%</td></tr>
<tr><td>Fixed route LOS 3[1]</td></tr>
<tr><td>Fixed route LOS 4 or 5[1]</td></tr>
</table>

[1] With or without intercity service

Based on this analysis, only about 57,800 rural Oregonians (3.7% of the rural population) live in an area of reasonable density that might support a higher quality of fixed route transit than currently exists. Less than 9,000 of those people live in an area that is currently not served by any type of transit, aside from intercity service. **Most of the service area gaps identified in areas with a density of at least one unit per acre (the boxes shaded in yellow and orange), are located adjacent to existing transit service.**

Future Demand and Costs

Without any improvement in service, transit ridership in rural Oregon will likely grow only at the same rate as the population.[2] This is assumed to be the "baseline" condition. In addition to this baseline estimate, two methods were used to estimate future rural transit demand, which assumes a significant improvement in service to meet currently unmet demand, beyond what is identified above as a gap in service. The process of selecting the two estimation methods and the methods themselves are described in more detail in the Study Methods section. The first method assumes that every rural provider achieves a ridership level equivalent to the provider at the 75th percentile. This means that for just under 75 percent of the agencies, ridership would be expected to increase. The second method uses trip rates developed for an Arkansas study and also used in an Arizona analysis *(Cambridge Systematics, Inc. 2008)*.

The results of the estimates are shown in Figure III. **The analysis shows that there may be a gap in needs of 50-75% currently, and that this gap would increase to 54-68% in the year 2030, compared with the baseline.** The 75th Percentile method resulted in the higher estimate. This implies that there is an unmet demand for service among the bottom 75% of the providers (based upon trips provided per capita). In other words, if their service improved to match that provided by the operator at the 75th percentile, more people would ride transit, thus meeting their need for service.

[2] One exception to this assumption would be a very large increase in gas prices. However, it is unclear how large of a price increase would be necessary to boost transit demand in rural areas. Moreover, such an increase would need to be sustained over time, and it is impossible to project such an event.

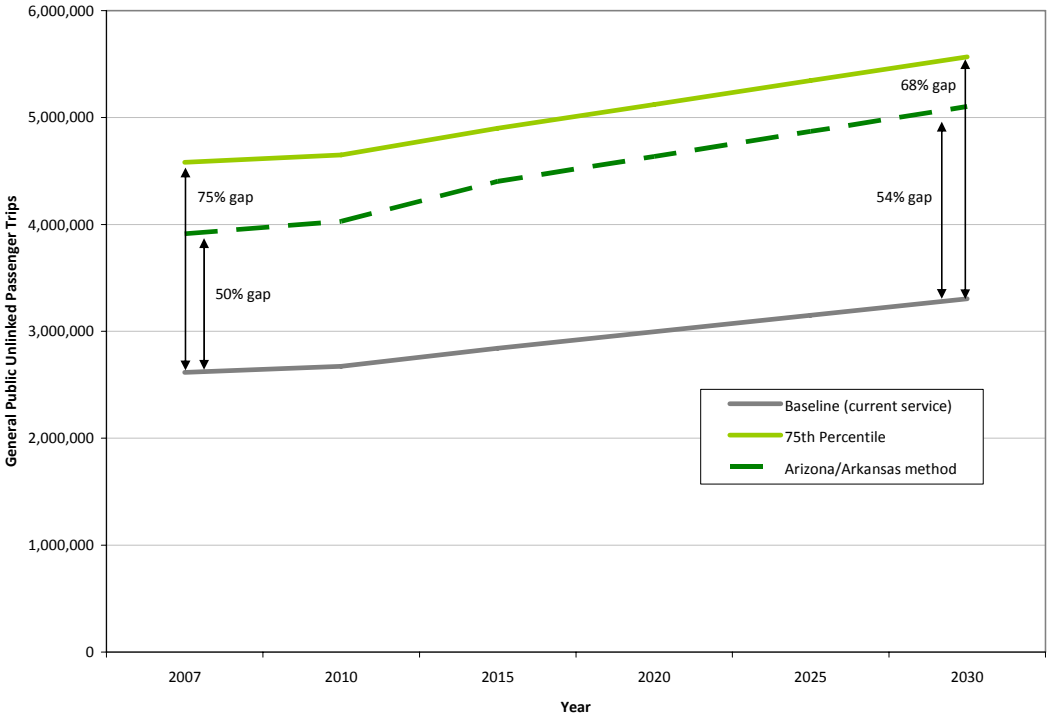


Figure III: Estimates of Current and Future General Public Rural Transit Demand

Annual operating costs for the local service (not intercity) provided by the rural transit agencies totaled at least $22 million in fiscal year 2007. Future costs were estimated using low (2.5%) and high (5.0%) assumptions regarding inflation rates. The total, statewide estimated annual operating costs are shown in Table VII and Figure IV. If current funding sources keep up with inflation, they would cover the baseline costs. However, this may be a risky assumption. Some local sources, such as general fund revenues and Business Energy Tax Credits, may not increase at the rate of inflation. However, even with this optimistic assumption, **the funding gap to provide the higher level of service to meet more of the unmet demand is $16-$26 million per year in 2015 and $32-$70 million per year in 2030.**

Table VII: Estimated Annual Operating Costs (in millions), 2010 through 2030

	Millions $			
	2007	**2010**	**2015**	**2030**
Baseline (low)	$22.0	$25.3	$29.1	$43.9
Baseline (high)	$22.0	$27.2	$35.3	$76.5
75th Percentile (low)	$39.1	$42.8	$50.9	$84.2
75th Percentile (high)	$39.1	$46.0	$61.7	$146.6
Gap (versus Baseline)	77%	69%	75%	92%
Arizona/Arkansas (low)	$32.9	$36.6	$45.3	$75.8
Arizona/Arkansas (high)	$32.9	$39.4	$54.9	$131.9
Gap (versus Baseline)	49%	44%	55%	72%

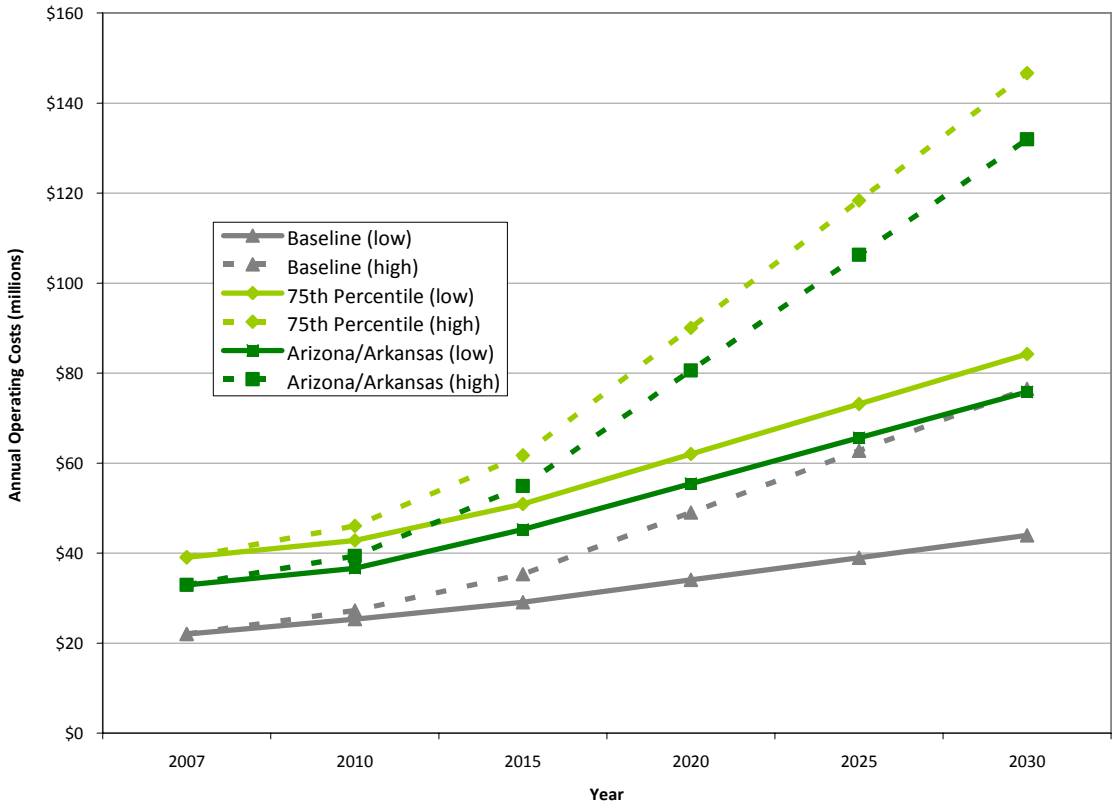


Figure IV: Estimated Annual Operating Costs, 2010 through 2030

These estimates do not include the cost of replacing existing vehicles or purchasing new vehicles for the additional service assumed. Providing an accurate estimate of capital needs is not possible without knowing how agencies would need to expand service to meet the demand estimated. Undoubtedly, the capital costs would be

significant. The providers indicated that they could only meet about 20-25% of their fleet needs under "normal budget conditions." In 2007, the 29 rural agencies in Oregon that reported cost data to the NTD spent $2.4 million on capital costs, 71% of which came from federal grants. If they are currently only meeting 20-25% of their capital needs, this would mean that their current capital needs are $9.6-$12.0 million, with a gap of $7.2-$9.6 million annually. These capital needs represent 55-68% of what is currently spent on operating costs. It should be noted, however, that the providers' estimates of what they need to expand their fleet is unrelated to the estimate of potential future demand presented here. In addition, some respondents may have overestimated their needs and/or underestimated their ability to fund the fleet purchases. Given all of the uncertainties, **it may be reasonable to assume that total costs (capital and operating) could be 50-75% higher than the operating costs shown above.** There could be additional capital costs for facilities, such as maintenance buildings, bus shelters, and dispatch equipment.

1. Introduction

Purpose of the Study

Mobility, the ability to get around, is a basic human need. Mobility provides independence and the capacity to get to and from work or school, shop for fresh food, clothing, and other daily needs, participate in physical and social activities, engage in and contribute to community affairs, and gain access to health and social services. These activities are crucial to the health and well-being of all Oregon residents, and to the economic well-being of the state. Public transportation provides mobility for those who, for a variety of reasons, cannot use a private vehicle. In rural areas, however, where population densities are low and places are spread out, public transportation may be limited or even nonexistent.

Oregon is a largely rural state. Under 800 of the approximately 97,000 square miles of the state are within one of the state's six designated urbanized areas (i.e., areas having populations of 50,000 or more, specifically Portland, Salem-Keizer, Eugene-Springfield, Medford, Corvallis, and Bend). In 2000, about 57% of the state's population lived within those urban areas, with the remaining 43% of Oregon residents living in rural areas. Moreover, 10 of Oregon's 36 counties had six or fewer people per square mile and thus are considered "frontier" counties, and one additional county had just 6.5 people per square mile *(U.S. Census Bureau 2000)*.

In rural areas, where population densities are low and places are spread out, traditional fixed route service may not be efficient or even feasible. The lack of population density and the distance between places also poses problems for the provision of special transportation. As noted by the U.S. Department of Transportation *(2001)*, many transit services in rural areas have limited schedules and little night and weekend service. Thus, residents of rural areas often have fewer transportation options available to them, other than driving private vehicles, in order to get to work and other necessary resources. **Improved rural transit service could enhance the quality of life for Oregon's rural residents and contribute to the state's economic well-being by facilitating travel to jobs and shops, access to medical services, volunteering, and other forms of participation in the community.**

The purpose of the research reported here was to identify the current status and needs for general public transportation in Oregon's rural areas, as well as opportunities and barriers (e.g., funding, governance issues, and leadership) to

expanding services over a 20-year period. Portland State University was contracted by the Association of Oregon Counties, via an agreement with the Oregon Department of Transportation, to conduct the study using existing data. The specific tasks undertaken to produce the report included:

- Identifying factors such as geographic differences and travel trends that potentially affect service delivery and cost
- Analyzing current rural service delivery, including location of service, service delivery methodologies, fleet and facilities, productivity, proportion of populations served, and per ride and per mile costs of service
- Identifying and recommending methodology to determine the base number of trips per person estimated to be needed per year
- Identifying demand for additional general public service
- Identifying local governance and funding sources, and
- Estimating the cost of expanding general public services over the next 20 years, including determining an appropriate inflation factor to use.

The work was conducted by a multidisciplinary team of faculty and graduate students with expertise in transportation, urban studies and planning, gerontology, and public health. Numerous sources of existing data were used to inform the study and conduct the analyses, including data from the *2000 Census*, the *American Community Survey (2006)*, the *Rural National Transit Database (FY2007)*, ODOT public transit operations data (i.e., quarterly reports), transit provider websites and interview with ODOT staff (for service information), data from a study conducted in 2007, *"The Older Driver in Oregon: A Survey of Driving Behavior and Cessation" (Neal, Baggett, Sullivan, and Mahan 2008)*, and data from a study conducted in 2008, *"Needs, Costs, and Funding Alternatives for Transportation Services for Older Adults and People with Disabilities in Urban and Rural Oregon" (Dill, Neal, Lycan, Delahanty, Jacobson, Smith, and Tipper 2008)*. In addition, other existing relevant studies were identified through a review of the literature.

Organization of the Report

This report has seven main chapters. In Chapter 1, the purpose of the study and the organization of the report are described. In Chapter 2, transit in rural areas today is discussed, including how "rural" is defined, what differences exist in transportation between rural and urban areas, why rural transit is important, the forms of rural transit that exist nationally and the funding mechanisms available, and recommendations for needed improvements in rural transit. Chapter 3 describes the methods used in the present study, including decisions about study parameters, the data sources used, the types of analyses conducted and how these analyses were conducted. Chapters 4, 5, and 6 present

the findings of the study. In Chapter 4, rural transit in Oregon today is described, including the demographic characteristics of Oregon's rural population, population projections, the types of transit services that currently exist in rural Oregon, how rural transit is presently used, the relationships that exist between ridership and service, and the cost of rural transit in Oregon today. Chapter 5 describes the findings concerning funding and governance of rural transit in Oregon today, and Chapter 6 presents the findings concerning service gaps and future needs related to rural transit in Oregon. Chapter 7 summarizes the key findings of the study and recommendations for future research. The references cited are then listed, followed by an Appendix that contains maps of rural transit service throughout the state.

2. Transit in Rural Areas Today

Overview

The purpose of this section is to provide an overview of rural transportation in the U.S. We begin by defining what is meant by "rural." We then describe the unique transportation issues faced by rural residents compared to those faced by urban residents. We delineate the basic types of transit services provided nationally in rural areas and how rural transit is funded, along with some of the current limitations in rural public transportation. Finally, we provide some examples of innovative ways in which other states and providers meet the rural transit needs of their residents and outline recommendations that have been made to improve rural transit.

What is Rural?

The U.S. Census delineates urban areas as including: (1) block groups or blocks with "a population density of at least 1,000 people per square mile and (2) surrounding census blocks that have an overall density of at least 500 people per square mile".[3] "Urbanized areas" are places where contiguous urban block or block groups meeting these density criteria total 50,000 people. Areas designated as Urbanized Areas must follow specific federal transportation planning requirements and are eligible for different federal transportation funding sources. The Census defines "Urban clusters" as areas with at least 2,500 people, but fewer than 50,000 people living in contiguous urban blocks or block groups. However, **for the purposes of this report, any area outside of an Urbanized Area is considered rural.**

The Federal Transit Administration of the U.S. Department of Transportation uses a population cutoff of 50,000 for eligibility for funding through its Rural and Small Areas program. Specifically, this program provides formula funding to states for the purpose of supporting public transportation in areas having populations smaller than 50,000 (49 U.S.C. 5311) *(Federal Transit Administration, n.d.)*.

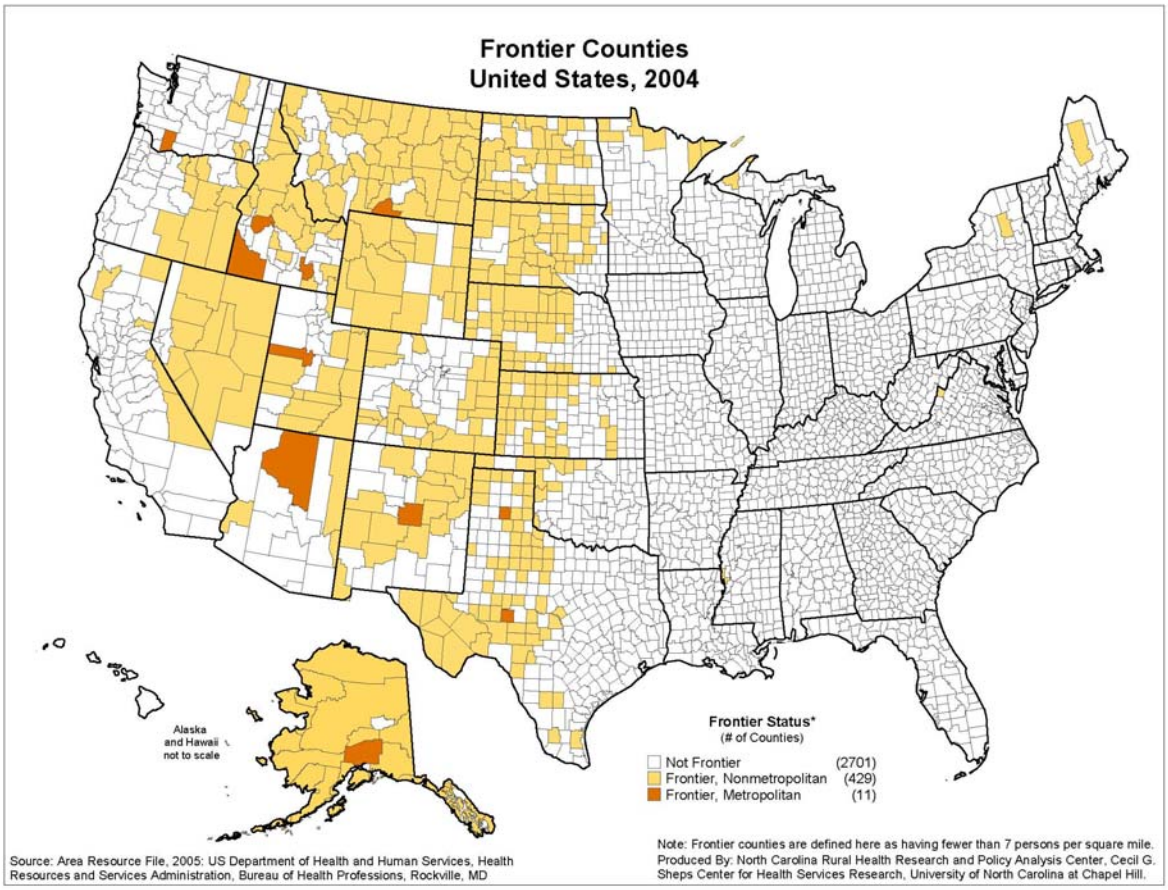
Oregon is considerably less densely populated than the U.S. as a whole. In the most recent U.S. census *(2000)*, Oregon's density was 35.6 persons per square mile, compared to 79.6 for the country as a whole *(U.S. Census Bureau, no date)*. Only about 750 of the

[3] See http://www.census.gov/geo/www/ua/ua_2k.html.

approximately 97,000 square miles of the state are within one of the six designated urbanized areas (Portland, Salem-Keizer, Eugene-Springfield, Medford, Corvallis, and Bend). In 2000, about 57% of the state's population lived within those urban areas, with 43% of Oregon residents living in rural areas.

Moreover, in 2000, 10 of Oregon's 36 counties met the simple definition of "frontier," that is, having a population density of six or fewer people per square mile *(National Center for Frontier Communities, n.d.)*, and one additional county (Crook) had a population density of 6.4 people per square mile. According to the Rural Assistance Center *(2009)*, frontier areas are "sparsely populated rural areas that are isolated from population centers and services." Definitions of "frontier" for specific state and federal programs vary. In addition to population density (i.e., six or fewer people per square mile), more complex definitions of "frontier" take into account other important factors, too, that may isolate a community, such as distance in miles and travel time in minutes to services. Other issues that may be considered when classifying an area as frontier include the extent to which paved roads are available or not and seasonal changes in access to services *(Rural Assistance Center 2009)*.

Over 56% of the land in the U.S. is in the frontier *(National Center for Frontier Communities 2009, based on 2000 U.S. Census data)*. As reported by the National Center for Frontier Communities, these lands comprise "farm land, natural resources, national parks, and military installations. These areas are crucial to the economy, culture and security of the United States." Frontier lands in the U.S. as a whole contain just under 4% of the nation's population. In 2000, 38 states contained at least one county designated as frontier. Thirteen states had more than 10% of their population in a frontier county, ranging from Wyoming, with 73.9% of its population living in a frontier county, to Colorado, with 11% of its population in a frontier county. Figure 2.1: depicts frontier counties in the U.S. in 2004, using the criterion of seven persons per square mile, not six. As can be seen in this map, the vast majority of frontier counties are in Alaska and the central and western parts of the U.S., although there are a few exceptions in the eastern part of the country.



Source: North Carolina Rural Health Research & Policy Analysis Center 2004.

Figure 2.1: Frontier Counties in the U.S.

In Oregon, as shown in Table 2.1, 10 counties meet the "frontier" density criterion of six persons per square mile; Crook County just misses meeting the criterion, with its density of 6.4 persons per square mile. Geographically, about 78% of Oregon's area has a population density of six or fewer persons per square mile, although only 3% of the state's population lives in areas that sparsely populated. More specifically, in Oregon, in 2000, of its total population of about 3,421,400, 3% of the population lived in a block group meeting the frontier criterion.

Table 2.1: Oregon's Population in Frontier Counties

Frontier Counties	Population	Persons per Square Mile
Baker	16,206	5.5
Crook	18,047	6.4
Gilliam	2,118	1.6
Grant	7,781	1.8
Harney	7,383	0.8
Lake	7,151	0.9
Malheur	28,480	3.2
Morrow	10,987	5.4
Sherman	1,773	2.3
Wallowa	7,189	2.3
Wheeler	1,547	0.9

Source: National Center for Frontier Communities (2009; based on 2000 U.S. Census data).

As noted by the Rural Assistance Center *(2009)*, frontier areas, in particular, face a number of transportation challenges. In these areas, public transportation options are often limited or unavailable, making access to needed services especially difficult for people who have few, if any, other means of getting around, such as those with low incomes and older adults, people with disabilities, or others who cannot drive. Long trip lengths are another transportation-related issue faced in frontier areas due to the isolation and distances that classify them. Getting to work or school, shopping for groceries, and obtaining health care and other basic services can be especially problematic due to the distances that must be traveled. Weather conditions, including snow and ice and heavy rains, can make trips even longer, more hazardous, or even impossible, especially in mountainous areas. Frontier areas are also more at risk economically, because their economies typically are based on only a few specific resources or activities. In addition, those frontier areas with much land that is federally owned may lack an adequate tax base to pay for needed services. Finally, population loss is a greater risk in counties with already low population density, unless communities have cultural or natural amenities to attract tourists and retirees *(Rural Assistance Center 2009)*.

Differences in Transportation in Rural and Urban Areas

The car is the principal mode of travel in both urban and rural areas. According to the 2001 National Household Travel Survey (NHTS), over 97% of rural households own at least one car versus 92% of urban households; 91% of trips are made by car in rural areas versus 86% in urban areas. In general, there is a heavier reliance on the automobile for transport in rural areas.

Although residents of rural areas have a higher rate of car ownership, those without cars in rural locations have few transit options compared to urban residents. Millions of people in rural areas lack access to the automobile. Carless citizens in rural areas are particularly dependent on public transportation, especially those living in high poverty areas. Rural areas lacking public transportation may have no other resources for addressing the transportation needs of the poor, disabled, and elderly; 38 % of the nation's rural residents live in areas lacking public transportation *(U.S. Department of Transportation [USDOT] 2001)*. Furthermore, many systems providing transit services in rural areas offer only limited services. With limited schedules, and little night and weekend service, rural transit agencies may not offer the flexibility that regular riders need to get to work and other necessary resources.

Urban and rural residents make about the same number of trips per day, but rural trips are much longer. The NHTS data showed that rural households travel 38% more miles per person per day than urban households. The differences in distances traveled are greatest among the poor, with the rural poor covering 59% more miles per day than their urban counterparts. The rural poor are forced, by more dispersed destinations and longer trip distances, to be more mobile, while the urban poor are more likely to live in relatively compact communities that permit shorter trips. In addition, the NHTS data revealed that transit trips in rural areas averaged 15.6 miles, compared to 8.3 miles in urban areas. Only about 0.1% of trips in rural areas were made on transit, compared to 1.7% of trips in urban areas. For rural households with no vehicles, only 1.0% of their trips were made on transit, compared with 19.1% of urban households without vehicles *(Pucher and Renne 2004)*. This is indicative of the lack of transit service in rural areas. However, a slightly higher share of trips in rural areas were made on school buses (2.7% versus 1.5%) *(Pucher and Renne 2004)*.

Residents in urban areas, while having greater access to public transportation, may also be able to walk or bike to work or to garner necessary resources. Urban residents made 10.4% of their trips by walking or bicycling, compared with 6.1% for rural residents *(Pucher and Renne 2004).* In many rural locations, long distances between services and lack of infrastructure appropriate for walking and biking may leave these forms of transportation unavailable.

People in rural areas lacking cars and access to public transportation are at a strong disadvantage. With no access to these transit resources, they may be limited to relying on friends, family, or associates for travel. This reliance may severely limit the flexibility of travel and limit those individuals' independence.

Rural transit also faces other challenges that may not be present in urban areas. The USDOT *(2001)* lists some of these challenges as:

- A dispersed system with high unit costs for service delivery, operations and maintenance;
- Geographical issues such steep grades and mountain passes;
- More dramatic weather events and effects on road conditions;
- A lack of federal spending that goes to public transportation in rural areas; and
- Transit that is funded and maintained by multiple levels of government and is often a system of disparate parts.

The last point is particularly salient because transit service in rural areas is often poorly linked, compared to urban systems. For example, passengers living in a rural area seeking a ride to work or a medical facility in a neighboring county or area may not be able to connect seamlessly between providers. This may impede the ability of rural residents to maintain employment or manage other important necessities of daily life. The lack of transit options in rural areas, therefore, leaves many rural citizens at a tremendous economic as well as social disadvantage, as detailed below.

The Importance of Rural Transit

Rural public transit offers a wide range of benefits, including:

- Direct benefits to users, operators and administrators;
- Indirect benefits to businesses and service providers when employees and customers are able to reach them via transit; and
- Induced benefits, such as increases in an area's long-term attractiveness to potential businesses, residents and development, as well as increased independence for people who cannot meet their mobility needs by driving *(Burkhardt, Hedrick, and McGavock 1998)*.

When transit is not available, older adults and people with disabilities, in particular, experience more restrictions on their ability to travel and must rely more heavily on informal networks or formal supportive services to meet their needs. Rural public transit also plays a vital role for agricultural workers. As a report from California explained, "The annual income for farm workers is around $11,525, making it difficult for them to afford transportation to work. Many are not eligible for a driver's license and many cannot afford to own cars to get them to and from work" *(CACT and CRTAP 2007, p. 30)*. The importance

of public transportation in rural areas also has been demonstrated by the key role it has played in the implementation of welfare reform *(Stommes, Brown, and Houston 2002)*.

Rural areas where transit is provided have been shown in one study, at least, to experience significant long-term economic benefits. Specifically, Burkhardt, Hedrick, and McGavock *(1998)* found that average net earnings in rural counties with transit were 11% higher than in rural counties without transit located in the same commuting zone. Between 1980 and 1994, the average annual economic impact of transit provision came to roughly $1.1 million per rural county, with the nation as a whole experiencing economic impacts of over $17.6 billion during that time period. Thus, for every $1 spent on rural transit, $3.35 in benefits were generated. Unfortunately, no more recent studies of this nature appear to have been conducted, and because Federal Transit Administration rural programs have received increased funding since 1996, the findings should be viewed with caution.

As noted by Dye Management Group, Inc. *(2001)*, despite the significant benefits offered by rural transit, less than 10% of federal public transportation spending goes to rural areas. This report states that 83% of the nations' land, and 21% of the population, is rural, indicating that funding of rural transit is disproportionate with respect to population share. The estimates cited above by the National Center for Frontier Communities *(2009)* based on 2000 Census data (i.e., 56 % of the nation's land being rural, and just under 4% of the U.S. population living in rural areas) paint a different picture. Nonetheless, access to transportation services in rural areas has been shown to be decreasing. Dye Mangement Group, Inc. *(2001)* reported that between 1965 and 2001, the number of cities served by intercity bus service decreased by 80%, and, as of 1998, 38% of rural residents in the U.S. lived in areas with no public transportation. More recent research found that nearly 40 percent of all rural counties are not served at all by transit services, and an additional 28 percent have only limited service (defined as having less than 25 trips taken each year per carless household) *(Stommes, Brown, and Houston 2002)*. A 2008 study of the rural transit needs specifically in Arizona found that less than 20% of the demand was being met with current services *(Cambridge Systematics, Inc. 2008)*.

Rural Transit Service Provided Nationally

Forms of Service

Public transportation service in rural areas is generally of three types: fixed route, demand response, and intercity.

- **Fixed route transit** operates on pre-determined routes and schedules, regardless of whether a passenger actively requests a vehicle. Services are provided on a repetitive, fixed schedule, along a specific route with vehicles stopping to pickup and deliver passengers to specific locations. In rural areas, service is provided almost exclusively by buses.
- **Deviated fixed route transit** operates along a fixed alignment or path at generally fixed times, but may deviate to collect or drop off passengers who have requested the deviation. Deviated fixed route transit is particularly well suited to rural areas where population densities are low and places are spread out, making traditional fixed route service inefficient or even infeasible. Examples of this type of service include:
    - **Route deviation services**, in which a vehicle follows a particular route and schedule but meanders off-route to pick up or drop off passengers in other places upon request. The vehicle then returns to the route and moves on to the next stop at the scheduled time.
    - **Point deviation services**, which feature scheduled stops at designated time points with no set route between time points. Deviations for pick-ups and drop-offs occur between time points.
- **Demand response (or demand responsive) transit** uses passenger cars, vans, or small buses operating in response to calls from passengers. The transit operator dispatches a vehicle to pick up the passengers and transport them to their destinations. Vehicles generally do not operate over a fixed route or on a fixed schedule. The vehicle may pick up several passengers at different points before taking them to their respective destinations. It may also be interrupted en route to pick up other passengers. Some demand responsive services feed fixed route stops; this type of service may be effective in areas where intercity or regional service is available, but distances are too far for individuals to walk to stops. **Complementary paratransit**[4] is a type of demand response service required by the Americans with Disabilities Act (ADA) for individuals with disabilities who are unable to use fixed route transit. Service must be comparable to that provided to individuals without disabilities using the fixed route system. The demand response services must be origin-to-destination or they must provide service to or from an accessible fixed route, enabling the individual to use the fixed route

[4] Paratransit is a broad term for forms of transit that are more flexible than conventional fixed route transit. Paratransit includes demand response transit, shared-ride taxis, car-pooling and vanpooling, and jitney services. However, many people use the term paratransit to describe wheelchair-accessible, demand response service.

system for part of his or her trip. By definition, complementary paratransit is found only where fixed route service exists; thus, it is not common in rural areas.[5]

- **Intercity service** operates on a fixed route, traveling between cities or communities. This type of service can include Amtrak and Greyhound, as well as other private carriers. Service is generally less frequent with stops further apart than local fixed route.

Other forms of transit include taxis as well as vanpools and commuter buses that cater to the specific needs of employees, students, and older adults and people with disabilities. Some organizations providing employment services for people with disabilities offer transportation to and from worksites, which could be vanpools or commuter buses. Taxis and other private sector options are available, but less so in rural areas than in urban areas. Most of these types of transit are provided by private entities.

In rural areas, where population densities are low and places are spread out, traditional fixed route service may not be efficient or even feasible. In these places, rural providers may best utilize service that combines elements of fixed route and demand response services. In addition, the deviated fixed route services described above may be more cost-effective than traditional fixed route services.

As noted earlier, a national assessment of rural transit was conducted by Burkhardt, Hedrick, and McGavock in 1998. The findings revealed the following with respect to types of service provided:

- 87% of rural transit systems provided demand response service.
  - 34% of systems provided only demand response.
  - 31% of systems provided both demand response (either complementary paratransit and/or general public) and fixed route.
  - 22% of systems provided demand response and other, non-fixed route forms of service.
- 40% provided fixed route service.
  - 31% provided both demand response and fixed route (as noted above).
  - 9% of systems provided *only* fixed-route **.**
- 4% of systems offered another form of service.

[5] See: http://www.ntdprogram.gov/ntdprogram/Glossary.htm

A study of rural transit systems conducted 10 years later suggests that, nationally, rural transit providers are making small shifts away from traditional forms of service toward more flexible and/or smaller service types. Specifically, a 2008 study of rural transit systems receiving 5311 funds from the Federal Transit Administration (FTA) found that 89% of systems were providing demand response services (compared to 87% ten years earlier found by Burkhardt et al.), while only 31% were providing fixed route (compared to 40% ten years earlier). Also, 25% were providing a form of demand response via subscription services, and 18% were offering a hybrid form of fixed-route services, such as route or point deviation *(NRTAP and CTAA 2008)*.

In 2007, rural public transit systems averaged 115,859 passenger trips and 513,505 annual vehicle miles per system *(NRTAP and CTAA 2008).*[6] However, these averages are inflated by atypical rural transit systems such as those at service resort locations. The majority (51%) of systems provided fewer than 50,000 passenger trips, and 72% provided fewer than 500,000 vehicle miles of service. The average annual vehicle hours provided by each system was 36,721. Most systems have relatively small fleets and workforces, with an average of 21.9 vehicles and 25.5 employees per system *(NRTAP and CTAA 2008)*.

Rural Transit Governance and Administration in the U.S.

Rural transit systems vary in their geographic boundaries and in how they are administered. Nationally, 43% of rural transit systems operate at the county level, with 23% operating as multi-city systems and 21% serving only one municipal area; the remaining 13% serve multiple towns, operate on tribal reservations, or have a different geographic organization *(NRTAP and CTAA 2008)*. Only 19% of rural transit systems nationally include an urbanized area within their service area. Just over two-thirds (67.4%) of rural public transit systems are directly operated by public agencies, 13% contract with outside operators, 17% combine direct and contract operations, 1.2% are operated by brokerages, and 1.7% by some other arrangement *(NRTAP and CTAA 2008)*.

Federal Sources of Funding for Rural Transit

This section provides background on the federal funding sources for rural transit. Examples include federal funds, state funds, local funds, and directly-generated funds. Funds generated may be utilized for capital expenses or operations and maintenance requirements. Basic information is provided regarding these various types of funding.

[6] Note that only means, not medians, were provided.

In 2005, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act - A Legacy for Users (SAFETEA-LU) was signed into law. SAFETEA-LU included $52.6 billion dollars for federal transit programs, a significant increase in transit funding beyond that guaranteed in the Transportation Efficiency Act for the 21st Century (TEA-21). Moreover, SAFETEA-LU provided an increased share of transit money for rural areas.

These funds are distributed through the Federal Transit Administration (FTA) through several different programs. Most of the funds are distributed based on formulas that take into account population and other factors. Federal funding programs used for capital costs and to operate rural transit include:

- **FTA Section 5309 Capital Improvement Grants.** Congress earmarks these funds directly. Grants are split into three categories—New Starts, Fixed Guideway Modernization, and Bus and Bus Facilities. SAFETEA-LU guarantees that 5.5 % of these funds are used in rural areas. Traditionally, Congress earmarks a greater amount of these funds for rural projects.
- **FTA Section 5310 Capital for Elderly and Disabled Transportation.** Through this section, funding is provided to states for the purpose of assisting in meeting the transportation needs of older adults and people with disabilities. Funds are distributed based on each state's population of these groups. Funds are largely for vehicles and may be used to replace vehicles operated by agencies serving seniors and those with disabilities.
- **FTA Section 5311 Public Transportation for Rural Areas.** Federal transit funding for rural areas is currently provided to states through the Public Transportation for Rural Areas program for non-urbanized areas. The purpose is to support public transportation in areas of less than 50,000 people. Funds may be used for capital, operating, and administrative assistance. States must spend 15 % of the apportionment to support rural intercity bus service. Funds are apportioned by a formula that is based on the latest U.S. Census figures for areas with less than 50,000 people.
- **FTA Section 5316 Job Access and Reverse Commute (JARC).** This section provides funding for local programs that offer job access and reverse commute services to provide transportation for low-income individuals who may live in the city core and work in suburban locations. The funding formula allocates funds based on the number of low-income persons in an area.
- **FTA Section 5317 New Freedom.** This section provides funding for programs that enhance transportation for people with disabilities beyond that which is required by

the Americans with Disabilities Act (ADA). The amount of the allocation is based upon the size of the population with disabilities in an area.

In addition, the **Rural Transit Assistance Program (RTAP)** provides funding to assist in the design and implementation of training and technical assistance projects as well as other projects and services designed to meet the transit needs of those in rural areas. RTAP has both state and national components. The state program provides annual funds to each state to develop and implement training and technical assistance programs in conjunction with the state's administration of Section 5311 assistance. The national program provides for the development of information and materials for use by local operators and state administering agencies. Support is also provided for research and technical assistance projects of national interest.

Other Sources of Funding for Rural Transit

In addition to federal funding, transit systems receive funds from a variety of state, regional, and local government sources. State, regional, or local government funding may be generated though a variety of sources, including income and sales taxes (e.g. general fund revenue), lotteries, casino revenues, and property taxes. Most transit agencies generate revenue directly from fares. However fares make up a very small amount transit operating funds and rarely cover any of the capital costs of transit service. Other sources generated directly by transit agencies include contract revenue with local businesses or colleges, special taxes and fees, fundraisers, advertising, and private partnerships. There is considerable variability in availability and use of these mechanisms, and not all transit providers have all of these options available to them. A nonprofit organization has no authority to levy taxes, for example. For those providers who do have taxation authority, however, potential taxes to fund rural transit may include the following:

- Sales Tax - Potential sources of funding in this category include a general sales tax, excise/special sales tax dedicated to transit, cigarette tax, alcohol tax, lodging tax, restaurant tax, rental car taxes.
- Employment-Related Taxes - Sources of funding in this category include income taxes, payroll taxes, and occupational license taxes.
- Development Taxes and Fees - Potential funding from this source includes property taxes, real estate transfer taxes, mortgage recording taxes, and development fees.

Some Rural Transit Funding and Allocation Suggestions from Other States

Concerns about rural transit funding are not unique to Oregon. Several other state and local agencies have examined the topic, and their findings may be useful for Oregon. For example, the Boone County Community Partnership *(2006)* made several recommendations for strategies to increase funding for rural transit in Boone County, Missouri. One recommendation was that **small rural transit systems should not assume they cannot compete for funds,** as such systems often underachieve their potential for federal grant assistance. Instead, increased pursuit of federal funding was recommended. Another recommendation was that **each rural transit system should closely coordinate with the state DOT** so as to be aware of opportunities for federal grant assistance. Also recommended was that **specific provisions for recapitalization of the fleet should be made and that money from local funding sources be set aside annually** based on the recapitalization plan. This report noted, as well, that the strongest regional transit systems are those that make strong use of partnerships, such as partnerships with private companies, adjacent jurisdictions, and other major public facilities and thus recommended **increased partnerships as a funding strategy**. Finally, the report recommended a dedicated county sales tax for transit services as the most stable and viable long-term funding source for the transit system there *(Boone County Community Partnership 2006)*.

A study of the rural transit needs of Arizona examined several strategies to provide additional state-level funding, including **increasing motor fuel taxes, vehicle license taxes, motor carrier fees, registration fees, and real estate fees** *(Cambridge Systematics, Inc. 2008)*. Other potential sources of funding noted included **financial contributions from community organizations or faith-based organizations.** This study also recommended a **partnership** between the state, local governments, and the funding recipients, and that **formalized criteria for funding recipients to receive funding** should be established and communicated, including local matching requirements. The study also recommended that **Arizona maximize its potential to garner federal Section 5311 funding**, in particular, since those funds may be used for capital or operating expenses. **A master statewide program for facility expenses and new vehicle purchases** was recommended, as well, for use in prioritizing new or expanded rural transit services. Receipt of Section 5311 funds by an operator was recommended to be contingent upon meeting **formalized performance-based criteria**, with lowered state funding for those who did not meet the criteria *(Cambridge Systematics, Inc. 2008)*.

A study of the S. 5311(f) program as implemented in California *(California Statewide Rural Intercity Bus Study 2008)*, reported that the California Department of Transportation Division of Mass Transportation (Caltrans DMT) conducts **an annual competitive process**

to determine the projects that best satisfy the national and statewide objectives for rural connectivity and intercity bus service. There are **various policies not required by federal regulations, including limitations on the project period, a cap on the size of individual projects** (to prevent large projects form consuming all of the money administered through the program)**, match ratios, and an application/evaluation process which involves examining the extent to which State Emphasis Goals are met.** The State Program Emphasis prescribes that the project should emphasize **coordination** and **connectivity** by providing a meaningful connection among various transportation modes.

The study noted that the **match requirement** can be difficult especially difficult for transit agencies in areas with low population densities and long distances required for travel. To secure these funds in non-urbanized areas, the operator must maintain a ratio of fare revenues to operating cost of 10%. **Other sources of local revenue may include county jurisdictions - general fund or local tax measures, interest income, federal planning assistance, the National Park Service, and Amtrak feeder bus contract revenue.**

An alternative performance measure, besides the farebox recovery ratio, was proposed: the Load Factor, defined as passenger miles divided by seat miles. This measure would reflect utilization of the capacity provided, rather than fare policy; implementation would, however, require additional data collection by some operators (e.g., rural operators would have to calculate the seat miles provided on a route). To better address the needs of underserved corridors, **the use of performance data to justify funding allocations away from less productive agencies was proposed.** The study also noted that performance data can be enhanced to account for the unique circumstances of rural and frontier communities *(California Statewide Rural Intercity Bus Study 2008)*.

This section has described some of the many funding mechanisms, besides federal funds, that other states have implemented or that have been recommended in order to fund rural transit. Not all transit providers will have all options available to them; for example, a nonprofit organization will not have taxing authority. In addition, no one funding source is likely to provide the necessary funding for rural transit; thus, studies generally recommend that all feasible options should be explored by transit providers to garner the funding necessary to meet the growing need for rural transportation.

Other Recommendations for Improving Rural Transit

Our review of the literature revealed numerous recommendations for ways in which rural transit could be improved. Many of these involved **the creation of public/partnerships**

or coordinating councils at various levels with the relevant stakeholders with the goal of maximizing connectivity and available human and capital resources, and linking funding options *(e.g., Cambridge Systematics, Inc. 2008; Beverly Foundation 2006; Hegland et al. 2004; Mielke et al. 2005; Montana Department of Transportation 2001; Rosenbloom 2003)*. Mielke et al. *(2005)*, for example, recommended promoting the coordination of public, social service, school, church, and commercial transportation services a the local, regional, and state levels. Hegland et al. *(2004)* recommended that North Dakota establish a state-level coordinating body to promote cohesion among agencies and fund personal transportation, with members from the state DOT, Department of Health and Human Services, representatives of advocacy groups, and a representative of private sector transportation providers. Hegland et al. *(2004)* also recommended that the Governor issue a policy directive to each state agency that funds transportation to encourage grantees to coordinate transportation programs at the local level and, consistent with this, that all public transportation services that receive state or federal funding support from the North Dakota Department of Transportation become enrolled with the North Dakota Department of Human Services to provide Medicaid-related transportation services. Another recommendation related to coordination was that regional transportation boards made up of fixed route bus systems, public paratransit operators, city mayor(s), county commissioner(s), regional human service centers, county social services office, HeadStart programs, long-term care facilities, developmental disabilities facilities, business representatives, consumer advocates, and school districts be established for funding and management purposes *(Hegland et al. 2004)*.

Advisory councils or task forces were also suggested as a means of improving service coordination, efficiency, and connectivity, such as the creation of a community advisory group *(Beverly Foundation 2006; Hardin 2008)*, or a bus advisory task force (Mielke et al. 2005), or an advisory council that would advocate for the inclusion of the transit provider in development plans *(Hardin 2008)*.

Several studies recommended **the gathering of additional resident information** to identify residents' needs and to monitor changes (hopefully improvements) over time. For example, Mielke et al. *(2005)* suggested a survey of state residents concerning their unmet personal mobility needs and development of a personal mobility index to monitor changes to personal mobility.

Another state-level data collection effort recommended concerned **the establishment of performance criteria and a local performance evaluation framework** in which data would be gathered and monitored to track efficiency, safety, and quality *(Mielke et al.*

2005). Maintaining the state's role in providing assistance to counties and regions and in prioritizing competing funding needs was urged as well *(Cambridge Systematics, Inc. 2008)*.

A study of rural transit in North Carolina suggested that **consolidating** single-county service into regional agencies could provide benefits to riders, the transit agencies, and the state DOT *(Cook, Lawrie and Henry 2003)*. For example, the authors found that expenses per trip, per service hour, and per service mile were lower for multi-county agencies compared with single-county agencies. The study identified several issues with consolidation and provided recommendations for overcoming some of the barriers. For example, agencies would need additional transitional funding to cover the costs of consolidation, which might include planning funds, administration, and capital for new technology. The authors suggested that the DOT offer funding incentives to agencies electing to consolidate.

A study done in Montana recommended **education** as an important strategy. Specifically, the recommendation was that education of the public was needed in order to change public attitudes toward mass transit *(Montana Department of Transportation 2001)*.

Other recommendations centered around the i**mproved use of technology** *(Beverly Foundation 2006)*, such as GIS and intelligent transportation systems, to increase efficiency and enhance personal mobility *(Mielke et al. 2005; Rosenbloom 2003)*, or using the internet to establish a regional ride-matching program and ride brokerage *(Hegland et al. 2004)*.

Various innovative uses of grants were also touted, such as : (a) using a New Freedom/JARC Grant from the Federal Transit Administration to create a one-stop information center for rural transit with outreach and marketing to improve knowledge of services and how to access them *(Hardin 2008)*, or (b) using Community Transportation Association (CTAA grants) to establish a rural vanpool program; publish a transportation resources directory of all mobility options, from state-supported rural programs to specialized providers, vanpool, and car-purchase programs and marketing transportation resources to employers and the business community; create a new website and printed brochure to increase community awareness options for meeting the needs of workers on nighttime and weekend shifts at nearby manufacturing plants; create a website for jobseekers with information on transit providers in the area *(Dickson et al. 2008)*.

Numerous types of service improvements also were suggested as innovative ways to improve service quality, efficiency, and cost effectiveness. Vanpools and ridesharing were among the most commonly mentioned *(Cambridge Systematics, Inc. 2008; Dickson et al. 2008; Hegland et al. 2004; Rosenbloom 2003)*. Others suggested improvements included considering route and service restructuring, creating park-and-ride areas, providing transport for after-school care *(Rosenbloom 2003)*, participating in the use of insurance

pools *(Beverly Foundation 2006)*; developing flexible schedule methods; and leveraging the use of available unused vehicles *(Beverly Foundation 2006)* or unused drivers (such as enabling drivers who have traveled to an urban area and are waiting to provide ADA transport) *(Rosenbloom 2003),* although reporting requirement constraints would have to be resolved.

Another key set of recommendations involved **the use of volunteers** as volunteer drivers or escorts *(Mielke et al. 2005; Rosenbloom 2003)* and promoting volunteer recognition *(Beverly Foundation 2006)*.

Finally, **private-sector solutions** also were cited as recommendations for improving rural transit options, such as getting private businesses to provide their own buses. One example provided was the grocery store chain in Lubbock, Texas, that funded a shopper's bus to take rural riders to local grocery stores *(Rosenbloom 2003)*.

Rural Transit Issues Specifically in Oregon

Unmet Transportation Needs Previously Identified by Oregon Providers

In a study of the transportation needs and costs of older adults and people with disabilities, Dill et al. (2008) reviewed 32 coordinated plans prepared by Oregon transit districts. In order to receive federal funding through Oregon's Discretionary Grant Program, transit services, whether provided by a non-profit, governmental, or for-profit organization, must be coordinated. More specifically, in order to be eligible for federal transit monies through programs such as Section 5309,and JARC, counties, tribes, and metropolitan areas must complete "coordinated plans" *(Oregon Department of Transportation 2007)*. These plans are required to identify unmet transportation needs. Although the review by Dill et al. *(2008)* was not focused exclusively on rural transit needs, because Oregon is largely a rural state, the findings pertain here. Table 2.2 presents the unmet needs that were identified by 10 percent or more of the plans *(Dill et al. 2008)*.

Several themes emerged. Most notably, **the need for service during non-standard hours** (that is, for the hours before 9:00 am and after 5:00 pm) was identified in over three-quarters of the plans. Reasons cited included the need for medical transportation for seniors, for non-essential travel for seniors (e.g., shopping, social activities), and for travel to work during non-standard employment hours. Also listed by nearly three-fourths of the plans were **the need for additional service between counties**, particularly for medical needs, and **the need for service to rural or remote portions of the county** in order to serve isolated seniors or low-income populations.

Table 2.2: Unmet Needs Identified in 32 Oregon Coordinated Transit Plans

Rank	Identified Issue	Percent of Plans Which Cited Issue
1	Access: Hours/Days of Service	78%
2	Access: Intra-county Service Area	75%
3	Access: Inter-county Medical	72%
4	Awareness of Service/Marketing	69%
5	Inter-Agency/Organization Coordination	47%
6	Affordability (Patron)	44%
7	Improved Quality/Increased Service to Disabled	44%
8	Improved Quality/Increased Service to Low-Income	44%
9	Nonessential Inter-county Travel	41%
10	Improved Quality/Increased Service to Older Adults - Life Sustaining	38%
11	Inter-County (Nonspecific)	38%
12	Improved Quality/Increased Service to Veterans	31%
13	Improved Quality/Increased Service to Youth	28%
14	Improved Quality/Increased Service to Older Adults - Life Enriching	28%
15	Funding Reliability	28%
16	Additional/Improved Rolling Stock	25%
17	Employee Training	25%
18	Job-Search Services	25%
19	Improved Quality/Increased Service to Families	22%
20	Improved Quality/Increased Service to Social Services	22%
21	Transit Availability (in general; non-specific comments)	22%
22	Improved Quality/Increased Service to Non-English Speakers	13%

Source: Adapted from Dill et al. *(2008)*

These findings echoed recommendations made by older adult advocacy organizations, such as the Beverly Foundation *(2007)* and Partners for Livable Communities *(2007)*. Both organizations identified **expanded or more flexible hours of operation** as a pressing need for seniors as they travel and suggested **moving from a focus on commuting to life sustaining and enriching travel**. For example, arranging medical appointments (especially out of the county) and shopping trips can be quite difficult for seniors using a demand response system. In addition, these systems often require considerable advance notice and **have operating hours oriented toward a standard work day.** In extrapolating the findings of the review by Dill et al. *(2008)* to a general rural population, although the relative importance of each need might shift, it seems likely that the same set of needs would emerge.

Another need articulated in the plans concerned transportation as it relates to **employment**, specifically the lack of routinely available transportation services during

days and hours when entry-level and supported employment are available, including evenings, nights, and weekends as well as normal business hours.

Rural Transit Needs in Oregon from the Perspective of Older Adults

Another recent study conducted in Oregon also addressed the issue of transit needs in rural areas, although it was focused on older adults and their travel patterns and perceived needs. Specifically, Neal et al. *(2008)* surveyed older adults concerning their driving and driving cessation behavior. A key finding in that study was that in rural areas, especially, there was a reported **lack of transportation options other than driving or relying on family and friends, and more non-drivers than drivers reported a lack of public and special transportation**. Specifically, nearly one-half (49%) of older rural drivers reported that no public transportation was available in their community, and 19 percent said no special transportation services were available. (This compared to 15 percent and 4 percent of older urban drivers, respectively.) Among older adults who lived in rural areas and who had ceased to drive, however, 57 percent reported that there was no public transportation, and 32 percent said there were no special transportation services in their community (compared to 13 percent and 6 percent, respectively, of those in urban areas who had ceased to drive, or "ceasers") *(Neal et al. 2008)*.

The **decline in rail and bus services in the past few years** was noted by older rural residents, as was the fact that, although many coastal communities and inland areas of the state have very high percentages of older adults, there are few services. At the same time, rural drivers and ceasers alike were cognizant of the economic disincentive to provide public and special transportation in the state's rural areas and small towns *(Neal et al. 2008)*. As one respondent noted:

> *I live in a very rural area, and it doesn't make economic sense for the government or a private enterprise to provide me something because where I chose to live does not have those things available. There are 24 houses in a mile and a half; it's a one way, and it's a dead-end street. There's no way we'll ever have public or alternate transportation down there unless we pay for it, and it should not be a responsibility of the government. Nothing else is down here. We have to pay for our own roads, we have a volunteer fire department, the sheriff serves two small towns, it takes him about an hour to get here, and that's all we've got. But, we chose to live here, for one reason, and that is we don't have the urban environment.* (Neal et al. 2008, p. 49)

Neal et al. *(2008)* also found that among both older drivers and older adults who had voluntarily ceased driving, whether they were living in urban or rural areas, **few individuals were willing to consider moving in order to have better access to transit**

services. Less than 20 percent of both urban and rural drivers reported that they had considered or would consider relocating for this purpose. Even fewer older adults who had ceased to drive, 15 percent, were willing to consider relocating to have better access to transit services. Satisfaction with their present homes and communities was the main reason mentioned for not wishing to relocate, although some respondents had already moved to be near children, services, or to retirement communities. Among current drivers, some said they just had not had to consider relocating yet, but a small number said they might do so should their (or their spouse's) ability to drive change. Drivers in rural areas were the group most likely to say that they would or might consider relocating to improve their access to transit services; thus, this group could potentially be targeted for education about the merits of using public transportation and techniques for using it *(Neal et al. 2008)*.

One issue facing urban transit *providers* in Oregon is relevant to a discussion of increasing rural transit service. The Americans with Disabilities Act requires complementary paratransit service to be offered within three-quarters of a mile of fixed route transit service. Providers of complementary paratransit cannot limit the number of rides provided to eligible riders (people with disabilities). Although these agencies work to lower costs as much as possible through operating efficiencies, **several urban providers are facing the difficult decision of cutting fixed route service (e.g., to more outlying areas or on Sundays) in order to control the costs of complementary paratransit (Necker, 2009)**. In other words, the only way they see to significantly control the rising costs of the required complementary paratransit is to reduce the service area and/or hours of operation, which are both determined by the routes and hours of the fixed route system. Thus, **the high costs of complementary paratransit may limit the ability of rural areas to provide new fixed route transit.**

Rural Transit Needs Identified in the 2008 ODOT Public Transit Division Provider Survey

In August 2008, an electronic survey of public transit providers in Oregon was conducted by the Oregon Department of Transportation Public Transit Division, in partnership with the Oregon Transit Association, to obtain current information about the capital needs of transit providers, including their fleet and facility needs. According to the report describing the survey's preliminary findings *(ODOT 2008)*, a total of 82 public transit providers that provide urban, rural and special needs transportation services in Oregon were surveyed. Of the 82 providers contacted, 62 responded to the survey *(ODOT 2008)*. In some cases, Public Transit Division staff added data to the survey results, where information gaps existed and a current provider report contained the needed data, or the data could be obtained via a

telephone call or some other means. Still, the results represent an underestimate of vehicle and facilities needs, because not all providers responded.

Of interest in the present study are the findings with respect particularly to rural transit providers. As described in the preliminary report of findings *(ODOT 2008)*, a major finding of the study pertaining to rural transportation and the *vehicles* used to provide it was that **rural providers expect a gap of about $9 million per year for the next five years** between what providers have budgeted with "likely" available funds and what is actually needed. Specifically, $25.5 million will be needed to replace 356 vehicles to keep the public transit fleet within federal replacement standards, and $19 million will be needed to expand by 180 vehicles to meet demand. These estimates were based on average replacement costs, not taking into account additional costs associated with purchasing "green" technology and not taking into account inflation. Our analysis of the data revealed a common theme among respondents who wrote comments concerning replacement vehicles of all sizes: that there is no money available to provide replacement vehicles, and grant assistance will be needed. Another common theme was general interest in green technology, but at the same time, most providers responded that it was not feasible to consider replacing current buses with "greener" ones due to cost and/or impracticality in rural areas.

Rural providers also estimated a cost of **$45 million needed to *improve facilities***, including improved phone and communication systems, computer modernization, administrative buildings, and maintenance buildings, shops, and secured parking *(ODOT 2008)*.

Trends with respect to *operating costs* also were examined in the survey. **Rising fuel costs and costs associated with the provision of complementary paratransit were clearly found to have driven up operating costs.** For rural providers, fuel costs grew five times greater than the Consumer Price Index (CPI) between 2007 and 2008; for urban providers, the increase was nine times greater than the CPI. Operations costs for both rural and urban providers grew about three times greater than the CPI. For urban providers specifically, the costs of required ADA services (i.e., complementary paratransit) grew 11%, compared to the CPI increase of about 3% *(ODOT 2008)*.

Rural providers reported that they had experienced substantial *increases in the number of trips made,* and they expected this trend to continue over the next few years. Between 2007 and 2008, the number of trips increased by 9.5%, and between 2008 and 2009, the number was expected to increase by 4%. A large increase, 12.3%, was anticipated between 2009 and 2010, with another 7% increase expected between 2010

and 2011. The scenario was the opposite for urban providers: rather than increasing service, urban providers reported that they expected to have to curtail services due to budget constraints *(ODOT 2008)*.

In addition to the report describing the survey's preliminary findings *(ODOT 2008)*, we analyzed the raw data from the survey, as obtained from the Public Transit Division staff. After eliminating duplicate cases, cases with large amounts of missing data, and providers who exclusively served older adults and people with disabilities, 33 providers remained, 7 urban and 26 rural.

Among the 26 rural provider respondents to the survey, our analyses revealed that 10 (38.5%) responded "no" to the question, "Do you/will you provide *fixed route transit*?" while 12 (46%) said "yes," and 4 (15%) did not respond. When queried as to whether or not they "Do/will provide *demand response transit*", 20 (77%) said "yes," 2 (8%) said "no," and 4 (15%) left this question blank. When asked whether they currently provide or plan to provide *commuter bus service*, 8 (31%) indicated "yes," 13 (50%) said "no," and 5 (19%) did not respond. Three providers (almost 12%) indicated that they currently operate or plan to operate in the future *intercity transit*, while 4 (15%) said "no" and 19 (73%) did not respond. Unfortunately, due to the wording of the survey, for all of these types of service, it is not possible to differentiate current services from planned services.

Providers were also asked whether they had *increased their level of service* during the last fiscal year (2007-2008). **Of the 26 rural providers, 12 (46%) reported that they had increased service in some way**, including increasing the number of days of service in a week, increasing the number of hours in a day of service, increasing service area coverage, increasing the number of seats or size of vehicle, and/or increasing the number of volunteers or employees. Examples of specific service increases that were mentioned included adding service to previously unserved areas, and adding a shopping service once a week to a particular community. Eight providers (31%) said they had not increased service, and six (23%) did not respond.

When queried as to whether they had ***reduced the level of service*** **during the previous fiscal year**, 19 of the 26 **providers (73%) reported that they had not, and 7 (27%) did not respond. One provider** noted that in the previous year (2006-07), they had been forced to reduce intercity routes.

The findings that a majority of the providers responding had increased their level of service in 2007-2008 and none reported decreasing the level of service that year may be seen as positive: although rural transit providers are dealing with shrinking budgets as demand

increases, they still found ways to increase the level of service. At the same time, it seems likely that further increases in level of service with less or even stable funding will not be likely, as providers feel they are already "getting blood out of a turnip."

Overall, lack of funding and the need to rely on grants or other assistance were prevalent themes in the comments of the rural providers responding to the Public Transit Division's survey. Taken together, the findings of the survey indicate that **an increase in demand for service yet limited funding will make it challenging to increase, or even maintain, the current level of transit service in rural Oregon in the future.**

3. Study Methods

Decisions on Study Parameters

The analyses described here defined "rural Oregon" simply as those areas outside of the six metropolitan areas designated as "urbanized areas" by the U.S. Census. Urbanized areas are areas with a population of 50,000 or more at the last decennial Census, in 2000. There are six such areas in Oregon: Portland-Vancouver, Salem-Keizer, Eugene-Springfield, Medford, Corvallis, and Bend. Bend and Corvallis were designated as urbanized areas as a result of the 2000 Census. For this report, the analyses of transit agencies and service focus on the agencies that are based in rural Oregon. In addition, five transit providers in the urban areas (TriMet, SMART (South Metro Area Rapid Transit) in Wilsonville, Salem Area Transit, Lane Transit, and Rogue Valley Transit) also provide service connecting the urban areas to rural areas. That service is included in some of the analyses.

The focus of the analyses is on transit service for the general public, rather than service limited to older adults and people with disabilities, commonly referred to as "elderly and disabled" or "E&D" service. Therefore, data from services that restrict rides only to older adults and people with disabilities are not included. However, it should be noted that older adults and people with disabilities likely represent a large share of riders on general public transit service in rural areas.

Data Sources

The analyses use several data sources:

- 2000 Census data at the *block group level* are used to determine the characteristics of the population currently served by transit. A census block group is a cluster of census blocks having the same first digit of their four-digit identifying numbers within a census tract. Block groups generally contain between 600 and 3,000 people, with an optimum size of 1,500. Block groups typically were delineated by local participants as part of the U.S. Census Bureau's Participant Statistical Areas Program, with the U.S. Census Bureau delineating them only where a local, state, or tribal government declined to participate or where a potential local or tribal participant could not be located. Block groups do not cross the boundaries of states or counties or census tracts, except in rare instances (e.g., block groups delineated by American Indian tribal authorities) *(U.S. Census Bureau, n.d.; see http://www.census.gov/geo/www/cob/bg_metadata.html*).

- 2000 Census and 2006 American Community Survey (ACS) data were used to develop county-level population projections for 2010, 2015, and 2030. The methodology and details of these projections are described in "Needs, Costs, and Funding Alternatives for Transportation Services for Older Adults and People with Disabilities in Urban and Rural Oregon: Final Report" *(see Dill et al. 2008)*.
- The National Transit Database (NTD) provided data on transit ridership, service provision, costs, and funding sources for fiscal year 2007 for many of the Oregon providers, as well as over 1,200 agencies nationally. This is the first year that rural transit providers were included in the NTD. The national dataset was obtained directly from the Federal Transit Administration.
- ODOT provided quarterly data on ridership, service, and costs for transit providers reporting to the agency. Ridership and cost data from the reports were used when NTD data were unavailable.
- In 2008, ODOT conducted a survey of transit providers in Oregon *(Oregon Department of Transportation (ODOT) 2008)*. Questions focused on current and projected service and funding needs and gaps. In addition to some quantitative data, providers' volunteered comments provided qualitative insights into the issues facing transit providers.
- Transit agency websites and direct communications with the agencies were used to identify the location of routes, types, and levels of service provided.
- A separate data gathering effort was mounted to learn more specifically about the various sources through which Oregon's rural transit providers are obtaining funding. Public Transit division staff (Jean Palmateer) identified the 38 agencies to be included in the survey and the individual to contact.

Analyses

GIS Analysis

To assess the levels of transit service currently provided to Oregon's rural residents, it was necessary to know the geographic service areas for the rural transit systems. To perform the analysis, the service areas needed to be in a geographic information system (GIS) that allows the merging and layering of various geographic data, such as population characteristics from the Census and transit service areas. Unfortunately, no single source having all the required information exists. Therefore, the project team set out to map (also known as geocoding) the existing rural transit service in Oregon. To do this, the team acquired route maps from transit agency web sites or by calling agencies directly. In some

cases, routes were simply described as a series of several stops near local landmarks (e.g., grocery store X in town X). These locations were identified using Google Maps or other internet sources.

For fixed route local service, routes were coded as lines, using each community's street network. For routes within cities, a quarter-mile buffer was created around the routes to represent the service area. A quarter mile is a commonly considered a reasonable walking distance for accessing transit *(Center for Urban Transportation Research 2009)*. For intercity service, the routes were defined as a series of stops. Because intercity route stops are further apart, half-mile buffers were drawn around each of those stops to delineate the service area. Therefore, the service area for intercity service is a series of circles, rather than a line. In both cases, the buffers were based on straight-line distances, not the actual walking distance along the road or path network. Therefore, the actual walking distance to a route or stop within the buffered service area may be longer than one-quarter or one-half mile. For demand response transit, service areas were usually defined by city, county or other jurisdictional boundaries, based on the descriptions of service found on agency websites. In addition, ODOT staff provided transit district boundaries for some providers.

Service areas for the following providers were created in GIS:

- Albany Transit
- Amtrak (intercity)
- Basin Transit Service
- Canby Area Transit
- CARTS (Salem Area Mass Transit rural service)
- Cascades East Transit
- Central Oregon Breeze (intercity)
- Columbia Area Transit (Hood River)
- Columbia County Rider
- Confederated Tribes of Umatilla
- Coos County Area Transit
- Curry Public Transit
- Greyhound (intercity)
- Harney County Dial-A-Ride
- Josephine County Transit
- Lebanon Dial-A-Bus
- Lincoln County Transportation
- Linn Shuttle
- Linn-Benton Loop
- LTD Rhody and Diamond Express
- Mid-Columbia Council of Governments (formerly LINK)
- Milton-Freewater Public Transportation
- Mountain Express (Welches)
- NEortheast Oregon Public Transportation
- Oregon Coachways (intercity)
- Pendleton Bus
- People Movers (Grant County) Transportation
- Porter Stage Lines (intercity)
- Rogue Valley Transit (service outside the urban area)
- Sage Stage (intercity)
- Sandy Area Metro
- Sherman County Community Transit
- Silver Trolley (Silverton)
- SMART-Wilsonville (service outside the urban area)
- Snake River Transit (Malheur Co.)
- South Clackamas Transportation District
- South Lane Wheels
- Sunset Empire Transportation
- Sweet Home Dial-A-Bus
- The Klamath Shuttle (intercity)
- Tillamook County Transportation
- TriMet (service outside the urban area)
- Utrans (formerly Umpqua Transit)

- Valley Retriever (intercity)
- Wash. Co. U-Ride (Ride Connection)
- Woodburn Transit
- Yamhill County Transit

Insufficient information was available to map service for the following rural providers: Klamath Tribes; Estrella Blanca; and Frontera del Norte.

Once the transit service areas were created in GIS, as described above, the project team was able to "overlay" that information with the Census data at the block group level to determine the number and characteristics of people living within the defined service area. The block group boundaries are shown in Figure 3.1. In some cases, block groups are very large. Therefore, block group boundaries often extended beyond the defined service areas. For the analyses here, the population within each block group was apportioned to the transit service area according to the share of the block group falling within the service area. For example, if the transit service area covered 23% of the area of the block group, 23% of the block group's population was assigned to the transit service area. Although this was the best estimation method available given the constraints of the study, it may underestimate the population served, because it assumes that the population is evenly distributed throughout the block group, which is unlikely. In fact, the provision of transit service in one portion of a large block group most likely indicates that that area has more population than the remainder of the block group.

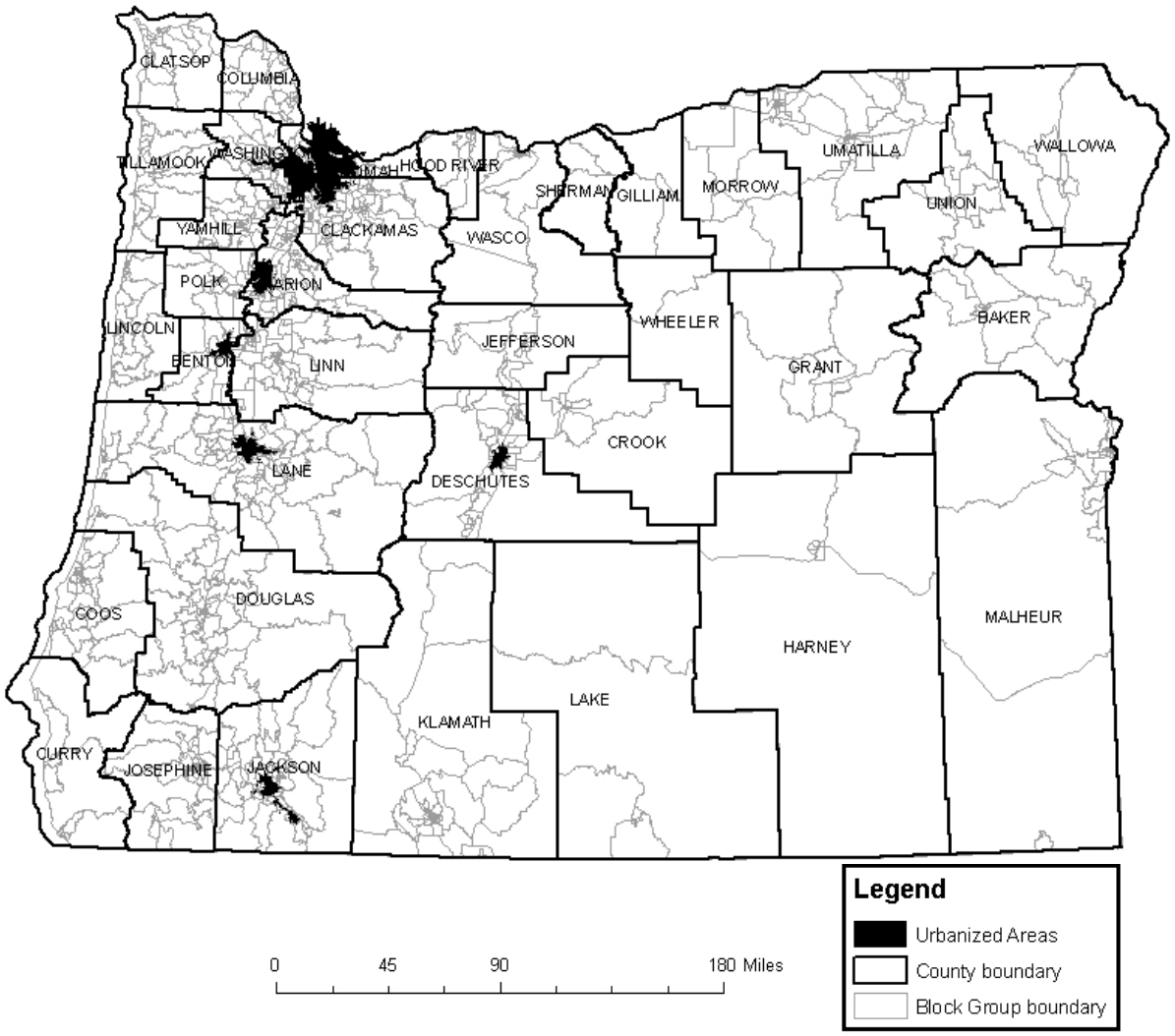
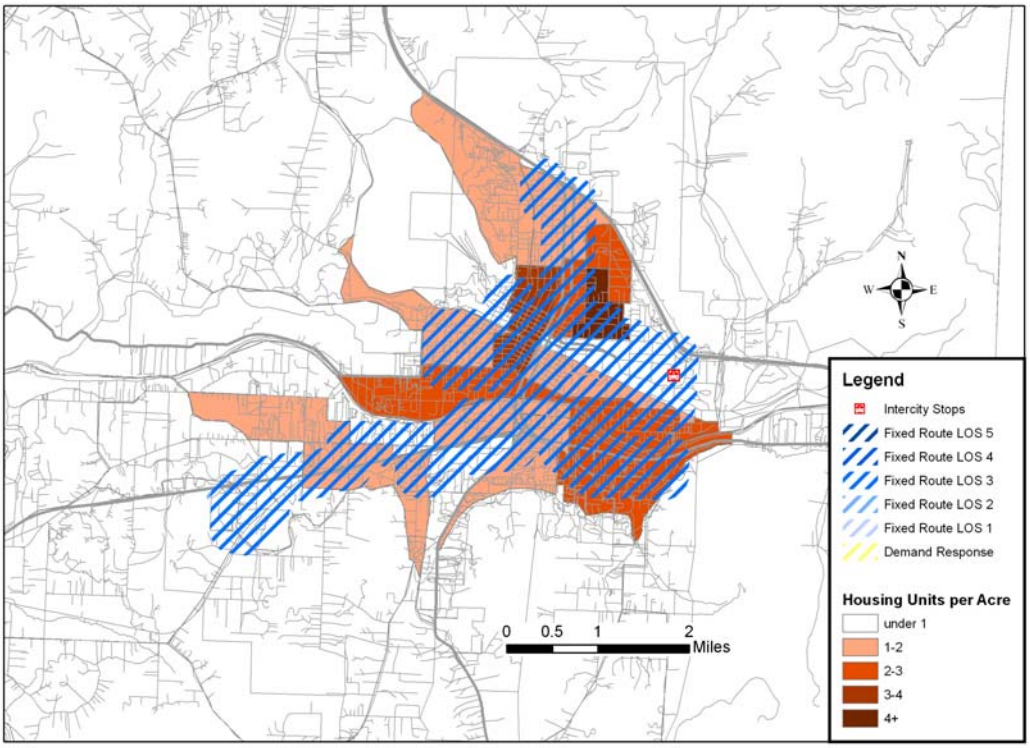


Figure 3.1: Oregon Counties and Block Group Boundaries

An example of the transit service area and the block group data appears in Figure 3.2. Similar maps of each of the service areas mapped are included in the Appendix.



Note: See Levels of Service section starting on page 49 for a explanation of "LOS."

Figure 3.2: Example of Transit Service Area with Census Block Groups, Grants Pass

The Census data at the block group level are only available for the year 2000, and ACS data from a more recent year are not available at that small a geographic scale. However, the transit ridership and other data are available for fiscal year 2007. Therefore, the 2000 Census block group data were adjusted to approximate 2007. This was done using the year 2010 population projections developed by PSU's Population Research Center for a recent study *(Dill et al. 2008)*. A 10-year growth rate was calculated by the project team for each county by age group using the 2000 and 2010 data. These growth rates were applied to all block groups within the county. This assumes that growth occurred at an even rate throughout the decade and throughout each county, which may not be the case. However, no other data were available to make finer estimates.

Methods to Estimate the Demand for Rural Transit

As a starting point, we developed a baseline estimate of future demand based on current ridership. It assumes that the current levels of service and ridership rates will continue. In the baseline, ridership will grow only because of population growth. If a

rural transit agency is providing service that currently generates 10 trips annually per person, in future years it will generate that same number of trips per person. But, with more people in the service area, total ridership will be higher. It is assumed that providers would not need to increase their fixed route service (e.g., add more routes) to meet this baseline demand.

However, it is likely that the current level of service is not meeting the needs of all rural Oregon residents. Even in the areas already served, service may be so poor that people's needs are not being met. For example, routes may not operate long enough in the day or on weekends. In addition, there are areas that do not have any service. **Estimating future demand that meets some of these unmet needs is a more difficult task.** A review of the literature found that projecting the demand for rural transit at a statewide level is not common. More common are methods or estimates developed for a single transit provider, a city, or a county. Those methods often involve detailed information on employment sites, social services (e.g., senior centers), other transit trip attractors (e.g., college campuses), or other local data (e.g., median rent, fares) not available on a statewide basis *(see, for example, Attaluri et al. 1997)*. Four potential methods were identified that used data available statewide. These methods were first evaluated for their applicability to Oregon using 2007 population estimates and transit ridership data.

Two of the four potential methods were developed by Painter et al. *(2007)*. Those two models were developed to estimate rural transit demand based upon data from four systems in the state of Washington. The model Painter and colleagues ultimately recommended has four inputs: total population, the number of people 65 and over, the number of mobility-limited people[7] aged 16 and over, and the percent of the population living above the poverty line. When our project team applied this model to Oregon's 2007 population data for each transit service area, a significant underestimation of current transit use resulted. For the Oregon rural agencies with complete ridership data, the model estimated a total of about 1,206,000 trips in 2007. The actual number of trips, however, was about 2,309,000 for service available to the general public and 2,857,000 when services limited to older adults and people with disabilities (e.g., complementary paratransit) were included. In sum, the method underestimated current ridership in Oregon by more than 50%; therefore, this method was determined to be inadequate for use here.

[7] The source used 1990 Census data to identify "mobility-limited people" but did not specify the definition used.

The Transit Cooperative Research Program (TCRP) developed a guidebook for estimating rural transit demand *(TCRP 1995)*. The guidebook is aimed at individual transit providers and is based upon data from a sample of agencies nationwide. There are formulas for estimating demand for expansion of existing service and for new service. For each, there is one method for estimating demand related to social service programs (e.g., senior centers, Head Start, job training, or mental health services) and one for estimating general demand. The former method may be more appropriate for estimating the need for transit service limited to older adults and people with disabilities. Moreover, data on such programs are not available statewide. Therefore, the second method was tested here. Similar to the model by Painter et al., this method used three inputs: the number of people age 60 and over, the number of people with disabilities ages 18-64, and the number of people under 65 and below poverty. Similar to the results we obtained using the Painter et al. model, when we applied this method using Oregon data, 2007 transit ridership was again underestimated by at least 50%. Therefore, this model, too, was deemed inappropriate for predicting future demand for the state.

The failure of both of these methods to accurately estimate current ridership points to the lack of good data and research on rural transit. The Washington models were based upon four agencies, while the TCRP report was based upon 39 counties. The data from Oregon rural transit agencies and the national rural NTD data show that there is wide variation in the types and levels of transit service provided, the characteristics of areas served, and ridership. Therefore, larger samples are necessary to develop more accurate and sophisticated models. It is possible that, in the future, the availability of more rural NTD data may help in this regard. As the rural NTD reporting program matures, the quality and quantity of the data should improve.

The third method we evaluated comes from an analysis of rural transit commissioned by the state of Arizona and published in 2008. This report, authored by Cambridge Systematics, Inc., used a method developed to estimate the demand for rural transit for the state of Arkansas. The method used trip rates for three categories of users: people aged 60 and over (6.79 annual one-way trips per person); people under age 60 with a disability (4.49 annual one-way trips per person); and people under age 60 in poverty (20.50 annual one-way trips per person). These rates were originally derived for Arkansas to estimate the *need* for rural transit, rather than "demand," which is dependent upon the actual service provided. Therefore, the rates represent what would be achievable with high quality service. They were based upon analysis of states with well-funded systems at the time (around 1990), including Pennsylvania and Wisconsin *(SG Associates, Inc., 1995)*. The Arizona report used these trip rates to estimate demand for each county. The difference between the estimate and current ridership was identified as a service gap. In Arizona,

statewide, transit agencies were only meeting 18% of the estimated demand. As will be shown in the Findings section that follows, when applied to Oregon, as it did in Arizona, this method resulted in an estimate of demand that exceeded current ridership.[8] Since it is unlikely that current services in Oregon are meeting all of the needs of rural residents, this method appeared promising and useful.

The fourth method we examined used data from the existing rural transit providers in Oregon. Current per capita trip rates were calculated for each transit provider using the service areas and Census data described above and 2007 ridership data. As a baseline, these rates were projected to remain the same in the future. This assumes that the levels and use of service will not change in the future and that any current unmet demand will continue to be unmet. However, there is wide variation in the per capita trip rates among Oregon's providers. Some of this variation may reflect better levels and types of service and may be due, in part, to higher population densities or particularly good connections to other services. Therefore, a higher estimate of demand was calculated using the 75th percentile trip rate. In other words, this estimate assumes that all of the state's providers will perform at the same level as the provider that currently performs better than 75% of all of the agencies. This means that for three-quarters of the providers, the number of trips per capita will increase from current levels.

Because the first two methods underestimated current demand, our estimate of future needs uses the final two methods, referred to as the "Arizona/Arkansas" and the "75th percentile" methods. The results appear in Chapter 6 Findings: Service Gaps and Future Needs, starting on page 93.

[8] The rates were applied to Oregon data using 65 and older or under 65 as the age groups, rather than 60, because the population data and projections used that age break point.

4. Findings: Rural Transit Services, Use and Costs in Oregon Today

Demographic Characteristics of Oregon's Rural Population

Population Size and Density

Oregon is a largely rural state. This lack of density poses problems for the provision of fixed route and special transportation alike. As noted earlier, under 800 of the approximately 97,000 square miles of the state are within one of the six designated urbanized areas (Portland, Salem-Keizer, Eugene-Springfield, Medford, Corvallis, and Bend). In 2000, about 57% of the state's population lived within those urban areas, with the remaining 43% residing in rural areas.[9]

Demographic projections show that the share of Oregon residents in urban areas will increase slightly, while the share in rural areas will decrease slightly (Dill et al. 2008). In 2010, about 49 percent of the population will be in rural areas with populations less than 50,000 (31 percent living in rural areas with populations under 2,500). By 2030, rural areas with populations less than 50,000 are projected to comprise 47 percent of Oregon's population (27 percent living in rural areas with populations less than 2,500*) (Dill et al. 2008)*.

The vast majority rural Oregon has a density of less than one housing unit per acre. As shown in Table 4.1, only about one-tenth of one percent of rural Oregon's area has a density of one or more housing units per acre. This area does, however, include 24% of Oregon's rural population, with the remaining 76% living in areas with less than one housing unit per acre (Table 4.2).

[9] To characterize Oregon's rural and urban populations, 2000 Census data by block group were used. If the block group's centroid was inside one of the state's then six urbanized areas (Portland, Eugene, Medford, Salem, Bend, and Corvallis) for the purposes of this study, it was considered urban. For block groups that straddled the urbanized area boundary, if the centroid was within one-half mile of the boundary, that block group was considered urban.

Table 4.1: Land Area by Housing Density, Urban and Rural Oregon (2000)

	Area (square miles)			
Housing Density	Rural: Outside Urban Areas		Inside the 6 Urbanized Areas	
0-0.99 units/acre	96,116	99.9%	415	52.2%
1-1.99 units/acre	876	0.1%	133	16.7%
2-2.99 units/acre	34	0.0%	102	12.9%
3.-3.99 units/acre	8	0.0%	69	8.7%
4 or more units/acre	6	0.0%	76	9.5%
Total	96,240	100.0%	794	100.0%

Note: Calculations based upon Census block groups. Some block groups have portions both inside and outside the urbanized area. Areas that extend outside of the urban area are included within the urbanized area in this table if the block group's centroid is within one-half mile of the area's boundary.

Table 4.2: Population by Housing Density, Urban and Rural Oregon (2000)

	Population			
Housing Density	Rural: Outside Urban Areas		Inside the 6 Urbanized Areas	
0-0.99 units/acre	1,123,100	75.7%	266,420	13.7%
1-1.99 units/acre	160,840	10.8%	319,960	16.5%
2-2.99 units/acre	121,810	8.2%	392,670	20.3%
3.-3.99 units/acre	40,570	2.7%	369,900	19.1%
4 or more units/acre	36,870	2.5%	588,820	30.4%
Total	1,483,180	100.0%	1,937,770	100.0%

Note: Calculations based upon Census block groups. Figures rounded to nearest 10. Some block groups have portions both inside and outside the urbanized area. Block groups that extend outside of the urban area are included within the urbanized area in this table if the block group's centroid is within one-half mile of the area's boundary.

With respect to population density, the most densely populated rural block group in Oregon contains 13,343 persons per square mile, compared to the most densely populated urban block group in Oregon, which contains twice that many people: 28,861 persons per square mile. The least densely populated rural block groups contain less than 1 person per square mile, compared to the least densely populated urban block groups, which contain 63 persons per square mile. The median density for rural block groups in Oregon is 183, compared to 5,118 for urban block groups.

As with housing density, the population density of rural Oregon differs significantly from urban Oregon. About 95% of Oregon's urban population lives in a block group with a density of over 1,000 people per square mile (Table 4.3). In contrast, only 29% of the rural population lives in an area with that density. At the other end of the scale, 7% of Oregon's rural population (and 3% of Oregon's total population) lives in an area with six or fewer people per square mile; this density is considered "frontier" rural

Table 4.3: Population by Population Density, Urban and Rural Oregon (2000)

Population Density (of the Census block group)	Population Rural: Outside Urban Areas		Inside the 6 Urbanized Areas	
6 or fewer people/sq. mi.	98,010	7%	-	0%
>6 to 50 people/sq. mi.	276,040	19%	-	0%
>50 to 100 people/sq. mi.	154,510	10%	1,384	0%
>100 to 200 people/sq. mi.	201,290	14%	7,151	0%
>200 to 1,000 people/sq. mi.	318,840	21%	142,257	5%
>1,000 people/sq. mi.	434,500	29%	1,787,423	95%
Total	1,483,180	100%	1,938,215	100%

Note: Calculations based upon Census block groups. Figures rounded to nearest 10.

Seasonal Vacancy Rates

Oregon's rural and urban areas do differ with respect to their seasonal vacancy rates. Not surprisingly, given Oregon's many tourist destinations along the coast and in central Oregon, the seasonal vacancy rate ranges from a low of 0 percent (there are both rural and urban block groups that have zero seasonally vacant housing units) to a high of 77 percent of all housing units in Oregon's rural block groups compared to a high of just 10 percent among the urban block groups. The median seasonal vacancy rate for rural block groups, however, is 0.7 percent, compared to 0.2 percent in the urban block groups.

Poverty

With respect to poverty rates, there is little variation between urban and rural block groups, as a whole. Among the rural block groups, the overall rate of poverty ranges from 0 percent to 65 percent of the total population living in poverty, with a median of 10.5 percent. In urban block groups the range is from 0 percent to 71 percent, with a median of 9.6 percent. In rural block groups, among people aged 0 through 64, the poverty rates range from 0 percent to 68 percent, with a median of 11.2 percent. The rates are similar among people in this age group in urban block groups, ranging from 0 percent to 71 percent, with a median of 10 percent. For people aged 65 and over, in the rural block groups the poverty rates range from 0 to 68 percent, with a median of 6.1 percent, compared to, in the urban block groups, a range of 0 percent to 100 percent, with a median of 4.8 percent.

Age

With respect to age, urban and rural block groups have similar age structures, except rural block groups have a slightly higher percentage of older adults and a lower percentage of persons aged 21 to 64 (Table 4.4). There is, however, great variability between block

groups, both urban and rural. For example the share of people aged 65 and over within a block group ranges from less than 1% to 75% in rural areas, with a median value of 14%.

Table 4.4: Population by Age, Urban and Rural Oregon (2000)

Age	Population			
	Rural: Outside Urban Areas		Inside the 6 Urbanized Areas	
0-15 years	364,180	22%	383,440	21%
16-20 years	113,110	7%	127,080	7%
21-64 years	911,040	56%	1,084,660	61%
65-74 years	126,660	8%	93,400	5%
75+ years	115,040	7%	102,790	6%
Total	1,630,030	100%	1,791,370	100%

Note: Calculations based upon Census block groups. Figures rounded to nearest 10.

Disability

Concerning disability rates, due to a flaw in question design, disability rates were overestimated in the 2000 Census; thus, the rates derived from the American Community Survey (ACS) in 2006 were used *(see Dill et al. 2008, for details)*. We report two rates of disability here. The first, "Any disability," is a composite measure created by aggregating respondents' answers to the six disability questions that were asked. The first two questions asked if the person had the "long-lasting condition" of (a) blindness, deafness, or a severe vision or hearing impairment, and/or (b) a condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting or carrying. The next four questions asked whether "because of a physical, mental, or emotional condition lasting 6 months or more" the person had any difficulty in (c) learning, remembering, or concentrating, (d) dressing, bathing, or getting around inside the home, (e) going outside the home alone to shop or visit a doctor's office, and/or (f) working at a job or business. Thus, the "any disability" measure yields a very broad estimate of the number of people with disabilities who would potentially need and use special transportation.

The second disability measure reported here is much narrower in scope and consists solely of the fifth of the six conditions above, referred to as "Go-outside-the-home-alone" disability. It specifically assesses mobility impairment; as such, it can serve as a proxy indicator of need for special transit and thus is highly relevant to transportation and transit planning.

Dill et al. *(2008)* attempted to make use of the best features of both the ACS 2006 and the 2000 Census data, involving using the more geographically-detailed age and disability data from the 2000 Census, but adjusting them using the disability rates derived from the 2006 ACS data. Because of the sampling error associated with the ACS data, however, and because of instability in the results of the finer geographic divisions, the estimates could not be trusted *(see Dill et al. 2008 for details)*.

As a result, for that study and the present one, the project team adjusted the Census 2000 rates of any disability and go-outside-the-home-alone disability by the rates of disability revealed in the ACS 2006 data. We did this for purposes of consistency, comprehensiveness, and accuracy, both to describe the current population with respect to age and disability rates and to project forward to 2030. This analysis revealed that in the rural block groups, anywhere from 10 percent to 35 percent of people had any disability, with a median rate of 16 percent, compared to a range of 9 percent to 40 percent in urban block groups, with a median of 15 percent. Among those aged 5 (the youngest age available) through 64, the rate of disability ranged from 10 percent to 14 percent in the rural block groups, with a median rate of 12 percent, and from 9 percent to 14 percent in the urban block groups, with a median of 12 percent. Among people aged 65 and over, the median percent of the population having any disability was 40 percent in the rural block groups (with a range from 28 percent to 55 percent) and 41 percent in the urban rural block groups (also ranging from 28 percent to 55 percent).

Looking only at the rate of "go-outside-the-home-alone disability," for all ages combined the range was 2 percent to 15 percent in the rural block groups, with a median of 5.4 percent; in the urban block groups, the range was 2 percent to 17 percent, with a median of 4.8 percent. Among those aged 16-64 (persons under 16 were not asked about this type of disability), the median percent with go-outside disability was 3.1 percent (ranging from 2 to 3.3 percent) in both the rural and the urban block groups. Among those aged 65 and over, the median percent with go-outside disability was 16.2 percent in the rural block groups (ranging from 8 to 26 percent), compared to 17 percent in the urban block groups (also ranging from 8 to 26 percent).

Figure 4.1 and Figure 4.2 *(taken from Dill et al. 2008)* depict the rates of disability in urban versus rural areas, by county, using these two measures, but using the ACS 2006 data, which served as the basis for that report. The ACS data are available in less demographic detail (geographic and age) than the 2000 Census. Because a smaller sample size is used in the ACS, the ACS protocol requires that a geographic area must have a minimum population of 65,000 to be reported separately. This results in an inability to describe separately the populations of several Oregon counties; thus, counties are grouped in Figure 4.1 and Figure

4.2. It should also be noted that because only people aged 16 and over were asked whether they had difficulty going outside the home alone to shop or visit a doctor's office, there are no data presented in Figure 4.1 for people aged 5-15. There are, however, data for this age group with respect to the composite measure of "any disability;" thus, Figure 4.2 does contain data for the age group 5-15.

Figure 4.1: Percent of Oregon Population with Go-Outside Disability

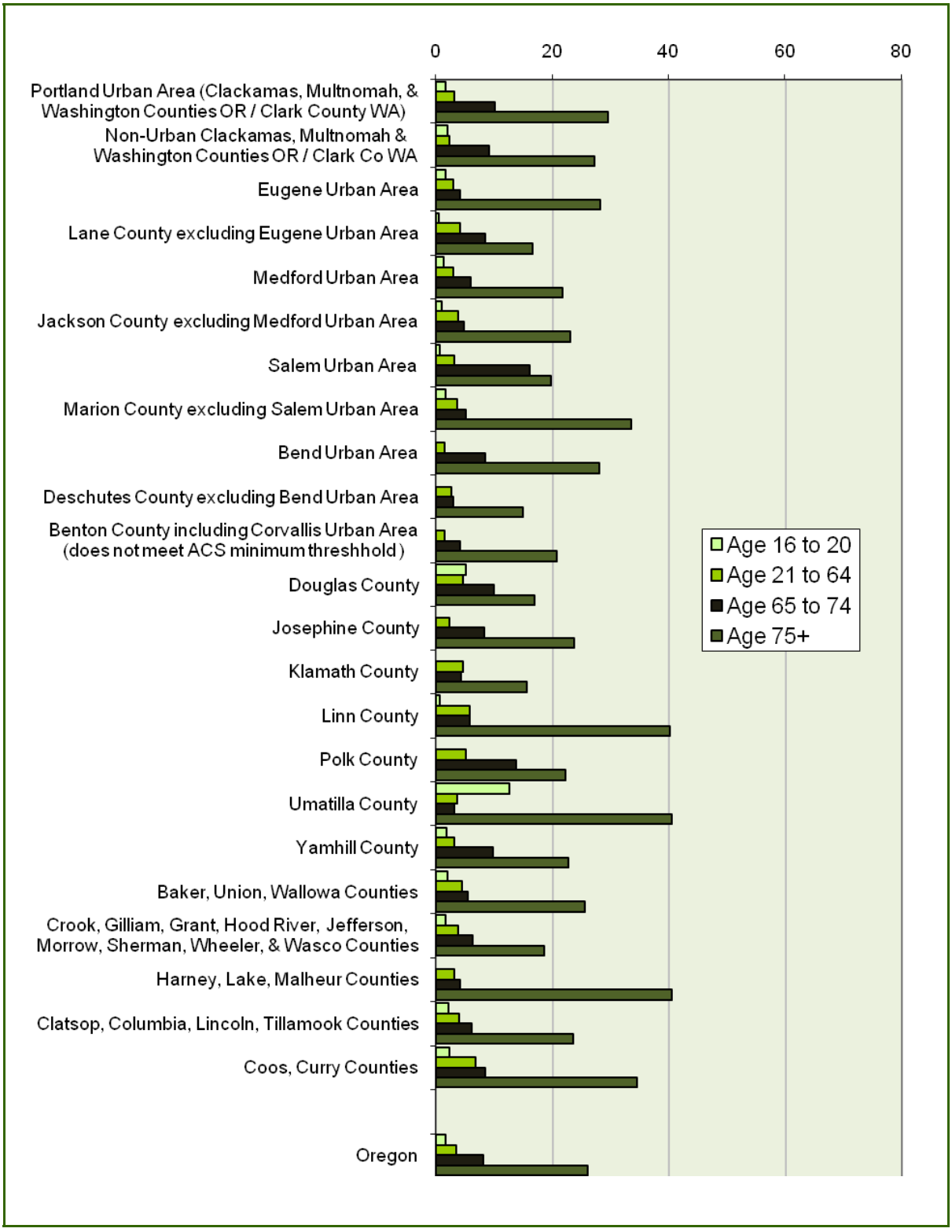
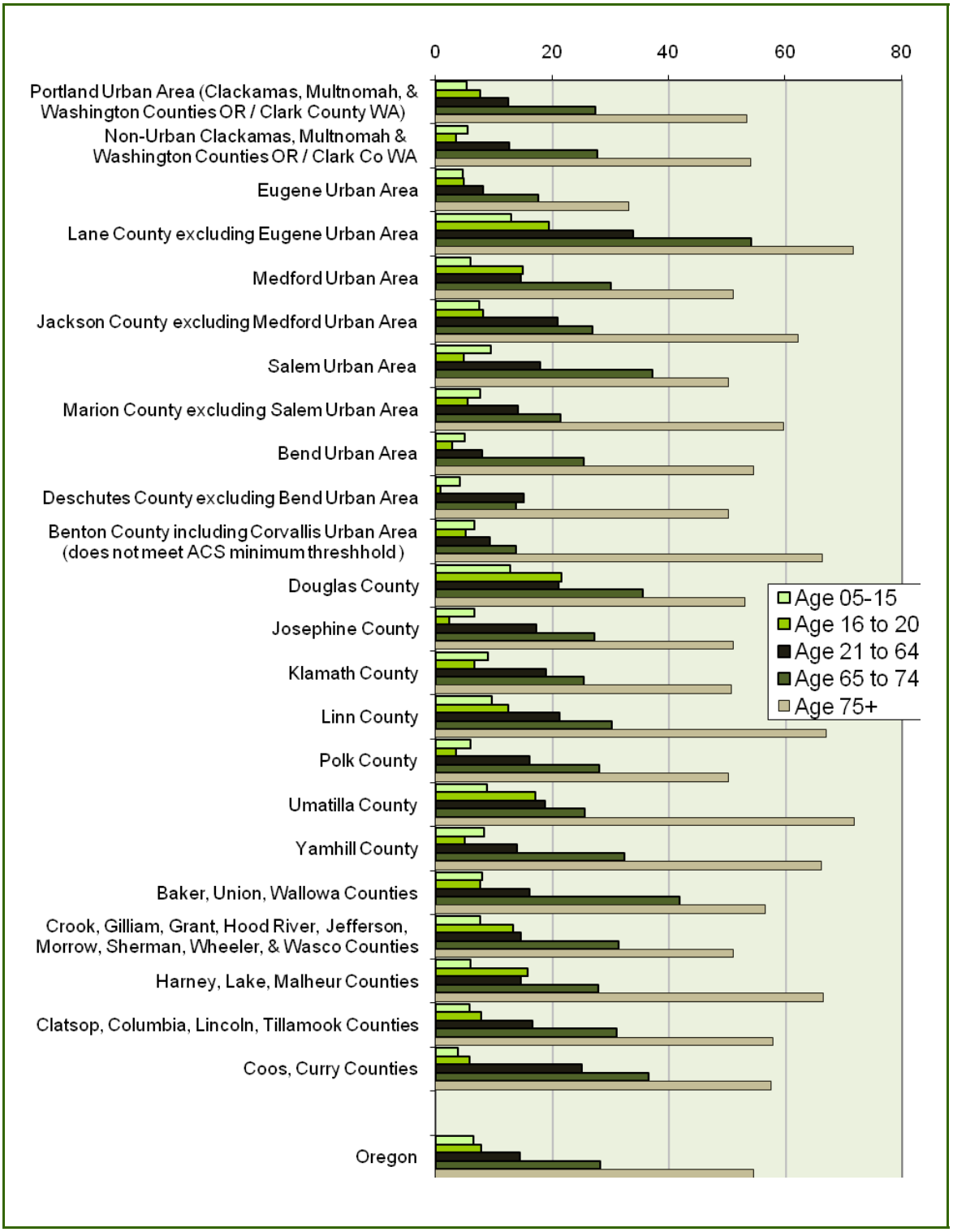


Figure 4.2: Percent of Oregon Population with Any Disability



Population Projections

Dill et al. *(2008)* prepared population projections, first for the state as a whole and then for each individual county by age, number of persons with any disability, and number of persons with go-outside-the-home-alone disability. These data are used in this report to estimate the future needs for rural transportation. Dill et al. *(2008)* developed projections for each county, based on the ACS 2006 population data. In brief, because the rates of disability reported in the 2000 Census were revealed to be flawed, the ACS 2006 rates were used. Although the authors had hoped to be able to apply geography-specific rates (e.g., by urbanized area and county), this was not possible due to sampling error and instability in the finer geographic divisions. As a result, the geography-specific rates were not used in the projections; instead, **the single statewide rate of disability derived from the 2006 ACS data was applied.** *(See Appendices 3-7 in Dill et al. (2008) for the projections for Oregon and for each of the 36 counties.)*

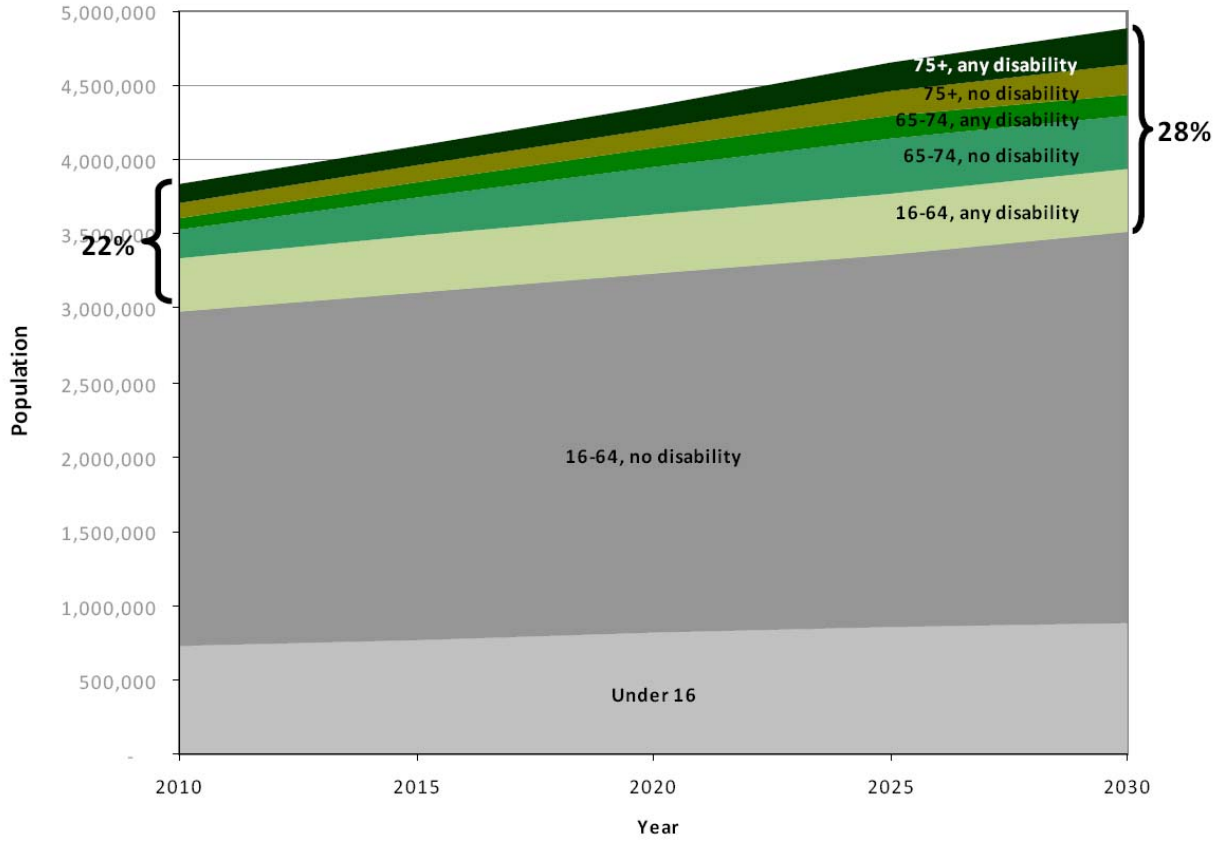
In addition, it was decided to hold constant over time the age-specific rates of disability. This decision was made based on the examination of the literature on recent trends in disability rates. *(See Appendix 3-8 in Dill et al. (2008) for the results of this review and analysis of the literature.)*

In brief, the analysis of disability rates revealed that **trends in disability rates vary by age cohort, and the findings are inconclusive within age groups.**

- For **older adults**, the rate of disability clearly has been dropping, but now, due to the rise in obesity, there are indications that this positive trend may be reversing.
- For **younger adults**, the rates of disability definitely have been rising.

Because of these ambiguous results, a conservative approach was taken and a constant rate of disability by age over the period of study was used, from 2010 to 2030.

Figure 4.3 illustrates the growth in absolute numbers, as well as the proportion of the population aged 65 and over, regardless of disability, and those aged 16 and over with a disability. As can be seen, **older adults and people aged 16 and older with disabilities will comprise 22% of the population in 2010, increasing to 28% in 2030.**



Source: Dill et al. (2008)

Figure 4.3: Percent of Oregon Population by Age Group and Disability Status, 2010 to 2030

Of particular importance here is where the growth will occur in the state as a whole with respect to population size. **The demographic projections developed show that the share of residents in urban and rural areas in Oregon will shift over time** *(see Appendix 3-7, Oregon projections, in Dill et al. 2008)*, **with slightly more people in urban areas.** The projections estimate that in 2010, about 51% of the population will be in urban areas with populations of 50,000 or more, 3% in urban areas of 25,000 to 49,999, 15% in urban areas between 2,500 and 24,999, and 31% in rural areas with under 2,500 population. By 2030, the urban areas with populations of 50,000 or more are projected to comprise 55% of Oregon's population, urban areas of 25,000 to 49,999 will comprise 5%, urban areas between 2,500 and 24,999 will have 14% of Oregon's total population, and rural areas with populations under 2,500 will contain 26% of the population. Thus, it appears that it may be possible to serve slightly more of the population with fixed route

transit than are presently served, because more will be residing in urban areas, which have fixed route service.

What Transit Services Currently Exist in Rural Oregon?

Forms of Service

Rural transit service in Oregon is consistent with the forms of service available in rural areas throughout the U.S., including local fixed route, demand response, and intercity (see pages 11 - 10). For this analysis, fixed route and deviated fixed route service are considered together, since deviated service is less common and usually provided in combination with regular fixed route service.

Levels of Service

Transportation planners use the concept "level of service" (LOS) to help describe and assess transportation services. LOS has long been used to describe levels of congestion on roadways or intersections, using an A-F scale. More recently, an LOS assessment method was developed for transit *(Kittleson and Associates, Inc. 2003)*. Higher levels of service presumably will result in higher ridership and more satisfied users. One component is the frequency of service, measured by headways – the time between each bus on a route. For example, 30-minute headways mean that a bus is scheduled to arrive at a stop every 30 minutes, or twice an hour. For urban systems, less than 10-minute headways are considered an A level of service (the highest), while headways more than 60 minutes are rated F (the worst). Another component of transit LOS is the hours of operation per day. The more hours a route is available, the higher the level of service. For example, routes having service from 4 -11 hours per day are considered LOS E. LOS A provides at least 19 hours of service per day.

Determining an appropriate level of service presents a challenge to rural transit providers, who must find a way to efficiently serve areas with low population density. Thus far, there are no widely-accepted guidelines for determining the minimum effective level of transit service, or the minimum population density needed to support the provision of transit services.

Sandlin and Anderson *(2004)* developed a serviceability index for use by rural transit providers in evaluating demand response systems. The index ranges from a low of 0 to a high of 6 and is based on the following factors: (a) the percentage of transit-supportive areas that can be served based on agency's operating costs; (b) the number of passengers

per vehicle mile; (c) the percentage of unmet passenger demand based on census data and existing coverage area; (d) the percentage of passengers aged 60 or older; (e) the percentage of costs consumed by administrative costs,; and (f) the average age of the fleet in years. The authors did not offer a similar index for evaluating rural fixed-route transit services.

Rather than relying on multi-factor assessments of level of service, some states have used single-factor level of service benchmarks as a guiding force within their public policy. In 2005, North Dakota set a target level of 7.0 annual vehicle miles of service per capita as high-level transit service for rural areas, with 5.0 annual vehicle miles of service per capita representing a more modest improvement over existing service *(Mielke et al. 2005)*.

Most of the transit LOS measures included in the TCRP Report 100: *Transit Capacity and Quality of Service Manual* are not directly applicable to rural transit service. For example, headways less than 30 minutes are very rare in rural areas. Most rural systems would receive an E or F LOS based upon headways. Thus, for the present analyses, the project team developed five LOS categories for local fixed route service using similar components as in the TCRP guidance. The following variables were used to determine the various LOS categories:

- **Number of days of service per week**. Categories include (a) six or seven days per week (b) five days per week (no weekend service), and (c) less than five days per week. More days per week were assigned to a higher LOS category.
- **Headways.** Hourly headways or better were assigned to a higher LOS category.
- **Number of hours of service per day.** Most systems that operated only five days per week offered similar hours of service per weekday. However, those offering weekend service differed significantly in the hours of service provided on those weekend days. Twelve hours of weekend service was used as a cut-point for differentiating the two highest LOS categories.

The five LOS categories developed to categorize current Oregon rural transit operators with respect to the local fixed route service they offer were as follows:

- LOS 1: < 5 days/week, no weekend service
- LOS 2: 5 days a week, no weekend service, more than 60-minute headways
- LOS 3: 5 days a week, no weekend service, 60-minute headways or better
- LOS 4: 6 or more days a week, less than 12 hours of service per weekend day

- LOS 5: 6 or more days a week, 12+ hours of service per weekend day

We recognize that that this scheme goes from low level of service (LOS 1) to high level of service (LOS 5), and thus differs from the A-F system of rating, which goes from presumably great service (A) to failing service (F). We preferred to differentiate level of service by simply describing what service was available without making a judgment.

Nonetheless, although our system of categorization appears straightforward, it is not. Applying a level of service concept to an entire transit system is difficult. The characteristics of each route usually differ. One route may operate on 60-minute headways five days a week, while another operates on 30-minute headways six days per week. For this set of analyses, the LOS measure for a transit system is based upon the **best service available in the system**. For most systems, this level of service is not available throughout the entire service area; thus, the LOS category assigned likely is an overestimate of overall service. In addition, some areas have both fixed route service and demand response service, which are sometimes, but not always, provided by the same agency. The LOS only takes into account the best fixed route service available.

Types and levels of transit service provided by the agencies included in these analyses are shown in Table 4.5. Of the 48 service providers identified, eight (17%) are intercity carriers, 18 (38%) provide demand response service to the general public, and 30 (63%) provide local fixed route service. Some providers have both general public demand response and local fixed route service. It should be noted that this inventory was conducted in Spring 2009 and does not include service added later in 2009.

Table 4.5: Types and Levels of Rural Transit Service Analyzed, by Provider

Provider	Highest Fixed Route LOS Available					Demand Response - General Public	Intercity
	LOS 1: < 5 days /week, no weekend	LOS 2: 5 days /week, no weekend, > 60 min. headways	LOS 3: 5 days /week, no weekend, ≤ 60 min. headways	LOS 4: 6-7 days /week, < 12 hours of service/ weekend day	LOS 5: 6-7 days /week, 12+ hours of service/ weekend day		
ODOT Region 1							
Canby Area Transit				X			
Columbia Area Transit (Hood River)		X				X	
Columbia County Rider			X			X	
Mountain Express - Welches		X					
Sandy Area Metro					X		
SMART, Wilsonville (service in rural areas)				X			
South Clackamas Transportation				X			
TriMet (service in rural areas)					X		
Washington County U-Ride						X	
ODOT Region 2							
Albany Transit System			X				
CARTS (Salem Area Mass Transit rural area service)		X					
Lane Transit (service in rural areas)			X				
Lebanon Dial-A-Ride						X	
Lincoln County Transportation				X		X	
Linn-Benton Loop				X			
Linn Shuttle		X					
LTD-Rhody and Diamond Express		X					
Silver Trolley (Silverton)						X	
South Lane Wheels						X	
Sunset Empire Transportation					X		
Sweet Home Dial-A-Bus						X	
Tillamook County Transportation					X	X	
Woodburn Transit Bus		X					
Yamhill County Transit				X		X	
ODOT Region 3							
Coos County Area Transit		X				X	X
Curry Public Transit (Coastal Express)	X					X	
Josephine County Transit			X				
Rogue Valley Transit (service in rural areas)			X				
Utrans (formerly Umpqua Transit)			X				

Provider	Highest Fixed Route LOS Available					Demand Response - General Public	Intercity
	LOS 1: < 5 days /week, no weekend	LOS 2: 5 days /week, no weekend, > 60 min. headways	LOS 3: 5 days /week, no weekend, ≤ 60 min. headways	LOS 4: 6-7 days /week, < 12 hours of service/ weekend day	LOS 5: 6-7 days /week, 12+ hours of service/ weekend day		
ODOT Region 4							
Basin Transit Service				X			
Cascades East Transit		X				X	
Mid-Columbia Council of Governments						X	
Sherman County Community Transit						X	
ODOT Region 5							
Confederated Tribes of Umatilla				X			
Harney County Dial-A-Ride						X	
Milton-Freewater Public Transportation	X						
Northeast Oregon Public Transportation				X		X	
Pendleton Bus						X	
PeopleMover (Grant County)							X
Snake River Transit (Malheur)			X				
Intercity Service							
Amtrak							X
Amtrak Porter Stage Lines							X
Amtrak Thruway; Oregon Coachways							X
Central Oregon Breeze							X
Greyhound							X
Sage Stage							X
The Klamath Shuttle							X
Valley Retriever							X
Total	**2**	**8**	**7**	**9**	**4**	**18**	**10**

Notes: The type and level of service listed is based upon the inventory conducted for this report. New service added in 2009 is not included, including new routes provided by the Confederated Tribes of Umatilla.

The service included in this analysis is shown on the statewide map in Figure 4.4. Smaller-scale maps for each region and cities appear in the Appendix. The figure shows that some of the highest levels of fixed route service (darker blues) are on routes extending from the Portland and Eugene areas, along with routes in the northwestern coastal counties.

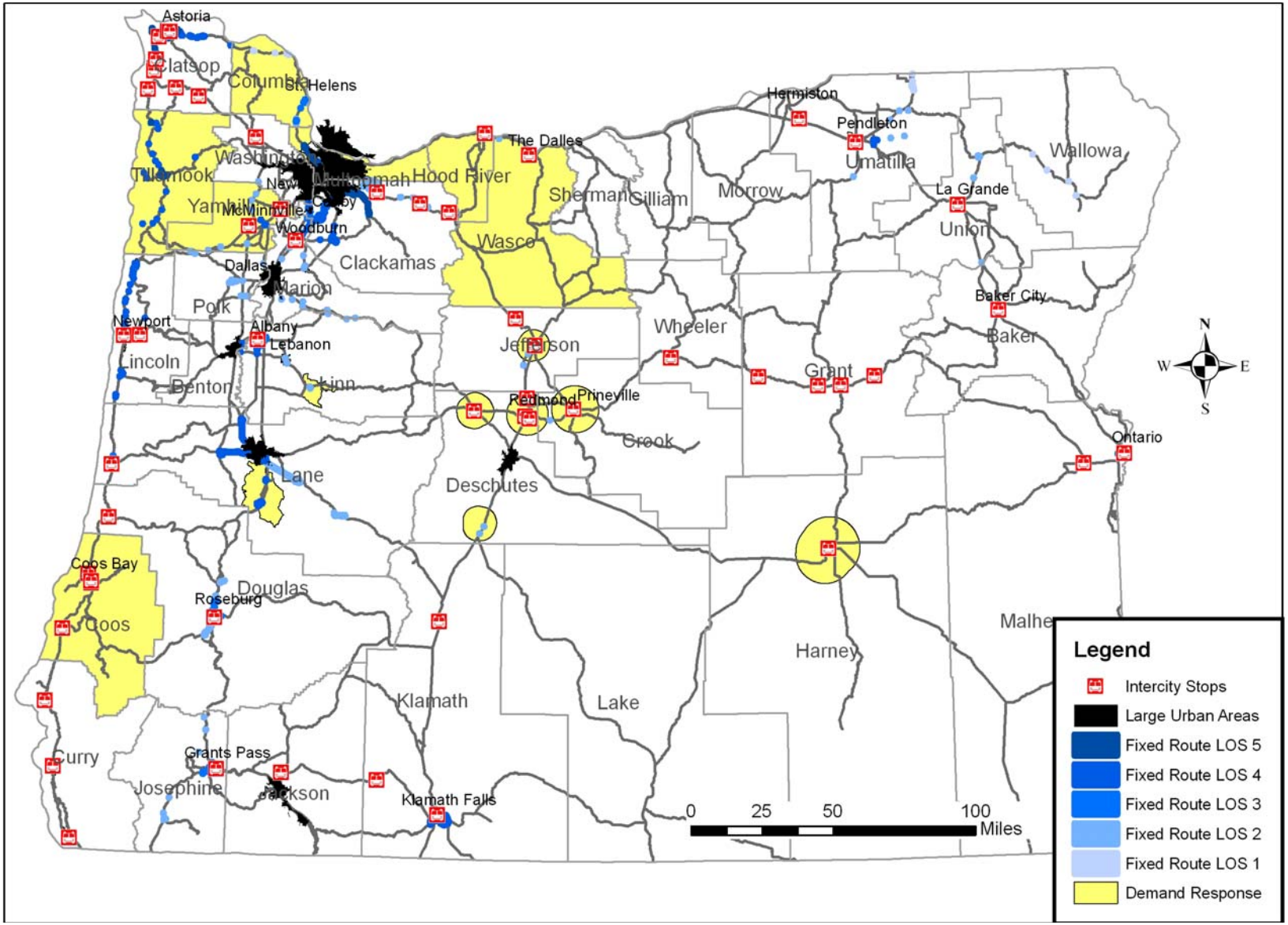


Figure 4.4: Transit Service Availability in Rural Oregon

A survey conducted by ODOT Public Transit Division staff in 2008 asked transit providers whether service levels had been increased or decreased in fiscal year 2007-08. Of the 20 rural providers that answered the question and who provide service to the general public (not just service for older adults and people with disabilities), 12 (60%) said that service had been increased, and none said that service had been decreased. This is in contrast to the seven[10] urban providers, where only two had increased service and one had decreased service. Increasing the service area was the most common type of service expansion (Table 4.6).

Table 4.6: Changes in Service by Oregon's Rural Transit Providers, 2007-08

	n	%
No change	8	40%
Decrease in service	0	0%
Increase in number of days per week	3	15%
Increase in number of hours per day	6	30%
Increase in service area coverage	8	40%
Increase in number of seats/size of vehicle	2	10%
Increase in number of volunteers/employees	6	30%
Total number of rural providers responding to question	20	

Source: ODOT Public Transit Division survey (ODOT 2008).

Note: Multiple answers were allowed for type of increase in service. The table includes only providers who provide service to the general public, not providers of service limited to older adults and people with disabilities. There were over 15 survey respondents in the later category who are not included in the table.

The types of transit service available (by block group) are shown in Table 4.7. Based upon the method used to assign population to the service area, perhaps as much as 60% of the state's rural population lives outside of a transit service area, and over 90% of the rural land area in the state is outside a transit service area. Note that this is likely a high estimate of the rural population not served, for two reasons. First, there are a handful of services that were not able to be analyzed for this report. Second, as explained in the methodology *(see section starting on page 30)*, the block group population was apportioned to the transit service area assuming an even population distribution throughout the block group. However, it is somewhat likely that a higher share of the population lives within the service area, since transit service is usually provided in denser areas.

[10] There are 6 urban areas (Portland, Salem, Eugene, Corvallis, Bend, Medford) but 7 urban area transit providers, because of Wilsonville SMART.

Table 4.7 also reveals that about 22% of the rural population is served only by demand response service. Only about 7% of the rural population is served by fixed route transit at a level of service (LOS) of 4 or 5, the levels which include weekend service.

Table 4.7: Transit Service Available in Rural Oregon

	Population		Area: Square miles	
No service *(see note)*	951,126	60.0%	87,259	90.7%
Intercity only	8,704	0.5%	21	0.0%
Demand Response only	344,019	21.7%	8,748	9.1%
Demand Response & Intercity only	9,694	0.6%	9	0.0%
Fixed route LOS 1, no intercity	6,014	0.4%	5	0.0%
Fixed route LOS 2, no intercity	49,564	3.1%	49	0.1%
Fixed route LOS 3, no intercity	68,493	4.3%	33	0.0%
Fixed route LOS 4, no intercity	78,072	4.9%	69	0.1%
Fixed route LOS 5, no intercity	16,892	1.1%	26	0.0%
Fixed route LOS 1 & intercity	476	0.0%	1	0.0%
Fixed route LOS 2 & intercity	19,783	1.2%	6	0.0%
Fixed route LOS 3 & intercity	17,120	1.1%	6	0.0%
Fixed route LOS 4 & intercity	8,813	0.6%	3	0.0%
Fixed route LOS 5 & intercity	5,605	0.4%	3	0.0%
Total	1,584,375	100.0%	96,239	100.0%

NOTE: As noted in the Study Methods section, service for at least three small providers was not included in this analysis due to insufficient information. Therefore, this estimate of "no service" may by slightly inaccurate.

Transit Service and Housing Density

One of the main reasons that levels of transit service in rural areas are lower than in urban areas is the lack of population density to support more service, given the available funding. There are no agreed upon standards for the minimum density needed to support fixed route transit. The Institute of Transportation Engineers recommended a minimum of four to five dwelling units per acre for local bus service *(ITE 1989)*. A review of best practices in transit service planning found one agency that had a minimum standard of three units per acre for bus service *(Center for Urban Transportation Research 2009)*. These density levels are rare in rural areas. **Only about 5% of Oregon's rural population lives in a block group with a density considered necessary by some sources to provide regular fixed-route bus service** (i.e., three or more housing units per acre) (Table 4.8).

Throughout rural Oregon, the likelihood of having transit available within a block group diminishes as density decreases. Of residents living in areas with a density of four or more

units per acre, at least 80% currently have some form of fixed route transit within the block group. An additional 3% of the rural population lives in an area with a density of 3-3.99 units per acre, and over 90% of these have some form of fixed route service. Availability drops off significantly when density falls below two units per acre. About 34% of the people living in block groups with a density of 1-1.99 units per acre have no service available; 72% of those living in the lowest density block groups (under one unit per acre) have no service.

Table 4.8: Transit Service Availability and Housing Density

	Percent of population living in a block group with this housing density					
Type of transit service available in block group	**0-0.99 units/acre**	**1-1.99 units/acre**	**2-2.99 units/acre**	**3-3.99 units/acre**	**4 or more units/acre**	**Total**
No service mapped	72%	34%	17%	7%	16%	60%
Intercity only	0%	1%	2%	1%	1%	1%
Demand Response only	23%	16%	21%	16%	3%	22%
Demand Response & Intercity only	0%	1%	3%	2%	0%	1%
Fixed route LOS 1, no intercity	0%	1%	3%	1%	0%	0%
Fixed route LOS 2, no intercity	1%	10%	9%	9%	6%	3%
Fixed route LOS 3, no intercity	1%	13%	15%	17%	29%	4%
Fixed route LOS 4, no intercity	1%	14%	16%	28%	13%	5%
Fixed route LOS 5, no intercity	1%	3%	2%	5%	1%	1%
Fixed route LOS 1 & intercity	0%	0%	0%	0%	0%	0%
Fixed route LOS 2 & intercity	0%	1%	5%	6%	15%	1%
Fixed route LOS 3 & intercity	0%	3%	4%	5%	8%	1%
Fixed route LOS 4 & intercity	0%	1%	3%	2%	4%	1%
Fixed route LOS 5 & intercity	0%	1%	1%	2%	4%	0%
Total	100%	100%	100%	100%	100%	100%
Total estimated population (2007)	1,203,960	170,080	129,000	42,720	38,620	1,584,380
% of rural population living in this density category	76%	11%	8%	3%	2%	100%

NOTE: Density is based upon 2000 Census data.

Our analysis of fixed route services in rural Oregon shows that the characteristics and completeness of transit network coverage vary from city to city. This variation can perhaps best be seen by visually comparing different transit networks as they relate to housing density in each city. The Appendix contains maps which show the current transit service throughout the state at the city level. These maps (starting with Figure 9.10) also show housing density at the census block group level, providing an illustration of how much of each city's housing falls within a quarter mile of the transit system. In addition, the street network for each city is included. The density and form of the street network can be considered a proxy for the intensity of development within each black group.

Some of the maps show fairly extensive service areas. For example, in addition to providing service within the city of Roseburg, UTrans (formerly Umpqua Transit), provides commuter bus routes that provide closely spaced stops between outlying areas and the central city (Figure 9.37). The two commuter routes shown serve Sutherlin, to the north, and Winston, to the south, but can also be considered to provide service to all locations along the route, because the stops are spaced at a half mile or less. Albany Transit has similar commuter service (Figure 9.10 in the Appendix).

Many of the systems shown in these figures feature routes that serve areas with very low housing density. One example is Klamath Falls (Figure 9.23). The Basin Transit Service fixed route system provides fairly comprehensive coverage of residential areas in Klamath Falls and its suburbs, but the system also includes Route 6, which stretches to an area of very low housing density to the southwest of the city. In this case, the area served is an industrial area with several employers, including a Weyerhauser plant. In other cases, routes are designed to provide shopping opportunities for those using transit. Many systems include stops at large retailers. For example, in La Grande, the fixed route service extends into a low-density area to the northeast to provide access to the city's Wal-Mart.

Transit Service and Poverty Levels

Transit serves many purposes. One objective is to provide mobility for people who cannot afford to own or operate a personal vehicle. In 2007, there were about 185,030 people living in poverty in rural areas in Oregon.[11] Of those, 55% lived outside of the transit service areas mapped for this analysis, while 21% lived in areas with demand response service only (Table 4.9). Services did appear to be concentrated somewhat in areas with higher levels of poverty. For example, of the estimated 50,610 people living in poverty who lived in block groups with the highest poverty rate (over 20%), only 42% had no mapped transit service, compared with 68% of the people in poverty living in the lowest poverty areas (0-5%).

[11] Estimate based upon 2000 Census poverty rate applied to 2007 population estimates.

Table 4.9: Transit Service Availability and Poverty

Type of transit service available in block group	Percent of population living in poverty who live in a block group with this poverty rate				
	0-5% poverty rate	>5-10% poverty rate	>10-20% poverty rate	Over 20% poverty rate	Total
No service mapped	68%	66%	56%	42%	55%
Intercity only	0%	0%	1%	1%	1%
Demand Response only	22%	23%	22%	17%	21%
Demand Response & Intercity only	0%	1%	1%	1%	1%
Fixed route LOS 1, no intercity	0%	0%	0%	1%	1%
Fixed route LOS 2, no intercity	2%	2%	4%	6%	4%
Fixed route LOS 3, no intercity	2%	2%	6%	9%	6%
Fixed route LOS 4, no intercity	3%	4%	5%	10%	6%
Fixed route LOS 5, no intercity	1%	1%	1%	2%	1%
Fixed route LOS 1 & intercity	0%	0%	0%	0%	0%
Fixed route LOS 2 & intercity	0%	1%	1%	4%	2%
Fixed route LOS 3 & intercity	0%	0%	1%	4%	2%
Fixed route LOS 4 & intercity	0%	0%	1%	2%	1%
Fixed route LOS 5 & intercity	0%	0%	0%	1%	0%
Total	100%	100%	100%	100%	100%
Total estimated (2007) population in poverty	8,280	36,500	89,630	50,610	185,020

NOTE: Poverty rates from the 2000 Census were applied to 2007 population estimates.

How is Oregon's Rural Transit Used?

Rural transit agencies in Oregon provided over 2.6 million rides to the general public in fiscal year 2007, including about 2.13 million rides on fixed route and intercity service and about 524,000 rides on demand response service open to the general public. Table 4.10 shows the number of trips made using fixed route services (local, regional connectors, and intercity) for which data were available. The number of annual fixed route trips per capita ranged from under 0.5 to nearly 40. The average was 8.5 rides per person per year and the median was 5.0. There were eight providers that averaged over 10 trips per person per year. Seven of those providers shared one thing in common – most of their routes operated six or more days per week. The eighth provider was the Confederated Tribes of Umatilla; one of their three routes included in this analysis provided weekend service. Three of those providers are also located just outside the Portland urban area (Canby Area Transit, Sandy Area Metro, and South Clackamas Transportation District).

Table 4.11 shows the data for general public demand response systems. The number of general public demand response trips per capita ranged from under 0.1 to over 11. The average was 2.0, and the median was 1.2.

Unfortunately, the rural NTD data do not include information on population size within each agency's service area. Therefore, comparable national numbers are not available. A now-dated review of high performance rural transit systems found a wide range of trips per capita per year, from 0.85 to 9 *(Burkhardt et al. 1995)*. A more recent study of six general public demand response systems in other states found that the number of annual rides per capita ranged from 0.5 to 7, although three of the systems ranged from 2.2 to 3.1 *(Spielberg and Pratt 2004)*.

Table 4.10: Fixed Route Transit Service Providers, Total Trips and Trips per Capita

Transit Service Provider	Service area (sq mi)[1]	Estimated 2007 pop.	2007 unlinked pass. trips	Trips per capita
ODOT Region 1				
Canby Area Transit	11.6	18,311	208,952	11.41
Columbia Area Transit (CAT, Hood River)	3.0	4,842	ridership data not available	
Columbia County Rider (CCC Rider)	4.4	6,969	20,233	2.90
Mountain Express (Welches)	2.6	1,786	11,387	6.38
Sandy Area Meto (SAM)	4.4	5,239	207,165	39.54
SMART Wilsonville (rural service)	1.9	3,119	ridership data not available	
South Clackamas Transportation District	3.7	2,252	82,119	36.47
TriMet (rural service)	22.9	10,023	ridership data not available	
ODOT Region 2				
Albany Transit System (ATS)	10.1	27,786	69,248	2.49
Salem Area Mass Transit (CARTS)	5.5	10,417	95,063	9.13
Lane Transit District (rural service)	25.7	16,512	ridership data not available	
Lincoln County Transportation	10.7	10,427	110,672	10.61
Linn-Benton Loop	4.6	12,004	77,060	6.42
Linn Shuttle	2.2	5,022	14,600	2.91
LTD Diamond & Rhody Express	6.2	6,579	32,753	4.98
Sunset Empire Transportation (Clatsop Co.)	15.9	12,583	342,633	27.23
Tillamook County Transportation District	6.8	4,947	65,317	13.20
Woodburn Transit	4.1	14,768	25,661	1.74
Yamhill County Transit Area	13.6	30,319	142,761	4.71
ODOT Region 3				
Coos County Area Transit	5.2	11,291	14,199	1.26
Curry Public Transit. Coastal Express	5.0	4,943	7,028	1.42
Josephine Community Transit	10.1	20,402	50,625	2.48
Utrans (formerly Umpqua Transit)	12.7	18,244	94,756	5.19
ODOT Region 4				
Basin Transit Service	16.5	30,194	358,805	11.88
Cascades East Transit	1.6	410	ridership data not available	
ODOT Region 5				
Milton-Freewater Public Transportation	12.1	11,573	2,454	0.21
Northeast Oregon Public Transportation	5.7	8,353	31,853	3.81
People Movers, Grant County	6.8	4,646	945	0.20
Snake River Transit	4.1	6,142	26,260	4.28
Confederated Tribes of Umatilla	3.0	2,944	29,711	10.09
Intercity Service				
Amtrak	2.9	7,084	ridership data not available	
Porter Stage Lines	5.8	4,849	ridership data not available	
Oregon Coachways	6.8	6,158	ridership data not available	
Central Oregon Breeze	6.0	5,537	ridership data not available	
Greyhound	50.8	70,774	ridership data not available	
Sage Stage	0.8	2,319	ridership data not available	
The Shuttle – Klamath	2.6	2,999	5,084	1.70
Valley Retriever	4.9	13,587	ridership data not available	
Total			2,127,344	

[1] Service areas were defined as ¼ mile around regular fixed route service and ½ mile around intercity stops.

Table 4.11: General Public Demand Response Service Providers, Total Trips and Trips per Capita

Transit Service Provider	Service area (sq. miles)	Estimated 2007 pop.	2007 unlinked pass. trips	Trips per capita
ODOT Region 1				
Columbia Area Transit (Hood River)	533.4	21,447	24,728	1.15
Columbia County Rider	688.6	46,750	18,800	0.40
Wash. Co. U-Ride, Ride Connection	288.6	27,027	11,797	0.44
ODOT Region 2				
Lebanon Dial-A-Bus	6.5	9,748	13,719	1.41
Lincoln County Transportation	15.7	12,177	138,042	11.34
Silverton Trolley	3.4	5,934	10,865	1.83
South Lane Wheels	204.3	24,160	24,077	1.00
Sweet Home Dial-A-Bus	61.5	11,289	2,487	0.22
Tillamook County Transportation	1124.5	25,955	17,726	0.68
Yamhill County Transit	707.2	60,878	95,174	1.56
ODOT Region 3				
Coos County Area Transit	1626.6	63,186	24,602	0.39
Curry Public Transit	9.8	7,407	15,160	2.05
ODOT Region 4				
Cascades East	732.8	67,815	3,915	0.06
Mid-Columbia Council of Governments	2395.1	23,720	21,494	0.91
Sherman County Community Transit			Ridership data not available	
ODOT Region 5				
Harney County Dial-A-Ride	412.1	5,272	36,348	6.89
City of Pendleton	10.1	10,923	34,670	3.17
Total			524,454	

The service characteristics of the rural transit systems vary significantly. Trip distances and lengths in rural areas are often longer than in urban areas. Unfortunately, the NTD does not collect information on passenger trip lengths. Instead, Table 4.12 shows the revenue miles per trip for the rural Oregon systems. However, this is not a very accurate assessment of individual passenger trip distances, because it is influenced by total ridership. Each mile that a bus travels in service (e.g., collecting fares) counts as one revenue mile. Consider a simple example of a five-mile bus route that picks up 10 passengers at the first stop and drops them all off at the last stop five miles later. There were five revenue miles and 10 passenger trips. Therefore, there are 0.5 revenue miles per passenger trip for that run (5 divided by 10), although each passenger went five miles. If only one person were on the bus, the revenue miles per trip would be five.

Table 4.12: Revenue Miles per Passenger Trip

Agency	Revenue miles per trip	
	Fixed route	Demand response
ODOT Region 1		
Canby Area Transit	1.3	
Columbia Area Transit (CAT, Hood River)		3.8
Columbia County Rider	12.5	6.7
Mountain Express (Welches)	5.2	
Sandy Area Metro (SAM)	1.2	
South Clackamas Transportation	2.7	
Wash. Co. U-Ride, Ride Connection		**7.4**
ODOT Region 2		
Albany Transit System	1.0	
CARTS (Salem Area Mass Transit District rural area service)	3.4	
Lebanon Dial-A-Bus		1.8
Lincoln County Transportation	2.1	0.8
Linn-Benton Loop	1.1	
Linn Shuttle	4.3	
LTD-Rhody and Diamond Express	5.6	
Silver Trolley (Silverton)		1.3
South Lane Wheels		7.0
Sunset Empire Transportation (Clatsop)	1.6	
Sweet Home Dial-A-Bus		1.1
Tillamook County Transportation	4.7	3.2
Woodburn Transit Bus	1.2	
Yamhill County Transit	4.1	3.0
ODOT Region 3		
Coos County Area Transit	2.5	5.1
Curry Public Transit (Coastal Express)	18.1	5.4
Josephine Community Transit	2.9	
Utrans (formerly Umpqua Transit)	2.6	
ODOT Region 4		
Basin Transit Service	0.8	
Cascades East		3.8
Mid-Columbia Council of Governments		4.0
ODOT Region 5		
Harney County Dial-A-Ride		4.7
Milton-Freewater Public Transportation	9.5	
Northeast Oregon Public Transportation	1.9	
City of Pendleton		1.7
People Movers, Grant County	37.5	1.7
Confederated Tribes of Umatilla	1.0	
Mean	5.4	3.7
Median	2.8	3.8

Note: Mileage data were not available for Snake River Transit or intercity service provider The Shuttle-Klamath, although ridership data appear in Table 4.10.

More common measures of transit performance are passenger trips per hour and per mile. These measures give a sense of how intensely the services are being used. These data are shown in Table 4.13 for Oregon's rural transit providers. For fixed route service, Oregon's rural providers average one-half of a passenger trip per revenue mile (median = 0.4). This is the same as the average for nearly 400 rural providers nationwide (based upon the NTD data analyzed). The median number of trips per revenue hour for Oregon is 6.8, which is higher than the national median of 5.1. This measure of productivity (trips per revenue hour, rather than trips per revenue mile) is used most often by transit planners, because labor, which is often paid on an hourly basis, makes up the majority of operating costs. These numbers (trips per revenue hour and mile) are well below the standards for many urban systems *(Center for Urban Transportation Research 2009)*.

For demand response systems, the median number of trips per revenue hour was 4.0, and the median number of trips per revenue mile was 0.3. Because the NTD does not indicate whether the demand response service is for the general public or limited to older adults and people with disabilities, the national averages are not provided for comparison. A new report from the Transit Cooperative Research Program (TCRP) published in late 2009 collected detailed data from 24 rural demand response systems (Ellis, 2009). Of those, five are definitely limited to older adults and/or people with disabilities, but it is not clear how many of the other services are not open to the general public. Passenger trips per vehicle hour for all 24 providers ranged from 1.6 to 7.1, with only six systems above 4.0 trips per vehicle hour (the median for the Oregon systems analyzed). The report provided an average for all providers reporting to the NTD of 2.9 for service in a single city, 3.1 for service in a single county, and 2.9 for service to multiple counties. The difference between the number for Oregon's providers and these two national samples (the 24 and the full NTD sample reported in Ellis, 2009), could be due to the inclusion of systems limited to older adults and people with disabilities in the national samples. For example, the report noted that the municipal system with the lowest productivity was an ADA paratransit service (Ellis 2009). People with disabilities may need more time to board and alight the vehicle, thus reducing the number of trips that can be provided per hour.

Table 4.14 provides similar data for fixed route service at a state level for states with data in the rural NTD system. There is a wide range of performance, from under two trips per hour to over 20. In this table, all of the services (including complementary paratransit) in each state are added together before calculating the performance measures. Therefore, the statewide numbers for Oregon are slightly different from those in Table 4.13.

Note that comparisons with the national NTD data *at the provider level* should be made with some caution, for several reasons. First, this is the first year data from rural

providers have been collected by FTA and made available. There may be more errors with the rural data than with the urban data because of a lack of experience with the system. In addition, it is not clear how much data cleaning and checking have been performed on the data. Second, in some cases, a single agency can affect the numbers. For example, Eagle County Regional Transit in Colorado had about 600 trips per hour. This agency provides service in the Vail ski resort area. According to its website, the agency provides service 23.5 hours per day, seven days per week (http://www.eaglecounty.us/eco_transit/). There also are several other cases of high ridership in resort-type communities. In a few cases, urban providers reported total rural ridership data that seemed excessively high compared to other rural service providers. Thus, we suspect that urban service was included in the rural report.

Table 4.13: Trips per Revenue Mile and Revenue Hour, Oregon Rural Transit Providers

	Fixed Route		General Public Demand Response	
	Trips per revenue hour	Trips per revenue mile	Trips per revenue hour	Trips per revenue mile
ODOT Region 1				
Canby Area Transit	13.2	0.8		
Hood River County Transportation			3.9	0.3
Columbia County Rider	0.7	0.1	3.0	0.1
OHAS – Welches	6.7	0.2		
Sandy Transit	20.5	0.8		
South Clackamas Transportation	7.6	0.4		
Wash. Co. U-Ride, Ride Connection			3.5	0.1
ODOT Region 2				
Albany Transit	15.0	1.0		
OHAS (Rural 102-21, CARTS from SAMTD)	5.5	0.3		
Lebanon Dial-A-Bus			5.2	0.6
Lincoln County Transportation	9.2	0.5	12.7	1.2
Linn-Benton Loop	22.8	0.9		
Linn County Linn Shuttle	0.9	0.2		
Lane Transit Rural	3.1	0.2		
Silverton Trolley			6.6	0.8
South Lane Wheels			2.0	0.1
Sunset Empire Transportation	17.0	0.6		
Sweet Home Dial-A-Bus			0.4	0.9
Tillamook County Transportation	4.8	0.2	5.3	0.3
City of Woodburn	12.6	0.9		
Yamhill County Transit	4.0	0.2	4.0	0.3
ODOT Region 3				
Coos County Area Transit	3.4	0.4	2.6	0.2
Curry Public Transit	1.9	0.1	2.7	0.2
Josephine County Transit	6.8	0.3		
Douglas County/Umpqua Transit	5.0	0.4		
ODOT Region 4				
Basin Transit Service	18.6	1.3		
COIC				0.3
Mid-Columbia Council of Governments			5.1	0.3
ODOT Region 5				
Harney County Dial-A-Ride			21.0	0.2
City of Milton-Freewater	1.6	0.1		
Community Connection of NE Oregon	7.8	0.5		
City of Pendleton			4.3	0.6
Grant County Transportation	0.6	0.03	3.5	0.6
Confederated Tribes of Umatilla	15.0	1.0		
Mean (unweighted)	**8.5**	**0.5**	**5.4**	**0.4**
Median	**6.8**	**0.4**	**4.0**	**0.3**
National mean (n=397)	**9.6**	**0.5**	See note[1]	
National median	**5.1**	**0.3**		

[1] National data for demand response include many systems that are not open to the general public and, therefore, are not comparable. The rural NTD data do not distinguish between type of demand response transit. Therefore, the national data are not included here.

Table 4.14: State-level Rural Transit Performance Measures, Fixed/Deviated Route Bus Service

State	Bus Trips per Revenue Hour	Bus Trips per Revenue Mile
Illinois Department of Transportation	32.17	2.13
Alaska Department of Transportation	26.67	1.49
Hawaii Department of Transportation	25.57	0.71
Colorado Department of Transportation	22.06	1.24
Maryland Department of Transportation	20.86	1.41
Washington State Department of Transportation	19.17	0.94
Montana Department of Transportation	18.10	0.44
Arkansas State Highway & Transportation Department	17.86	1.19
Utah Department of Transportation	16.99	0.95
South Carolina Department of Transportation	13.25	0.74
New Hampshire Department of Transportation	12.80	1.10
Wisconsin Department of Transportation	12.51	0.27
Florida Department of Transportation	12.26	0.66
Oklahoma Department of Transportation	10.65	0.91
Pennsylvania Department of Transportation	10.23	0.67
Indiana Department of Transportation	9.75	0.52
Vermont Agency of Transportation	9.58	0.55
California Department of Transportation	9.10	0.43
National Total	*9.06*	*0.53*
Idaho Transportation Department	9.03	0.49
Iowa Department of Transportation	8.95	0.91
Oregon Department of Transportation	***7.87***	***0.47***
Ohio Department of Transportation	7.86	0.43
Minnesota Department of Transportation	7.67	0.43
Mississippi Department of Transportation	7.47	0.27
Michigan Department of Transportation	6.34	0.47
New York Department of Transportation	5.57	0.28
Texas Department of Transportation	5.43	0.31
Arizona Department of Transportation	5.32	0.28
Connecticut Department of Transportation	5.24	0.37
Virginia Department of Rail and Public Transportation	4.92	0.25
NJ Transit	4.77	0.38
Kentucky Transportation Cabinet	4.05	0.34
West Virginia Department of Transportation	3.96	0.22
Missouri Department of Transportation	3.27	0.24
Kansas Department of Transportation	2.51	0.17
New Mexico Department of Transportation	2.50	0.22
North Carolina Department of Transportation	2.36	0.19
Alabama Department of Transportation	1.62	0.11
Maine Department of Transportation	1.37	0.36
North Dakota Department of Transportation		0.75

Relationships between Ridership and Service

It is generally assumed, and often observed, that higher levels of service will lead to higher ridership. We explored these relationships using the national NTD data at the state level and the local data from the Oregon rural providers. Table 4.15 shows the rural transit trips per capita (estimated rural population) at a state level, along with the revenue miles and hours of service per capita. These data include all types of service, including demand response service limited to older adults and/or people with disabilities. This is because the NTD data do not distinguish between demand response transit for the general public and service limited to older adults and/or people with disabilities. Oregon ranks 9th of the 47 states with data in terms of rural transit trips per capita, 17th in terms of revenue miles provided per capita, and 38th in revenue hours of service. The same data are shown in Figure 4.5 and Figure 4.6, where the positive relationship between trips per capita and revenue miles per capita is more clear. The positive relationship with revenue hours of service is not as strong.

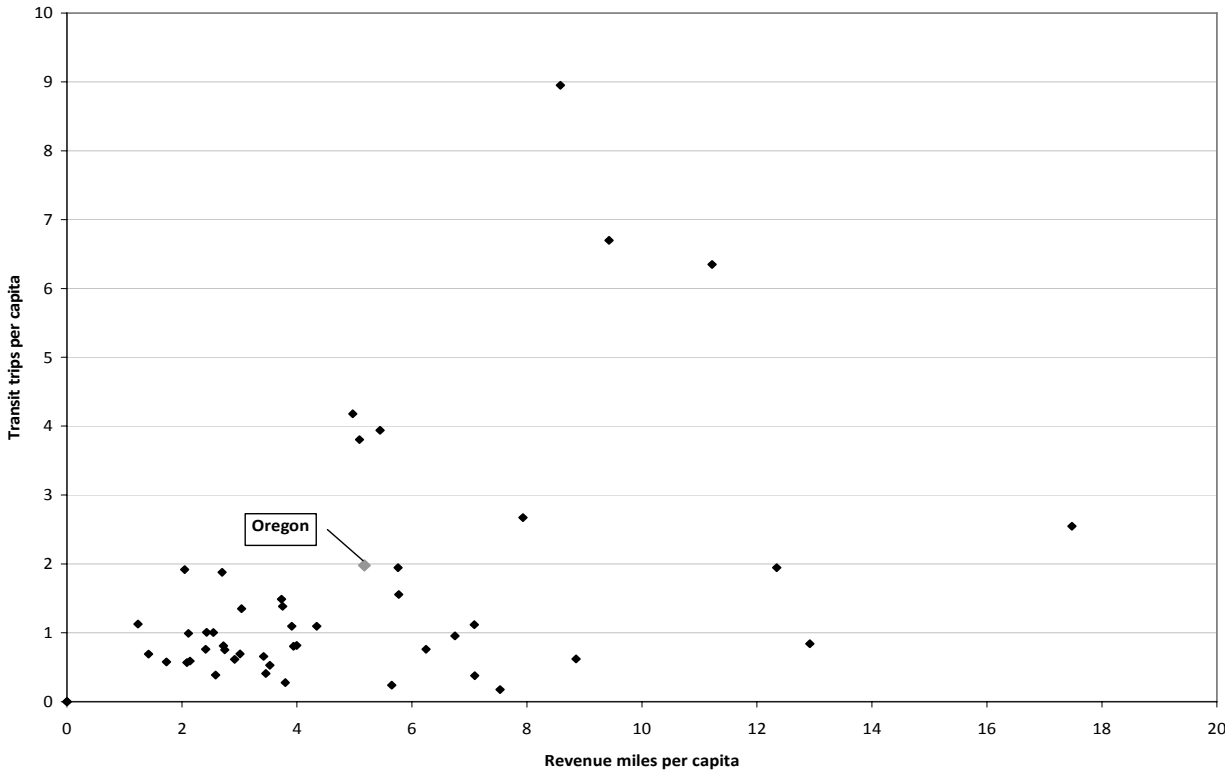


Figure 4.5: Rural Transit Trips per Capita and Miles of Service per Capita, by State

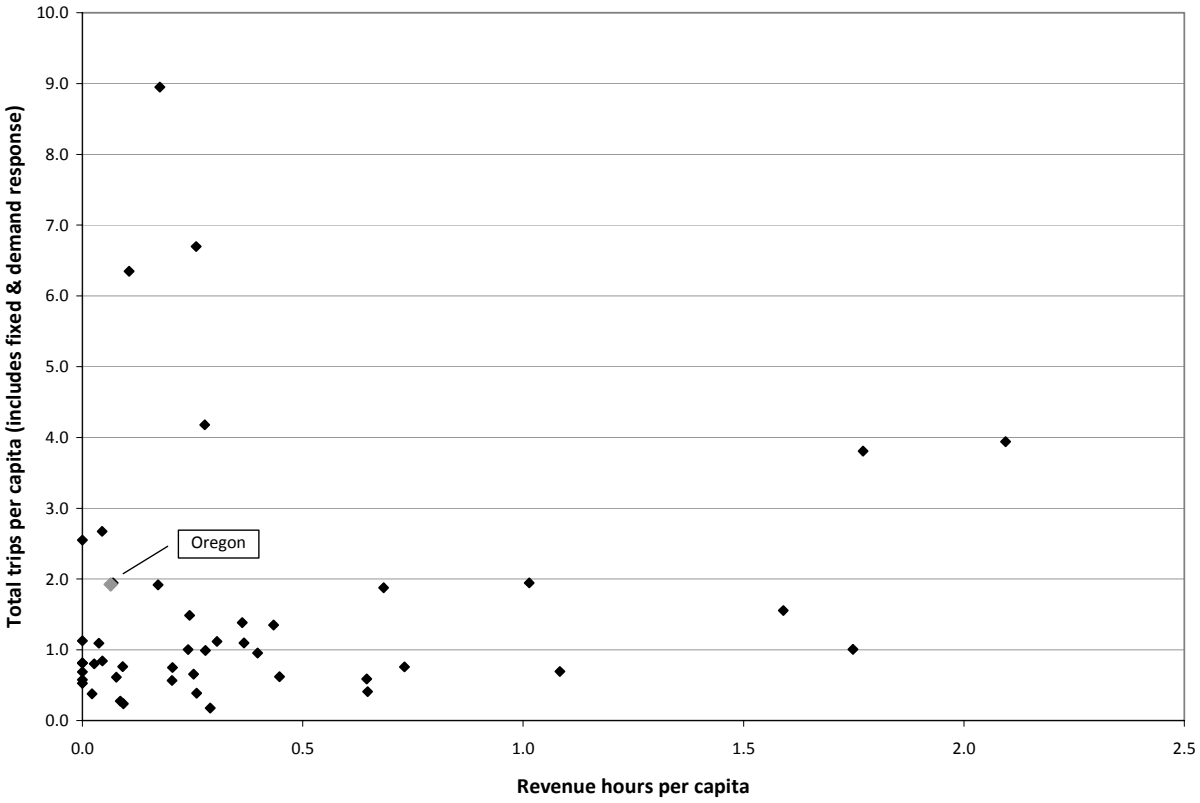


Figure 4.6: Rural Transit Trips per Capita and Hours of Service per Capita, by State

Table 4.15: Rural Transit Trips, Revenue Miles, and Revenue Hours per Capita, by State, Ordered by Number of Trips per Capita

State	Proportion of Population outside urbanized areas (2000)	2007 Estimated # Unlinked Transit Trips per Capita (rural)	2007 Estimated Revenue Miles per Capita (rural)	2007 Estimated Revenue Hours per Capita (rural)
Colorado	25%	8.95	8.58	0.18
Hawaii	31%	6.70	9.43	0.26
Washington	27%	6.35	11.22	0.11
Maryland	20%	4.18	4.97	0.28
Alaska	56%	3.94	5.45	2.09
Wyoming	74%	3.81	5.09	1.77
Iowa	62%	2.67	7.93	0.04
Vermont	83%	2.55	17.48	0.00
Oregon	**43%**	**2.11**	**5.52**	**0.03**
South Dakota	74%	1.95	5.76	0.07
New Jersey	8%	1.94	12.34	1.01
Utah	22%	1.92	2.05	0.17
Massachusetts	11%	1.88	2.70	0.68
North Dakota	64%	1.56	5.77	1.59
California	12%	1.49	3.73	0.24
Minnesota	45%	1.39	3.75	0.36
Illinois	22%	1.35	3.04	0.43
New Hampshire	55%	1.13	1.24	0.00
Oklahoma	57%	1.12	7.08	0.31
New Mexico	53%	1.10	4.34	0.37
New York	18%	1.09	3.91	0.04
Montana	74%	1.01	2.43	1.75
South Carolina	53%	1.00	2.55	0.24
Idaho	53%	0.99	2.11	0.28
Missouri	45%	0.96	6.75	0.40
Maine	75%	0.84	12.92	0.05
Kansas	55%	0.82	4.00	0.00
Wisconsin	47%	0.81	2.72	0.00
Indiana	44%	0.80	3.94	0.03
Michigan	34%	0.76	6.25	0.09
Nebraska	53%	0.76	2.41	0.73
Mississippi	76%	0.75	2.74	0.20
West Virginia	72%	0.69	3.01	1.08
Pennsylvania	33%	0.69	1.42	0.00
Virginia	33%	0.66	3.42	0.25
Kentucky	61%	0.62	8.86	0.45
Texas	29%	0.61	2.92	0.08
Connecticut	16%	0.59	2.14	0.64
Alabama	56%	0.58	1.73	0.00
Arizona	24%	0.57	2.08	0.20
Arkansas	68%	0.53	3.53	0.00
Louisiana	43%	0.41	3.46	0.65
Ohio	36%	0.39	2.58	0.26
Tennessee	48%	0.38	7.09	0.02
Georgia	39%	0.28	3.80	0.09
North Carolina	53%	0.24	5.65	0.09
Florida	16%	0.18	7.53	0.29
Delaware	32%			
Nevada	16%			

Sources for calculations: Rural NTD data, U.S. Census.

Notes: Includes general public, complementary paratransit, and other services limited to older adults and/or people with disabilities. Only includes ridership on services reporting to the FTA NTD program. No rural service was reported for Delaware, Nevada, and Rhode Island.

There is a similar positive relationship between transit ridership per capita and service per capita for Oregon's rural transit providers (Figure 4.7). A linear regression analysis of the data results in the following equation:

$$\text{\# Rural Transit Trips per Capita} = 0.37 \times \text{\# Revenue Miles per capita}$$

This equation explains nearly three-quarters of the variation in the data (adjusted $R^2 = 0.73$ no intercept-model). The model would predict, for example, that every mile of service provided per person would generate 0.37 annual transit trips per person.

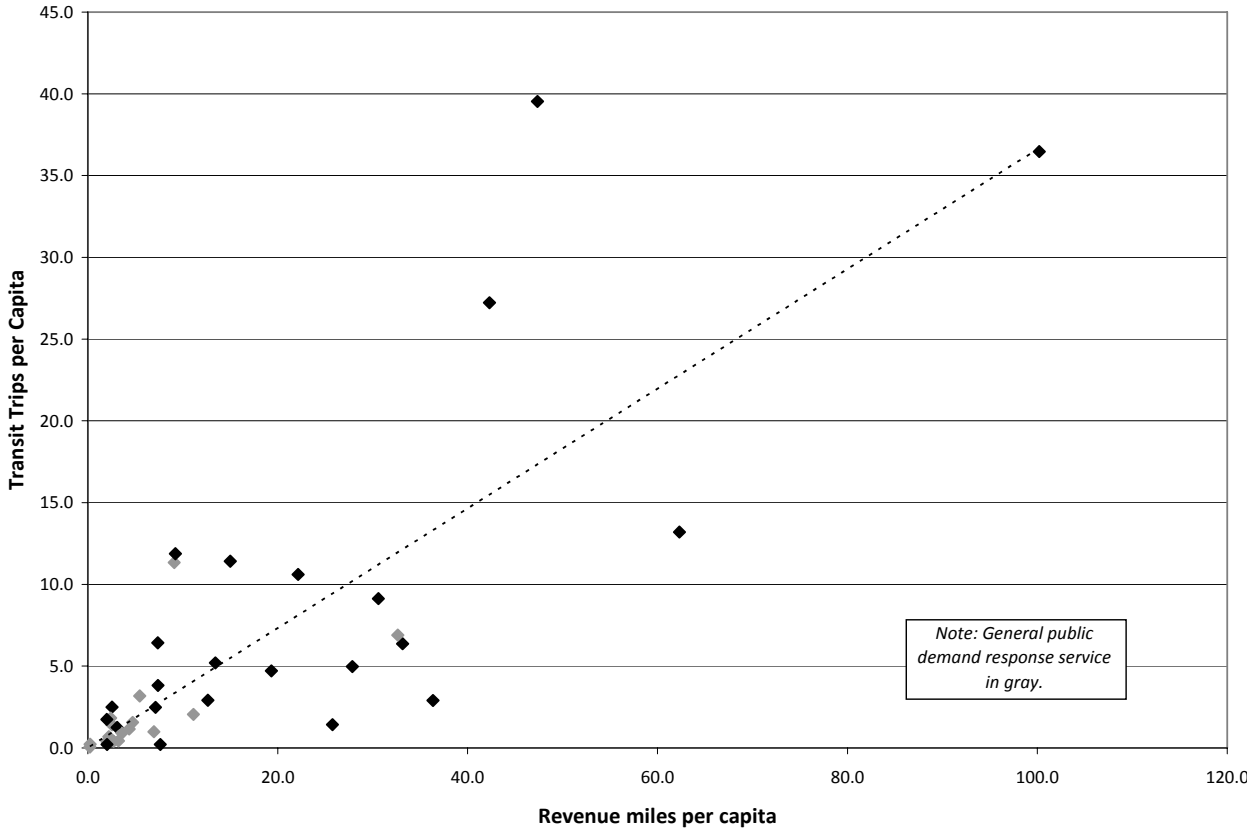


Figure 4.7: Transit Trips per Capita and Service per Capita, Oregon Rural Providers

Ridership per capita appears to increase significantly when providers include at least one day of weekend service, along with service Monday through Friday (Figure 4.8). The higher ridership is probably not due entirely to the additional weekend service, however. Rather,

providers that have weekend service are also more likely to have higher frequency service during weekdays, which will increase ridership.

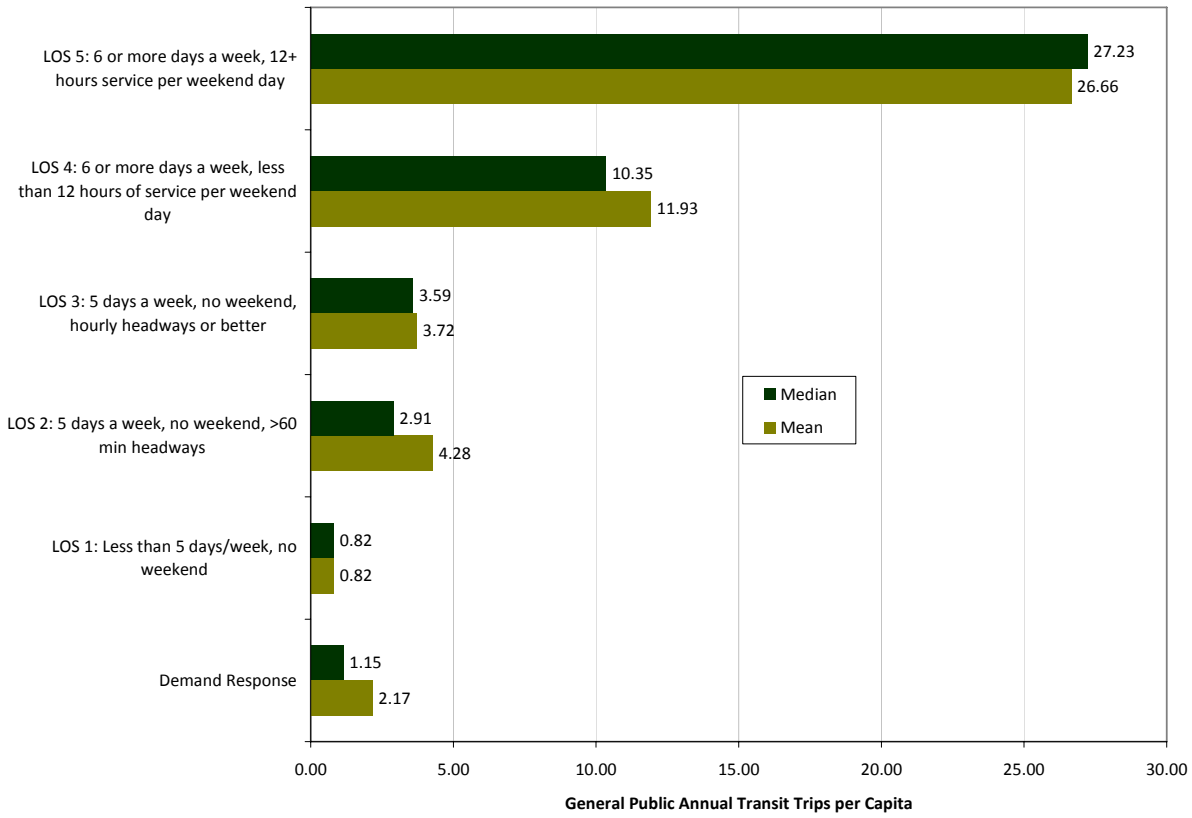


Figure 4.8: Trips per Capita by Level of Service, Oregon Rural Providers

What is the Cost of Rural Transit in Oregon?

Transit providers report operating and capital costs as part of the NTD system and to ODOT. However, costs are not separated out between fixed route and demand response service. Therefore, it is difficult to accurately assess service costs by type of service. For example, systems providing fixed route service usually also provide complementary paratransit service for eligible riders. These costs typically are much higher than fixed route costs. Table 4.16 shows the operating costs per passenger trip, per revenue mile, and per revenue hour for Oregon's rural providers and nationally. For Oregon's providers, figures are shown for agencies that provide only fixed (or deviated) route service to the general public, agencies that provide only demand response service to the general public, and those that provide both types of service to the general public. For providers of fixed

route service, complementary paratransit service, if provided, is included in the operating data (e.g., the number of trips or revenue miles), since costs are reported for all services combined. The table shows the mean, median, and range of costs. Because of some outliers, the median cost figures may be a more accurate representation of typical costs.

Costs are generally higher for agencies that provide only demand response service. For example, the median operating cost per trip for demand response only providers is $13.13, compared to $7.79 for fixed route providers (including complementary paratransit). The median cost per revenue hour of service is $55.76 for demand response service, compared to $46.54 for fixed route.

In general, the Oregon agency performance data are comparable to the national data from the rural NTD. However, because the NTD data provide costs for all services provided by an operator combined and do not distinguish between demand response service for the general public versus service limited to older adults and people with disabilities, the data are slightly different than the Oregon data. Thus, the data for fixed route only service (see the first row) do not include any provider that also provided demand response service, because we could not distinguish between complementary paratransit and general public demand response service. Providers with both fixed route and any type of demand response service are included in the third row. The data for cost per trip and cost per revenue hour are also displayed in Figure 4.9 and Figure 4.10, where the comparisons between Oregon and the national data are more clear. One notable difference is that the median cost per revenue hour of service among the eight demand response providers in Oregon was $55.76, compared to a national median of $30.69.

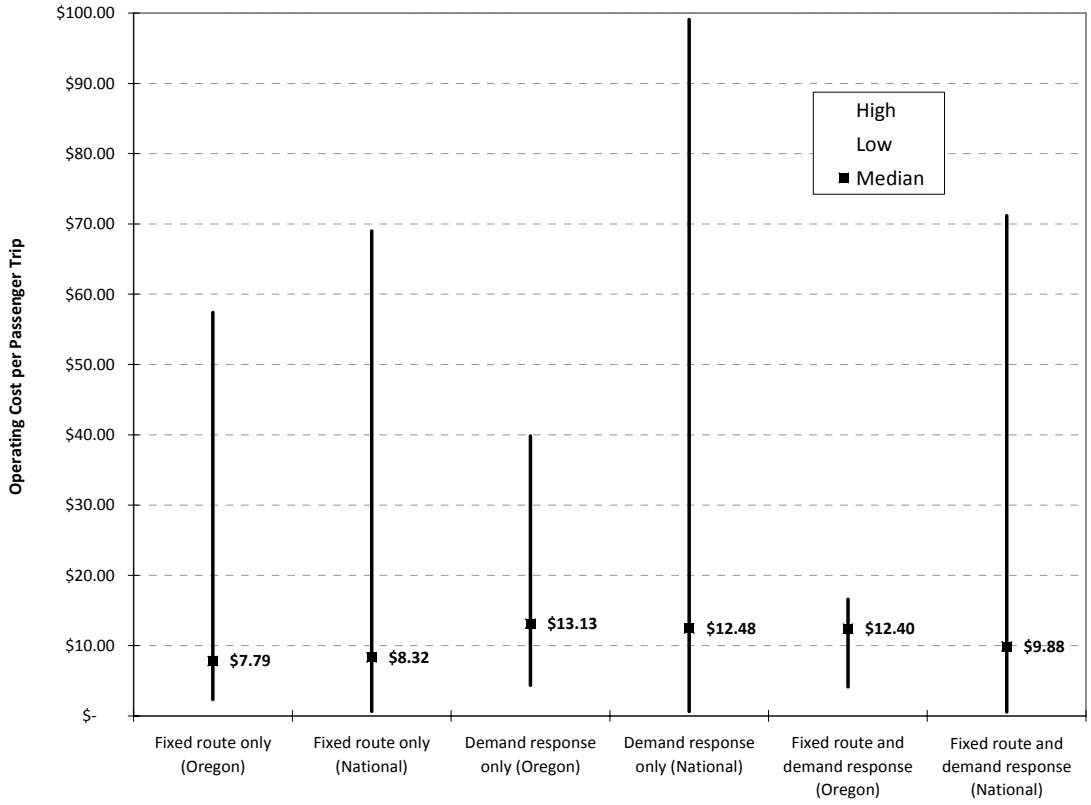
Table 4.16: Operating Cost Performance Measures, Oregon and National Providers

	Oregon			National		
	Mean	Median	Range	Mean	Median	Range[1]
Operating Cost per unlinked passenger trip						
Fixed route only (includes complementary paratransit, if provided) [2]	$12.80	$7.79	$2.34-$57.39 (n=17)	$12.45	$8.32	$0.64-$68.99 (n=210)
General public demand response only[3]	$15.41	$13.13	$4.34-$39.84 (n=8)	$19.26	$12.48	$0.63-99.10 (n=630)
Fixed route and general public demand response[2]	$11.38	$12.40	$4.15-$16.62 (n=7)	$13.47	$9.88	$0.55-$71.18 (n=182)
All services	$13.14	$8.20	$2.34-$57.39 (n=32)	$16.83	$10.85	$0.55-$99.10 (n=1022)
Operating Cost per revenue mile						
Fixed route only (includes complementary paratransit, if provided)	$3.42	$2.91	$1.41-$11.80 (n=17)	$3.24	$2.63	$0.02-$25.34 (n=210)
General public demand response only	$7.63	$2.98	$0.92-$35.05 (n=8)	$2.79	$2.07	$0.16-$181.62 (n=630)
Fixed route and general public demand response	$2.62	$2.79	$1.27-$4.34 (n=9)	$3.04	$2.78	$0.28-$12.36 (n-182)
All services	$4.20	$2.92	$0.92-$35.05 (n=34)	$2.93	$2.28	$0.02-$181.62 (n=1,022)
Operating Cost per revenue hour						
General public fixed route only (includes complementary paratransit, if provided)	$58.22	$46.54	$6.21-$217.79 (n=17)	$55.33	$46.39	$1.86-$427.51 (n=210)
General public demand response only	$53.41	$55.76	$17.03-$90.97 (n=8)	$37.80	$30.69	$0.44-$726.58 (n=630)
Fixed route and general public demand response	$38.06	$34.56	$18.42-$64.54 (n=8)	$47.21	$44.15	$5.87-$125.80 (n=182)
All services	$52.17	$44.97	$6.21-$217.79 (n=33)	$43.08	$36.22	$0.44-$726.58 (n=1022)

[1] The national NTD data included agencies with cost data over $100 per trip. These data are suspect, and these agencies were removed from the analysis, as were agencies with zero costs per mile or hour.

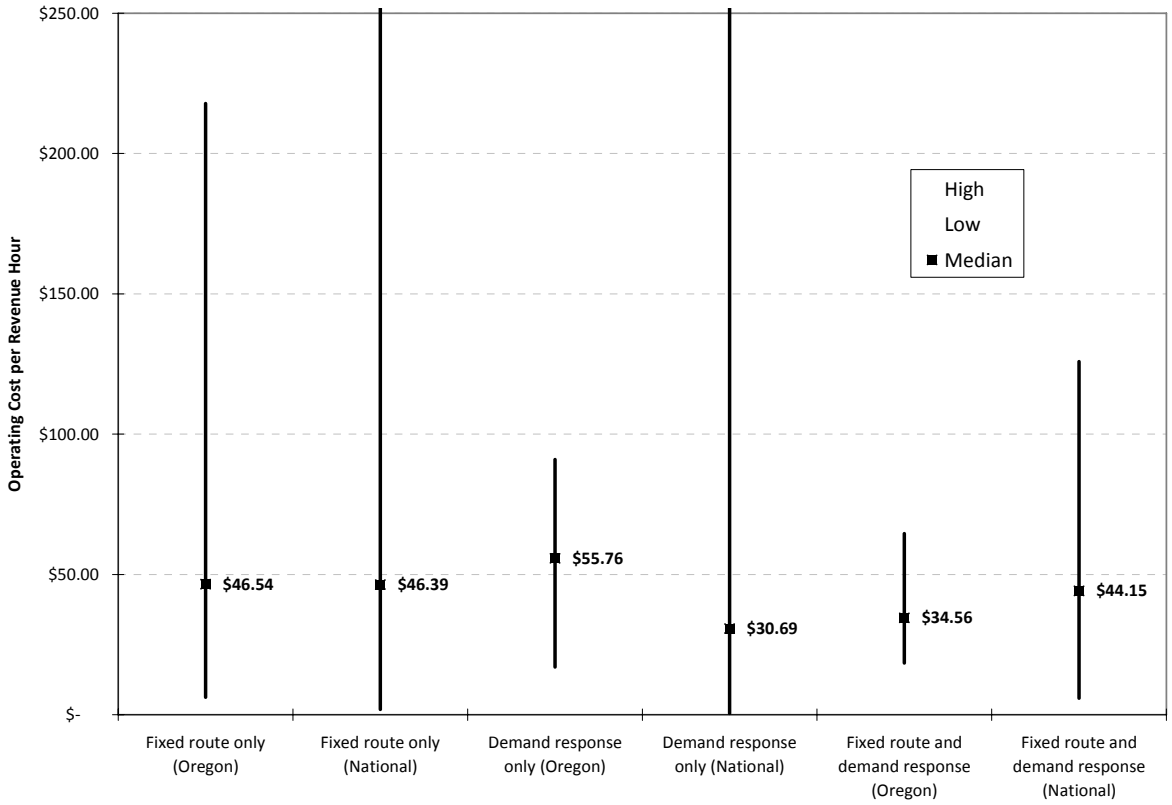
[2] The national NTD data do not distinguish between demand response service for the general public and service limited to older adults and people with disabilities. Therefore, for the national data, the "General public fixed route only" row includes providers that did not include *any* demand response service, and the "Fixed route and general public demand response" row includes providers that provided both fixed route and any kind of demand response service.

[3] The national NTD data include all types of demand response service (including ADA-only service).



See notes in Table 4.16 for explanation of what types of services are included in the data.

Figure 4.9: Operating Cost per Unlinked Passenger Trip, Oregon vs. National Rural Transit Providers



See notes in Table 4.16 for explanation of what types of services are included in the data.

Figure 4.10: Operating Cost per Revenue Hour, Oregon vs. National Rural Transit Providers

5. Findings: Funding and Governance of Rural Transit in Oregon

Overview

In this chapter, more detailed data are presented concerning how rural transit in Oregon is funded and governed. The data are derived from several sources:

- The National Transit Database (NTD) provided data on transit ridership, service provision, costs, and funding sources for fiscal year 2007 for many of the Oregon providers, as well as over 1,200 agencies nationally. This is the first year rural transit providers were included in the NTD. The national dataset was obtained directly from the Federal Transit Administration.
- Detailed data on funding sources were provided to ODOT Public Transit Division personnel by rural transit providers via a spreadsheet designed by project staff, in collaboration with ODOT Public Transit Division staff, and sent to rural transit providers by ODOT staff.
- Information on governance was provided to the project team by ODOT Public Transit Division personnel based on their knowledge of rural transit in Oregon.

Specific Funding Sources for Rural Transit in Oregon

Because the NTD data with respect to funding sources are limited, a separate data gathering effort was mounted to learn more specifically about the various sources through which Oregon's rural transit providers are obtaining funding. Public Transit division staff (Jean Palmateer) identified the agencies to include in the survey and the individual to contact. The providers asked to respond to the questions regarding rural general public service were those who are: (a) current 5311 recipients, and (b) known to be offering general public services in their area, even in the absence of funding for general public services.

Providers who are known to limit the scope of their services to clients, or to populations of older adults and/or people with disabilities, were not contacted. In addition, urban providers were not contacted about their service that extended into rural areas from the urban area, since the funding sources for the rural service can not be separated easily from those for the urban service.

Thirty-eight providers were contacted. The agencies and individuals contacted are listed in Table 5.1.

Table 5.1: Agencies Contacted for Supplemental Information about Funding Sources

Provider	Contacted for Supplemental Finance Information	Supplemental Information Provided
ODOT Region 1		
Canby Area Transit	X	
Columbia Area Transit (Hood River)	X	
Columbia County Rider	X	X
Mountain Express - Welches	X	
Sandy Area Metro	X	X
SMART, Wilsonville (service in rural areas)		
South Clackamas Transportation	X	
TriMet (service in rural areas)		
Washington County U-Ride, Ride Connection	X	X
ODOT Region 2		
Albany Transit System	X	X
CARTS (Salem Area Mass Transit rural area service)	X	X
Lane Transit (service in rural areas)		
Lebanon Dial-A-Ride	X	
Lincoln County Transportation	X	
Linn-Benton Loop	X	X
Linn Shuttle	X	
LTD-Rhody and Diamond Express	X	X
Silver Trolley (Silverton)	X	X
South Lane Wheels	X	X
Sunset Empire Transportation	X	
Sweet Home Dial-A-Bus	X	
Tillamook County Transportation	X	
Woodburn Transit Bus	X	
Yamhill County Transit	X	X
ODOT Region 3		
Coos County Area Transit	X	X
Curry Public Transit (Coastal Express)	X	
Josephine County Transit	X	
Rogue Valley Transit (service in rural areas)		
Utrans (formerly Umpqua Transit)	X	X
ODOT Region 4		
Basin Transit Service	X	X
Cascades East Transit	X	X
Mid-Columbia Council of Governments	X	X
Sherman County Community Transit	X	
ODOT Region 5		
Confederated Tribes of Umatilla	X	X
Harney County Dial-A-Ride	X	X
Milton-Freewater Public Transportation	X	X
Northeast Oregon Public Transportation	X	
Pendleton Bus	X	
PeopleMover (Grant County)	X	X
Snake River Transit (Malheur)	X	X

Of the 38 providers, responses were received from 20. Table 5.2 summarizes the data with respect to detailed local, state, and federal funding sources of 19 of those 20 providers aggregated. Data are reported for both FY 2006-07 and FY 2007-08. The amount and

percentage of funding represented by each source listed is listed for each of the fiscal years. In addition, the total amount and percentage of local, state, and federal operating assistance is provided. One provider was excluded because the data appeared to include urban service as well as rural service.

Table 5.2: Sources of Operating Revenues, Oregon Rural Transit Providers

Operating Revenues	FY 2006-07 (n=19) Totals	% of Total	FY 2007-08 (n=19) Totals	% of Total
Local Operating Assistance (Revenue Sources)				
Human service agencies (e.g., Community service block grants, Medicaid, DHS, IIIB Older Americans Act, local agency service, misc. service contracts, Housing Authority of Yamhill County, Willamette Valley MC, TANF, medical transportation)	$1,392,425	11.0%	$1,595,815	11.1%
Business Energy Tax Credit (BETC) pass-through payment	$480,875	3.8%	$547,075	3.8%
Fare box revenues (including charges for service)	$1,103,063	8.7%	$1,398,168	9.7%
Property taxes imposed by transit district	$948,806	7.5%	$964,678	6.7%
Other dedicated local tax (e.g., levies) for transit	$536,826	4.2%	$554,550	3.8%
General fund contributions (e.g., hotel, restaurant sales, other taxes)	$502,644	4.0%	$516,377	3.6%
Program revenue (e.g. advertising, interest earnings, other program income, refunds, rebates and reimbursements, rental income/vehicle rental, special events, federal fuel tax refund)	$338,878	2.7%	$420,081	2.9%
Donations, including cash and in-kind contributions	$225,795	1.8%	$406,573	2.8%
Payroll taxes imposed by transit district	$259,456	2.0%	$266,604	1.8%
College pass programs	$175,051	1.4%	$209,752	1.5%
Local government (city government, Confederated Tribes of Grand Ronde, county Government, local match, other jurisdictions)	$124,707	1.0%	$257,351	1.8%
Foundation grants and awards (e.g., United Way, Cow Creek Foundation)	$90,002	0.7%	$171,909	1.2%
Other miscellaneous (Greyhound, Safety grant, Unspecified/Misc)	$37,674	0.3%	$52,996	0.4%
Timber revenues (e.g., pass-through from federal to county)	$0	0.0%	$0	0.0%
TOTAL Local Operating Revenues	**$6,216,202**	**49.0%**	**$7,361,929**	**51.1%**
State Operating Assistance (Revenue Sources)				
Special Transportation Funds from the formula program	$1,566,623	12.4%	$1,404,129	9.7%
State-funded discretionary grants, including Special Transportation Discretionary grants	$318,299	2.5%	$379,468	2.6%
Mass transit payments (i.e., "in lieu funds") made by the State to transit districts that levy their own taxes	$216,322	1.7%	$220,834	1.5%
Other state sources (e.g., Medicaid Match STG Grant)	$0	0.0%	$28,262	0.2%
Payments by a state agency to a transit agency for something other than a contracted transit service	$0	0.0%	$0	0.0%
TOTAL State Operating Revenues	**$2,101,244**	**16.6%**	**$2,032,693**	**14.1%**
Federal Operating Assistance (Revenue Sources)				
5311 operating funds (Rural General Public, 5311 preventive maintenance, shelter maintenance)	**$3,734,301**	29.5%	**$4,111,405**	28.5%
5310 funds (Older Adults and People with Disabilities, maintenance, purchased service & preventive maintenance)	**$1,366,761**	10.8%	**$1,659,136**	11.5%
5316 operating funds (Job Access and Reverse Commute)	$125,543	1.0%	$182,166	1.3%
5317 operating funds (New Freedom)	$3,750	0.0%	$3,750	0.0%
5320 operating funds (Transit in the Parks)	$0	0.0%	$0	0.0%
TOTAL Federal Operating Revenues	**$4,356,317**	**34.4%**	**$5,022,501**	**34.8%**

Note: Data from one source, Ride Connection Washington County U-Ride, were excluded as they appeared to include funding for complementary paratransit within the entire TriMet area, not just the rural Washington County area.

As noted by Cherrington (2008), transit providers typically rely on one of three general sources of local funding: (a) the local government's general fund or other local revenue source, (b) fares and fare-related income, and/or (c) other directly generated revenue, such as that obtained through a local or regional tax or fees dedicated to transit, income from advertising, income from concessions or rental fees, or interest income. In Oregon, as can be seen on Table 5.2, the array of local revenue sources is extensive.

Table 5.2 reveals that local sources provide the largest source of operating revenues across the 20 providers (49% in FY 2006-07 and just over 51% in FY 2007-08), followed by federal sources (about 34% in FY 2006-07 and 35% in FY 2007-08), then state sources (17% in FY 2006-07 and 14% in FY 2007-08).

Among the 20 transit providers who responded, the largest of the local sources of operating revenues were human service agencies (including community service block grants, Medicaid, DHS, and Title IIIB of the Older Americans Act, local agency service and miscellaneous service contracts, Housing Authority of Yamhill County, Willamette Valley Medical Center, Temporary Assistance to Needy Families (TANF), medical transportation, and other unspecified) (11% of total funding in both fiscal years 2006-07 and 2007-08). The next largest sources of local funding were farebox revenues (about 9% in FY 2006-07 and 10% in FY 2007-08), followed by property taxes imposed by the transit district (about 7% in both fiscal years). The remaining local sources of operating assistance were other dedicated local taxes (such as levies) for transit, the Business Energy Tax Credit, general fund contributions, program revenue (e.g., advertising, interest earnings, rebates (insurance), refunds and reimbursements, rental income/vehicle rental, special events, trolley rental fees, federal fuel tax refund, and miscellaneous refunds), payroll taxes imposed by the transit district, donations, college pass programs, local government (including City government, the Confederated Tribes of Grand Ronde, County government, local match, other jurisdictions), foundation grants and awards (e.g., United Way, Cow Creek Foundation), and other miscellaneous sources. None of the 20 reporting providers received any operating revenues from timber revenues.

Federal sources of operating revenues were led in both years by 5311 operating funds (about 30% of total funding in FY 2006-07 and 29% in FY 2007-08), then 5310 funds, 5316 funds (about 11% of total funding in both fiscal years), 5316 funds (about 1% in each fiscal year), and 5317 funds (less than 1% in FY 2007-08 and 0% in FY 2006-07). None of the 20 providers reported receiving any 5320 (Transit in the Parks) operating funds. It is important to note that although several agencies get 5310 funds, the majority of these funds are to be used for procuring capital items.

The largest among the state sources of operating revenues were Special Transportation Funds from the formula program (23% of all operating revenues in FY 2006-07 and almost 15% in FY 2007-08). A distant second source of state operating assistance were the state-funded discretionary grants, including Special Transportation Discretionary grants (2% of total operating revenue in FY 2006-07, and 3% in FY 2007-08). Mass transit payments made to transit districts that levy their own taxes ("in lieu funds") were the next largest source of state funds, followed by other state funds – Washington State Department of Transportation in this case, at least in FY 2006-07.

Governance and Taxation for Rural Transit in Oregon

With respect to governance, there are seven primary political jurisdictions or governance types: city (10 providers), county (7 providers), a transit district formed under ORS 267 (8 providers), a non-profit organization (4 providers), a county service district formed under ORS 451 (4 providers), a government formed under ORS 190 (2 providers), and a tribe.

As shown in Table 5.3, only a few rural providers are located within local taxing jurisdictions that impose transit-specific taxes or fees. Specifically, these include an ad valorum tax (Basin Transit Service, Sunset Empire Transportation District and Tillamook County Transportation District), an employer payroll tax (Canby Area Transit-CAT, South Clackamas Transportation District, City of Sandy-SAM Trans), a three-year revolving levy (City of Milton-Freewater), and local property tax (Hood River County Transportation District/Columbia Area Transit). Lincoln County Transportation Service District also collects a dedicated transit tax. Salem Area Mass Transit District, Lane Transit District, and Rogue Valley Transit District each collect an ad valorum tax, but it is not used to fund rural transit. It should be noted as well that, as depicted in Table 5.2, some providers receive mass transit payments ("in lieu funds") made to transit districts that levy their own taxes.

With respect to other local government contributions, 11 of rural transit providers receive funding from their local government's general fund. These include the Albany Transit System (ATS) (City of Albany), NET (City of Pendleton), Woodburn Bus Service (City of Woodburn), Columbia County Rider (CC Rider), Utrans (Douglas County), Harney Public Transit (Harney County), Josephine Community Transit (Josephine County), Lebanon Dial a Ride (City of Lebanon), Mountain Express (Clackamas County), Silver Trolley (City of Silverton), and the various providers within the Yamhill County Transit Area.

Table 5.3: Oregon Rural Transit Service Providers, Governance Type

Transit Service	Grantee	Name of Contractor (if applicable)	Mobility Purpose	Political Jurisdiction/ Governance Type	Collect Dedicated Transit Taxes?	Other local government contribution?
ODOT Region 1						
Canby Area Transit (CAT)	Canby, City of	Oregon Housing and Associated Services, Inc.	In-town connector; also has routes connecting to Molalla and Woodburn	City	Yes - payroll	No
Columbia Area Transit (CAT, Hood River)	Hood River County Transportation District		Regional connector; local dial-a-ride	Transit district ORS 267	Yes	No
Columbia County Rider (CC Rider, Hood River)	Columbia County	Metro West	Regional connector; local dial-a-ride	County	No	General fund
Mountain Express (Welches)	Clackamas County	Oregon Housing and Associated Services, Inc.	Regional connector	County	No	General fund
Sandy Area Metro (SAM)	Sandy, City of	Oregon Housing and Associated Services, Inc.	Regional connector; local dial-a-ride	City	Yes - payroll	No
SMART Wilsonville (Routes that extend to rural areas only)						
South Clackamas Transportation District (SCTD)	South Clackamas Transportation District	Marston Trucking, Inc.	Regional connector; local dial-a-ride	Transit district ORS 267	Yes - payroll	No
TriMet (routes that extend to rural areas only)						
Washington County U-Ride	Ride Connection, Inc.	Metro West	Regional connector	Non-profit	No	No

Transit Service	Grantee	Name of Contractor (if applicable)	Mobility Purpose	Political Jurisdiction/ Governance Type	Collect Dedicated Transit Taxes?	Other local government contribution?
ODOT Region 2						
Albany Transit System (ATS); Call-a-Ride	Albany, City of		In-town fixed route connector; dial-a-ride	City	No	General fund
CARTS (Salem Area Mass Transit District rural area service)	Salem Area Mass Transit District	Oregon Housing and Associated Services, Inc.	Regional connector	Transit district ORS 267	Yes - ad valorum, but NOT for rural projects	No
Lane Transit District (routes that extend to rural areas only)	Lane Transit District			Transit district ORS 267	Yes - payroll, but NOT for rural projects	
Lebanon Dial-a-Ride	Lebanon, City of		In-town dial-a-ride	City	No	General fund
Lincoln County Transit	Lincoln County Transportation Service District		Regional connector; local dial-a-ride	County service district formed under ORS 451	Yes	No
Linn Benton Loop	Albany,City of, for Linn-Benton Loop		Regional connector	City operates the loop as a courtesy to partners: City of Corvallis, Linn Benton Community College, Linn County	No	Yes - city and county contributions
Linn Shuttle	Linn County	Sweet Home Senior and Community Center, Inc.	Regional connector	County	No	No
LTD-Diamond Express	Lane Transit District	Special Mobility Service	Regional connector; connects Oakridge and Eugene	Transit district ORS 267	No	No
LTD-Rhody Express	Lane Transit District	Three Rivers Taxi	Fixed route; serves Florence	Transit district ORS 267	No	No
Silver Trolley (Silverton)	Silverton, City of		In-town dial-a-ride	City	No	General fund
South Lane Wheels	Lane Transit District	South Lane Wheels, Inc.	Deviated fixed route (Cottage Grove); Dial-a-ride	City	No	No

Transit Service	Grantee	Name of Contractor (if applicable)	Mobility Purpose	Political Jurisdiction/ Governance Type	Collect Dedicated Transit Taxes?	Other local government contribution?
ODOT Region 2, continued						
Sunset Empire Transportation District (SETD, Clatsop Co.)	Sunset Empire Transportation District		Regional connector; local dial-a-ride	Transit district ORS 267	Yes - ad valorum	No
Sweet Home Dial A Bus	Sweet Home, City of	Sweet Home Senior and Community Center, Inc.	In-town dial-a-ride	City	No	No
Tillamook County Transportation District (TCTD)	Tillamook County Transportation District		Regional connector; local dial-a-ride	Transit district ORS 267	Yes - ad valorum	No
Woodburn Transit Bus	Woodburn, City of		In-town dial-a-ride	City	No	General fund
Yamhill County Transit Area (YCTA)	Yamhill County Transportation Area	Chehalem Valley Senior Citizens Council, Inc, and Yamhill County Community Action Program, Inc.	Regional connector; local dial-a-ride	County service district formed under ORS 451	No	General fund
ODOT Region 3						
Coos County Area Transit (CCAT)	Coos County Area Transportation Service District	South Coast Business Employment Corp	Regional connector; local dial-a-ride	County service district formed under ORS 451	No	No
Curry Public Transit; Coastal Express	Curry County Transportation Service District	Curry Public Transit, Inc.	Local dial-a-ride; Regional connector	County service district formed under ORS 451	No	No
Josephine Community Transit	Josephine County		Regional connector; local dial-a-ride	County	No	General fund
Rogue Valley Transportation District (RVTD)					Yes – ad valorum, but NOT for rural projects	
Utrans (formerly Umpqua Transit)	Douglas County	Umpqua Community Action Program	In-town fixed route connector	County	No	General fund

Transit Service	Grantee	Name of Contractor (if applicable)	Mobility Purpose	Political Jurisdiction/ Governance Type	Collect Dedicated Transit Taxes?	Other local government contribution?
ODOT Region 4						
Basin Transit Service (BTS)	Basin Transit Service Transportation Service District		In-town connector	Transit district ORS 267	Yes - ad valorum	No
Cascades East Transit	Central Oregon Intergovernental Council		Regional connector; local dial-a-ride	Other government formed under ORS 190	No	Yes - via contracts with cities and counties in the area
Mid Columbia Council of Government's (MCCOG) Transportation Network (formerly LINK)	Mid Columbia Council of Governments		Regional connector; local dial-a-ride	Other government formed under ORS 190	No	No
Sherman County Community Transit	Sherman County		Regional connector; local dial-a-ride	County	No	No
ODOT Region 5						
Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Public Bus Program	Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Public Bus Program	Elite Taxi	Regional connector (including to Washington State – Tri-Cities and Walla Walla; local dial-a-ride	Tribe	No	Yes
Harney County Dial-a-Ride	Harney County	Harney County Senior and Community Center	Regional connector to Bend; local dial-a-ride	County	No	General fund
Milton-Freewater Public Transportation	Milton-Freewater, City of	G. G. Taxi & Limo Service	Connector to Walla Walla; local dial-a-ride	City	Yes – three-year revolving levy	No
Northeast Oregon Public Transportation (Baker Bow, Wallow Link, LaGrande Arrow)	Community Connection of NE Oregon, Inc.- Baker County		Regional connector; local dial-a-ride	Non-profit	No	No
Pendleton Bus	Pendleton, City of	Elite Taxi	In-town dial-a-ride	City	No	General fund
People Movers; Grant County Transportation District (GCTD)	Grant County Transportation District		Regional connector; local dial-a-ride	Transit district ORS 267	No	No
Snake River Transit	Malheur County	Malheur Council on Aging and Disabilities, Inc.	Regional connector (including to Idaho)	County	No	Yes

Transit Service	Grantee	Name of Contractor (if applicable)	Mobility Purpose	Political Jurisdiction/ Governance Type	Collect Dedicated Transit Taxes?	Other local government contribution?
Intercity						
Amtrak	ODOT Contract Service		Rail	Non-profit	No	No
Amtrak Porter Stage Lines	ODOT Contract/Capitol		Intercity	For profit	No	No
Amtrak Thruway; Oregon Coachways	ODOT Contract Service		Intercity	For profit	No	No
Central Oregon Breeze	Capital		Intercity	For profit	No	No
Estrella Blanca			Intercity	For profit	No	No
Fronteras Del Norte			Intercity	For profit	No	No
Greyhound	No Oregon Grant Money		Intercity	For profit	No	No
Sage Stage	No Oregon Grant Money		Regional connector	Non-profit		Modoc County, CA
The Klamath Shuttle; The South West Point	ODOT Contract Service		Intercity (Brookings, Ashland, Klamath Falls)	For profit	No	No
Valley Retriever	Capital		Intercity	For profit	No	No

How is Rural Transit in Oregon Funded in Comparison to Other States?

In Oregon, according to the National Transit Database, the average rural transit provider receives about 8% of its operating costs from fares, 30% from local sources, 18% from state funds, 38% from federal sources, and 6% from contract revenues. As shown in Table 5.4, these statistics are comparable to the national data. The numbers differ somewhat from the supplemental funding data provided directly to the project team and shown in Table 5.2, because the supplemental data were available for only 20 providers. Table 5.5 shows funding sources aggregated statewide, sorted by the share coming from local sources. Only seven states have a higher share coming from local sources. For Oregon statewide, the share is 41%. This is considerably higher than the agency unweighted average shown in Table 5.4, because several of the largest rural providers in Oregon (e.g., Tillamook, Sandy, Canby, and Basin) receive over half of their operating costs from local sources.

Again according to the National Transit Database, standard fares for most of Oregon's rural transit agencies range from free to $3.00. The agencies collect an average of $1.10 in fares per trip; the median is $0.82 (Table 5.6). These figures include fare revenue from all passenger trips, including complementary paratransit, because the data do not distinguish which services generate the fares. The average fare collected in Oregon is lower than the national average of $1.20, but the median ($0.82) is higher than the national median of $0.70. The median is a better measure, as there are a few agencies nationally that reported very high fare revenues relative to total trips, thus skewing the mean. All but five percent of the agencies reporting to the NTD collected less than $3.00 in fares per trip.

Table 5.4: Sources of Operating Revenues, Oregon and National Rural Transit Providers

	Oregon			National		
	Mean (unweighted)	Median	Range	Mean (unweighted)	Median	Range
Percent of operating costs from						
Fares	8%	8%	0-24%	9%	7%	0-94%
Local funding	30%	30%	0-69%	25%	23%	0-100%
State funding	18%	15%	4-46%	20%	17%	0-100%
Federal funding	38%	38%	12-71%	35%	38%	0-100%
Contract revenues	6%	0%	0-52%	10%	0%	0-90%
		n=29			n=1,236	

Source: National Transit Database. Note that this table includes agencies that did not respond to the supplement data request conducted for this report and thus differs from Table 5.2.

Table 5.5: Operating Revenue Sources for Rural Transit, Statewide, Ranked by Local Sources

	Local	Fares	State	Federal
Hawaii	85%	2%	1%	12%
Washington	71%	6%	17%	4%
Colorado	61%	9%	0%	15%
Utah	59%	1%	0%	31%
Missouri	52%	3%	5%	38%
California	49%	12%	23%	17%
Alaska	46%	13%	5%	37%
New Jersey	45%	1%	42%	10%
Oregon	**41%**	**10%**	**17%**	**36%**
Maryland	40%	22%	27%	12%
Kansas	40%	10%	14%	35%
Alabama	39%	12%	0%	39%
New Hampshire	37%	5%	2%	54%
West Virginia	36%	13%	12%	35%
South Carolina	34%	9%	11%	36%
Idaho	34%	6%	3%	46%
Indiana	33%	7%	20%	40%
Montana	33%	5%	9%	53%
Georgia	31%	9%	18%	23%
Wyoming	30%	8%	4%	53%
New York	30%	7%	32%	11%
Arizona	29%	11%	14%	43%
Virginia	29%	5%	16%	44%
National Total	*28%*	*8%*	*15%*	*36%*
Michigan	27%	8%	38%	14%
Arkansas	26%	24%	10%	37%
Mississippi	24%	13%	0%	43%
South Dakota	23%	13%	12%	46%
Nebraska	21%	11%	20%	45%
Kentucky	21%	2%	0%	14%
New Mexico	20%	10%	24%	45%
Ohio	18%	7%	17%	37%
Louisiana	18%	4%	1%	53%
Florida	18%	3%	20%	23%
Illinois	17%	6%	33%	27%
Wisconsin	15%	24%	26%	35%
Oklahoma	15%	7%	10%	39%
Maine	15%	3%	2%	11%
Connecticut	14%	7%	30%	45%
Iowa	10%	12%	20%	20%
North Carolina	9%	3%	21%	20%
Vermont	9%	2%	17%	69%
Texas	6%	7%	33%	37%
Pennsylvania	4%	7%	37%	43%
Minnesota	3%	14%	54%	18%
Tennessee	2%	3%	25%	32%
North Dakota	0%	17%	28%	36%

Note: The Oregon figures differ from those in Table 5.4 because this table aggregates the rural provider funding data for the entire state, then calculates the percentage from each source. Table 5.4 averages the percentages for the rural agencies. The average across agencies is not influenced by the size of each agency, while the data in this table are.

Table 5.6: Fares Collected and Fares per Trip

	Fare Revenues (FY07)[1]	Fares per trip (all services)[2]
Albany Transit	$55,116	$0.34
Basin Transit Service	$225,252	$0.60
Canby Area Transit	$306	$0.00
City of Milton-Freewater	$2,483	$5.34
City of Pendleton	$0	$0.00
City of Woodburn	$28,132	$0.81
COIC	No data	
Columbia County Rider	$71,331	$1.83
Community Connection of NE Oregon	$38,320	$0.41
Confederated Tribes of Umatilla	$37,627	$1.56
Coos County Area Transit	$56,983	$1.47
Curry Public Transit	$41,913	$1.89
Douglas County/Umpqua Transit	$92,623	$0.98
Grant County Transportation	$13,327	$2.29
Harney County Dial-A-Ride	$19,818	$0.55
Hood River County Transportation	$32,953	$1.33
Josephine County Transit	$60,644	$0.84
Lane Transit Rural	$59,001	$1.80
Lebanon Dial-A-Bus	$11,158	$0.81
Lincoln County Transportation	$119,118	$0.48
Linn County Linn Shuttle	$13,592	$0.39
Linn-Benton Loop	$15,302	$0.20
Malheur Snake River Transit	No data	
Mid-Columbia Council of Governments	$24,699	$1.15
OHAS - Welches	$12,650	$1.11
OHAS (Rural 102-21, CARTS from SAMTD)	No data	$3.06
Ride Connection WashCo U-Ride	$7,056	$0.60
Sandy Transit	$2,609	$0.01
Sherman County Community Transit	No data	
Silverton Trolley	$0	$0.00
South Clackamas Transportation	$34,147	$0.42
South Lane Wheels	No data	$1.24
Sunset Empire Transportation	$447,996	$0.64
Sweet Home Dial-A-Bus	$5,563	$2.24
Tillamook County Transportation	$125,164	$1.51
Yamhill County Transit	$85,298	$0.36
Oregon Rural Agency mean		**$1.10**
Oregon Rural Agency median		**$0.82**
National mean (n=1,251)		**$1.20**
National median		**$0.70**

[1] Fare revenue data from NTD reports, except for Linn-Benton Loop and Sweet Home Dial-A-Bus, which are from ODOT Quarterly Reports.
[2] Includes all unlinked passenger trips, including complementary paratransit, if provided.

Demand response providers tend to generate a lower share of their operating expenses from fares. Table 5.7 shows that the six agencies that provide only demand response service generated an average of 5% of their expenses from fares (unweighted average). There does not appear to be a correlation between the share of operating expenses from fares and the level of fixed route service provided. In other words, those providing higher levels of fixed route service are not generating more of the revenues from fares, on average. (Note that some LOS categories were combined because of the small sample size).

Table 5.7: Percent of Operating Funds from Fares, by Level of Service, Oregon Providers

	Percent of Operating Expenses from Fares (Source: NTD)	
	Mean (unweighted)	n
LOS 1: Less than 5 days/week, no weekend	10%	3
LOS 2 & 3: 5 days a week, no weekend	10%	11
LOS 4 & 5: 6 or more days a week	9%	9
Demand Response	5%	6
Total	9%	

This analysis highlights several findings about funding rural transit service in Oregon:

- Oregon's rural transit providers are highly dependent upon local sources of operating funds, somewhat more so than rural operators in most other states.
- The sources of local funds are diverse. However, few of Oregon's rural transit providers have a dedicated source of local funding, such as a payroll or property tax. This may lead to less stability in service provision and greater difficulties in making long-term investments.
- Fare revenues are not a significant source of funding for rural transit either in Oregon or nationally, although there is variability. Agencies providing fixed route service tend to generate a higher share of their revenues from fares.

6. Findings: Service Gaps and Future Needs

Where are the Current Service Gaps?

Identifying gaps in transit service requires some criteria for what level of transit service should be provided. Given limited resources, the criteria for providing transit service should consider the economic feasibility of providing that service. It is generally more cost-effective to provide service in denser areas, since most potential riders will live within a reasonable distance of the service. As discussed in Chapter 4, some sources suggest that fixed route transit service is feasible only at densities of three or more units per acre. The Institute of Transportation Engineers recommended a minimum of four to five dwelling units per acre for local bus service *(ITE 1989)*. A review of best practices in transit service planning found one agency that had a minimum standard of three units per acre for bus service *(Center for Urban Transportation Research 2009)*.

Our earlier analysis showed the share of Oregon's rural population receiving different levels of transit service. That information is presented again in Table 6.1, with some categories combined. The table shows that 60% of rural Oregonians do not have transit service nearby, although the majority of those live in very low density areas (less than one unit per acre).

Table 6.1: Transit Service Availability and Housing Density

Type of transit service available in block group	Percent of population living in a block group with this housing density					
	0-0.99 units/acre	1-1.99 units/acre	2-2.99 units/acre	3-3.99 units/acre	4 or more units/acre	Total
No service	54.4%	3.7%	1.3%	0.2%	0.4%	60%
Intercity only	0.2%	0.1%	0.1%	0.0%	0.0%	1%
Demand Response only	17.7%	1.7%	1.7%	0.4%	0.1%	22%
Demand Response & Intercity only	0.2%	0.1%	0.2%	0.1%	0.0%	1%
Fixed route LOS 1 or 2[1]	1.1%	1.3%	1.4%	0.4%	0.5%	5%
Fixed route LOS 3[1]	0.7%	1.7%	1.6%	0.6%	0.9%	5%
Fixed route LOS 4 or 5[1]	1.6%	2.1%	1.8%	1.0%	0.5%	7%
Total	76%	11%	8%	3%	2%	100%

[1] With or without intercity service

Table 6.2 identifies some potential service gaps, if the following minimum levels of service were applied: (1) fixed route LOS 4 or 5 (includes some weekend service) for areas with at least three housing units per acre; and (2) demand response service in lower density areas. The analysis reveals the following:

- If service were provided at a minimum of fixed route LOS 4 (6-7 days a week, hourly headways or better) in areas with a density of at least three units per acre, an additional 57,800 rural residents would be served (3.7% of the total).
- If service were provided for areas with at least one unit per acre, an additional 83,900 rural residents were be served (5.3% of the total). This service might be demand response or extensions of existing, nearby fixed route services.
- Providing demand response service everywhere that does not currently have service (demand response or fixed route) would require providing service to an additional 862,600 people beyond that identified above (54.6% of the total).

Table 6.2: Identifying Rural Transit Service Gaps

<table>
<tr><th rowspan="2">Type of transit service available in block group</th><th colspan="5">Percent of Oregon's rural population</th></tr>
<tr><th>0-0.99 units/acre</th><th>1-1.99 units/acre</th><th>2-2.99 units/acre</th><th>3-3.99 units/acre</th><th>4 or more units/acre</th></tr>
<tr><td>No service</td><td rowspan="2">54.6% (~866,200)</td><td colspan="2" rowspan="2">5.3% (~83,900 people)</td><td colspan="2" rowspan="5">3.7% (~57,800 people)</td></tr>
<tr><td>Intercity only</td></tr>
<tr><td>Demand Response only</td><td colspan="3" rowspan="4">Already served by demand response or fixed route: 34.9%</td></tr>
<tr><td>Demand Response & Intercity only</td></tr>
<tr><td>Fixed route LOS 1 or 2[1]</td></tr>
<tr><td>Fixed route LOS 3[1]</td></tr>
<tr><td>Fixed route LOS 4 or 5[1]</td><td colspan="3"></td><td colspan="2">Already served: 1.5%</td></tr>
</table>

[1] With or without intercity service

Most of the service area gaps identified in Table 6.2 in areas with a density of at least one unit per acre (the boxes shaded in yellow and orange), are shown in Figure 6.1 through Figure 6.7. In almost all cases, the gaps are located adjacent to existing transit service. The exceptions are the cities of Reedsport (Figure 6.3), Nyssa (Figure 6.4), Myrtle Creek (Figure 6.5), Lakeview, Hermiston, and Umatilla (Figure 6.7). In October 2009 the Confederated Tribes of Umatilla added transit service to Hermiston (Hermiston Hopper) which was not included in this mapping effort because it was too new. Reedsport is served only by intercity service (Porter Stage Lines).

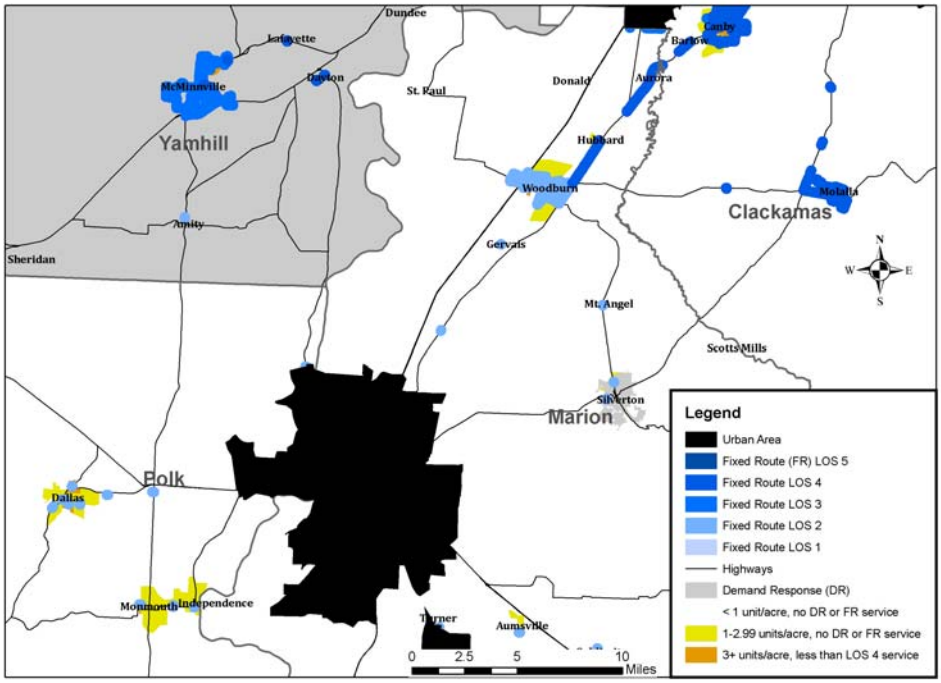


Figure 6.1: Rural Transit Service Gaps, Clackamas, Marion and Polk Counties

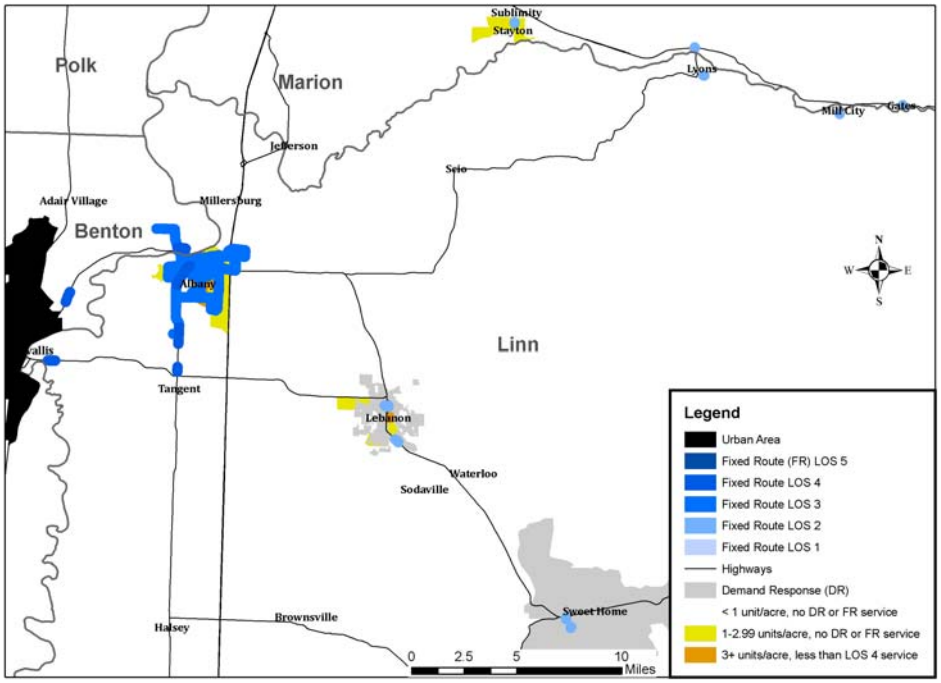


Figure 6.2: Rural Transit Service Gaps, Marion, Benton, and Linn Counties

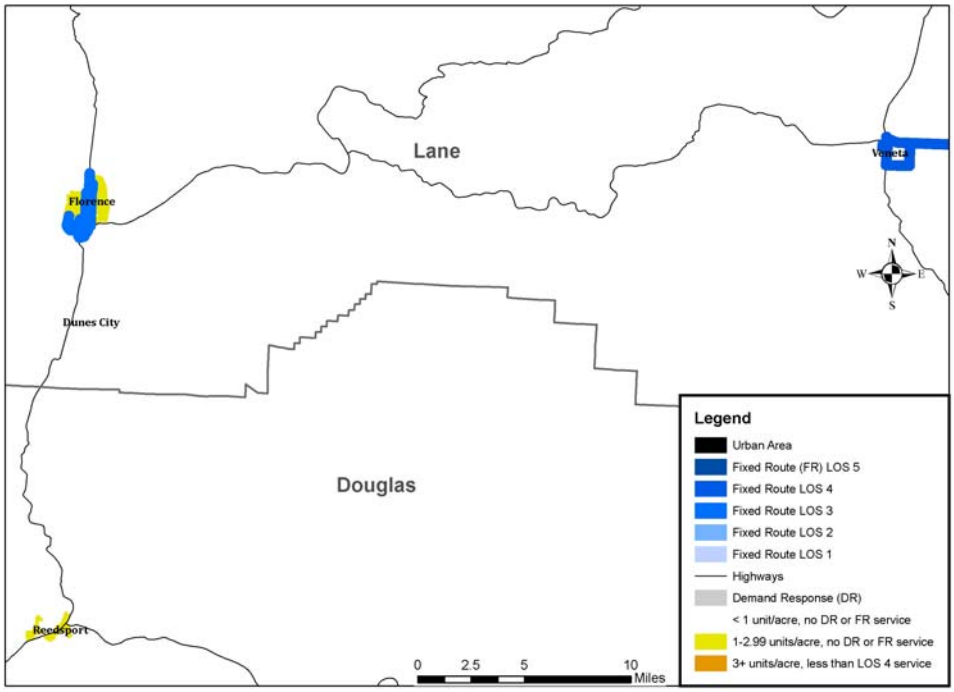


Figure 6.3: Rural Transit Service Gaps, Lane and Douglas Counties (Coastal)

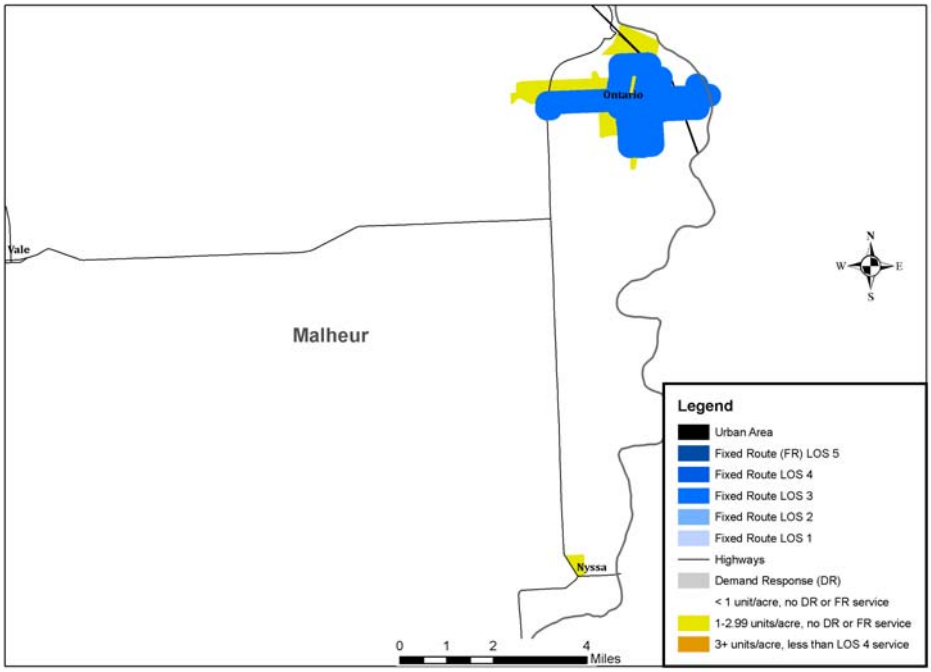


Figure 6.4: Rural Transit Service Gaps, Malheur County

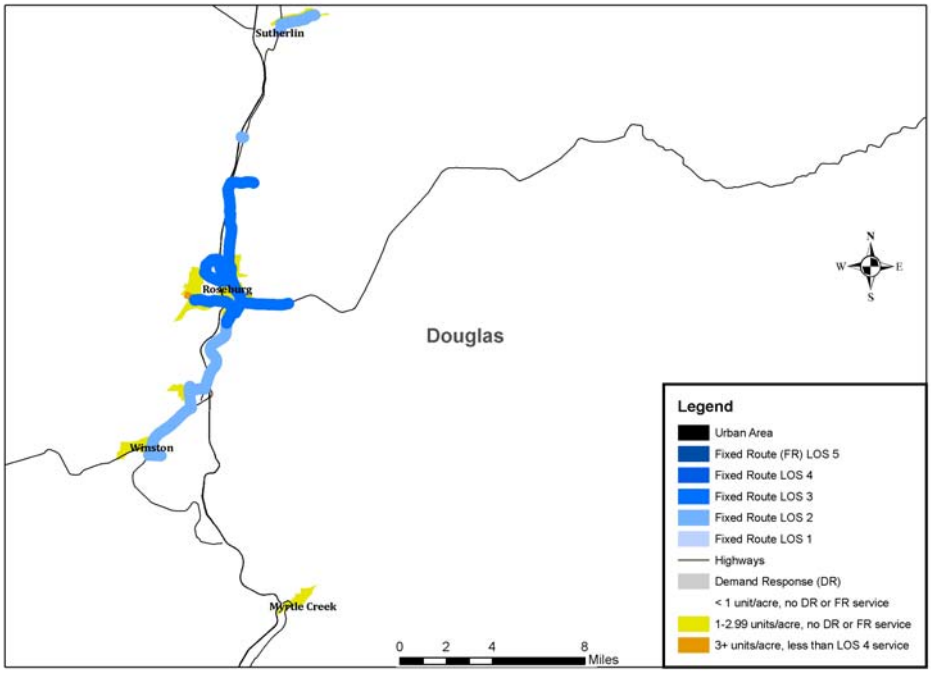


Figure 6.5: Rural Transit Service Gaps, Douglas County

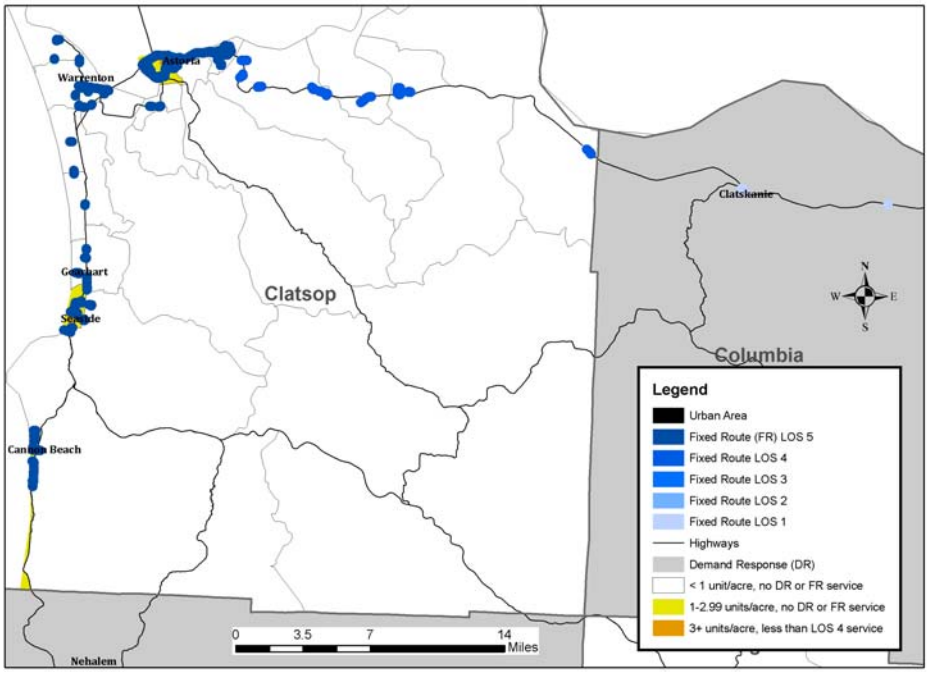


Figure 6.6: Rural Transit Service Gaps, Clatsop County

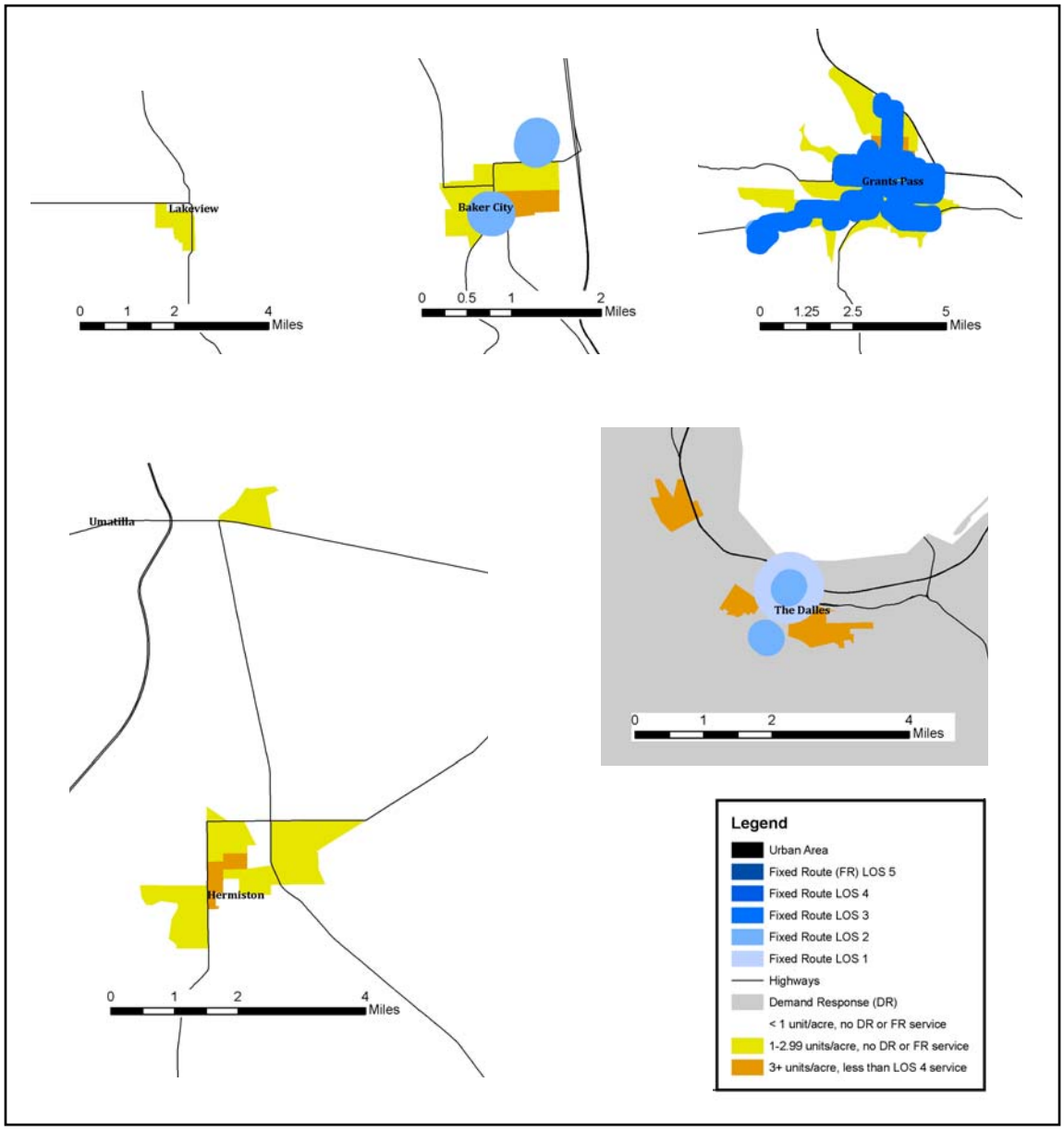


Figure 6.7: Rural Transit Service Gaps, Cities of Lakeview, Baker City, Grants Pass, Hermiston, and The Dalles

Note: Confederated Tribes of Umatilla added service to Hermiston (Hermiston Hopper) in October 2009. That service was not included in this analysis or the map above.

How Could the Demand for Oregon's Rural General Public Transit Change in the Future?

Without any improvement in service, transit ridership in rural Oregon will likely grow only at the same rate as the population.[12] This is assumed to be the "baseline" condition. In addition to this baseline estimate, two methods were used to estimate future rural transit demand which assume a significant improvement in service to meet currently unmet demand, beyond what is identified above as a gap in service. There are two categories of unmet demand: (1) areas with poor levels of service; and (2) areas without any service. In the analysis above, it was shown that most of the areas that are not served or are underserved, and that have at least one housing unit per acre, are adjacent to areas already served by transit. Therefore, this analysis assumes that service to most of these areas could be provided by improving existing service. This may include new or reconfigured routes. The few remaining areas without any demand response or fixed route service (e.g., Reedsport, Nyssa, Myrtle Creek, and Lakeview) may be too small and/or isolated to justify the expense of new service.

The process of selecting the two estimation methods and the methods themselves are described in more detail in the Study Methods section (see page 34). The first method assumes that every rural provider achieves a ridership level equivalent to that of the provider at the 75th percentile. This means that for just under 75 percent of the agencies, ridership would be expected to increase. The second method uses trip rates developed for an Arkansas study and also used in an Arizona analysis *(Cambridge Systematics, Inc. 2008)*. In a few cases, the Arizona/Arkansas method produced a number lower than current ridership. In these cases, the baseline (higher) numbers were used. The ridership figures that result from both of these methods would require improving service beyond filling the gap identified above.

The results of the estimates are shown in Table 6.3 and Figure 6.8. These estimates include only local service, not intercity service currently provided by nine agencies, or rural service provided directly by urban area transit agencies (TriMet, Lane Transit, SMART, and Rogue Valley). We did not have current ridership data for these agencies.[13] **The analysis shows**

[12] One exception to this assumption would be a very large increase in gas prices. However, it is unclear how large of a price increase would be necessary to boost transit demand in rural areas. Moreover, such an increase would need to be sustained over time and it is impossible to project such an event.

[13] Corvallis, Bend, and Salem have not been included in any of these analyses of rural transit, because they don't have rural service that extends from the urban area. Salem's rural service is reported separately by OHAS, and it is included.

that there may be a gap in needs of 50-75% currently, and that this gap would increase to 54-68% in the year 2030, compared with the baseline. The 75th Percentile method resulted in the higher estimate. This implies that there is an unmet demand for service among the bottom 75% of the providers (based upon trips provided per capita). In other words, if their service improved to match that of the operator at the 75th percentile, more people would ride transit, thus meeting their need for service.

Table 6.3: Estimates of Current and Future General Public Rural Transit Demand

Scenario	2007	2010	2015	2030
Baseline (current service)	2,616,000	2,673,000	2,843,000	3,305,000
75th Percentile	4,581,000	4,651,000	4,899,000	5,568,000
Gap compared to baseline	75%	74%	72%	68%
Arizona/Arkansas method	3,912,592	4,029,277	4,402,449	5,104,277
Gap compared to baseline	50%	51%	55%	54%

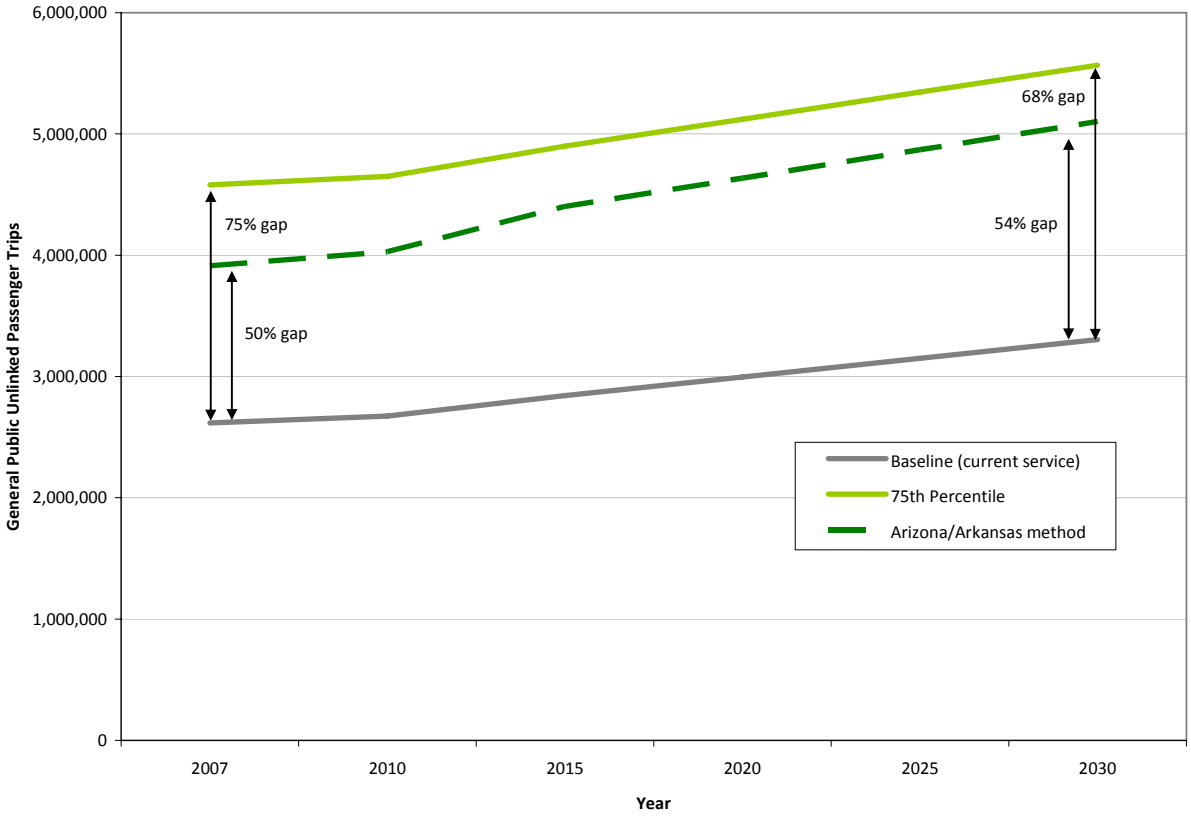


Figure 6.8: Estimates of Current and Future General Public Rural Transit Demand

What Could it Cost to Provide Service in the Future?

Annual operating costs for the local service (not intercity) provided by the rural transit agencies totaled at least $22 million in fiscal year 2007. Future costs were estimated in the following manner:

- **Baseline:** The level of service is assumed to remain the same as in 2007. For fixed route service, it is assumed that the current amount of service can accommodate growth in ridership due to population increase. Therefore, cost increases for fixed route service are due entirely to inflation. However, demand response service would need to increase in proportion to population increases, assuming each person takes the same number of trips per year. Therefore, costs for demand response service increase in proportion to the population *and* inflation.
- **75th Percentile and Arizona/Arkansas methods:** To achieve the higher ridership predicted for most agencies, the level of service needs to increase. An estimate of revenue miles[14] necessary to achieve the higher ridership was made using the formula presented on page 71, based on the data in Figure 4.7 for agencies that were performing below average. The cost per revenue mile was assumed to remain at current levels for each agency (except for inflation).
- For each method, a low and high estimate was made, using different assumptions for inflation. **Low** estimates assume an annual inflation rate of 2.5%. **High** estimates assume an annual inflation rate of 5.0%. (See Chapter 4 in Dill et al. 2008 for a discussion of increases in transit costs. Over the past eight years, nationally, per trip operating costs have increased about 5-7% annually. These increases may not all be due to inflation, however, and may also reflect increases in service provision.)

The total, statewide estimated annual operating costs are shown in Table 6.4 and Figure 6.9. If current funding sources keep up with inflation, they would cover the baseline costs. However, this may be a risky assumption. Some local sources, such as general fund revenues and Business Energy Tax Credits, may not increase at the rate of inflation. However, even with this optimistic assumption, the funding gap to provide the higher level of service to meet more of the unmet demand is $16-$26 million per year in 2015 and $32-$70 million per year in 2030.

[14] Revenue miles seemed a better predictor of service coverage and ridership than did revenue hours.

Table 6.4: Estimated Annual Operating Costs (in millions), 2010 through 2030

	Millions $			
	2007	**2010**	**2015**	**2030**
Baseline (low)	$22.0	$25.3	$29.1	$43.9
Baseline (high)	$22.0	$27.2	$35.3	$76.5
75th Percentile (low)	$39.1	$42.8	$50.9	$84.2
75th Percentile (high)	$39.1	$46.0	$61.7	$146.6
Gap (versus Baseline)	77%	69%	75%	92%
Arizona/Arkansas (low)	$32.9	$36.6	$45.3	$75.8
Arizona/Arkansas (high)	$32.9	$39.4	$54.9	$131.9
Gap (versus Baseline)	49%	44%	55%	72%

Note: The "gap" is calculated comparing the low estimate to the low baseline, or high estimate to high baseline. Both comparisons yield the same percentage gap.

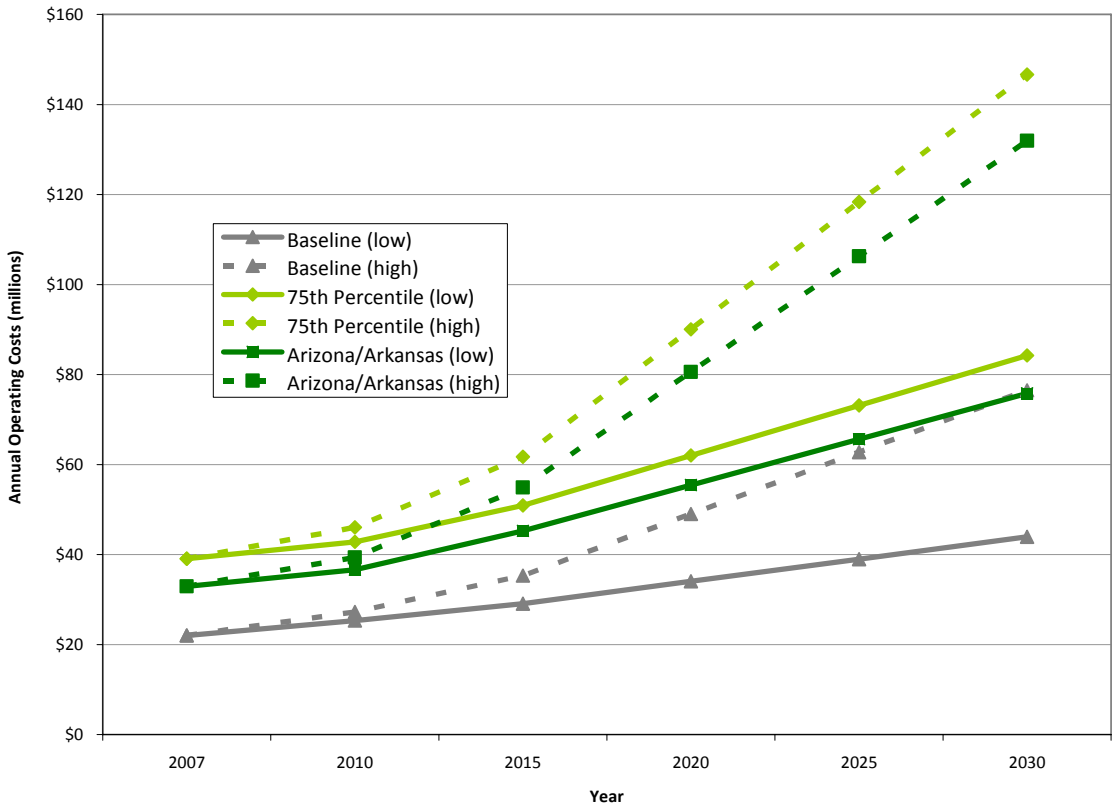


Figure 6.9: Estimated Annual Operating Costs, 2010 through 2030

These estimates do not include the cost of replacing existing vehicles or purchasing new vehicles for the additional service assumed. Providing an accurate estimate of

capital needs is not possible without knowing how agencies would need to expand service to meet the demand estimated. Some service might be improved or expanded without major fleet increases (e.g., adding hours or weekend service to existing routes). However, this might result in the need to replace vehicles sooner in the long-run due to increased use. On the other hand, adding new routes, increasing route frequencies (reducing headways), or expanding demand response service could require significant fleet expansions.

Undoubtedly, the capital costs would be significant. As noted previously (*Rural Transit Needs Identified in the 2008 ODOT Public Transit Division Provider Survey*, starting on page 24), rural providers expect a gap of about $9 million per year for the next five years between what providers have budgeted with "likely" available funds and what is actually needed. Specifically, they estimate that $25.5 million will be needed to replace 356 vehicles to keep the public transit fleet within federal replacement standards, and $19 million will be needed to expand by 180 vehicles to meet demand. These estimates were based on average replacement costs, not taking into account additional costs associated with purchasing "green" technology and not taking into account inflation.[15] Also, some providers did not offer estimates.

The responding providers indicated that they could only meet about 20-25% of their fleet needs under "normal budget conditions." In 2007, the 29 rural agencies in Oregon that reported cost data to the NTD spent $2.4 million on capital costs, 71% of which came from federal grants. If they are currently only meeting 20-25% of their capital needs, this would mean that their current capital needs are $9.6-$12.0 million, with a gap of $7.2-$9.6 million annually. These capital needs represent 55-68% of what is currently spent on operating costs. It should be noted, however, that the providers' estimates of what they need to expand their fleet is unrelated to the estimate of potential future demand presented here. In addition, some respondents may have overestimated their needs and/or underestimated their ability to fund the fleet purchases. Given all of the uncertainties, **it may be reasonable to assume that total costs (capital and operating) could be 50-75% higher than the operating costs shown in Table 6.4.**

[15] These estimates include providers that only serve older adults and people with disabilities. The responding providers that are included in this analysis (service for the general public) identified a need to replace 213 vehicles (67% of the fleet) and expand by 119 vehicles (a 38% increase in the fleet). However, there are 11 rural providers in our analysis that did not respond to the survey, so this is an underestimate of fleet needs. As a result, there is no way to determine whether the resulting figures overestimate or underestimate future capital costs for fleet replacement and expansion.

The rural providers also estimated a cost of $45 million needed to *improve facilities*, including improved phone and communication systems, administrative buildings. computer modernization, and maintenance buildings, shops, and secured parking *(ODOT 2008)*. If only the general public providers who responded are included, the estimate of facilities need is about $12.5 million. Again, because not all providers gave estimates, so this figure may underestimate the associated need for facilities improvements.

7. Conclusions

The Need for Rural Transit

Mobility, the ability to get around, is a basic human need. Mobility provides independence and the capacity to get to and from work or school, shop for fresh food, clothing, and other daily needs, participate in physical and social activities, engage in and contribute to community affairs, and gain access to health and social services. These activities are crucial to the health and well-being of all Oregon residents and to the economic well-being of the state. Public transportation provides mobility for those who, for a variety of reasons, cannot use a private vehicle. In rural areas, however, where population densities are low and places are spread out, public transportation may be limited or even nonexistent.

Rural transit faces challenges that may not be present in urban areas, including:

- A dispersed system with high unit costs for service delivery, operations and maintenance;
- Geographical issues such steep grades and mountain passes;
- More dramatic weather events and effects on road conditions;
- A lack of federal spending that goes to public transportation in rural areas; and
- Transit that is funded and maintained by multiple levels of government and is often a system of disparate parts *(USDOT 2001)*.

The last point is particularly salient, because transit service in rural areas is often poorly linked, compared to urban systems. This may impede the ability of rural residents to maintain employment or manage other important necessities of daily life. The lack of transit options in rural areas, therefore, leaves many rural citizens at a tremendous economic as well as social disadvantage. When transit is not available, older adults and people with disabilities, in particular, experience more restrictions on their ability to travel and must rely more heavily on informal networks or formal supportive services to meet their needs. Rural public transit also plays a vital role for agricultural workers and can play a role in welfare reform *(Stommes, Brown, and Houston 2002)*.

Key Findings

Most rural Oregonians live in very low density areas where transit service is cost-prohibitive.

Oregon is a largely rural state. This lack of density poses problems for the provision of public transit, whether through fixed route or demand response service. While well over 90% of the land area of Oregon is rural under this definition, only about 43% of Oregon residents live in rural areas. And, of those, over three-quarters live in very low density areas of less than one housing unit per acre. This density is very difficult and costly to serve with any form of transit.

Only about 5% of Oregon's rural population lives in a block group with a density considered necessary by some sources to provide regular fixed-route bus service (i.e., three or more housing units per acre). Of the 2% of Oregon's rural residents living in areas with a density of four or more units per acre, at least 80% currently have some form of fixed route transit nearby. An additional 3% of the rural population lives in an area with a density of 3-3.99 units per acre, and over 70% of these have some form of fixed route service.

Table 7.1: Transit Service Availability and Housing Density

Type of transit service available in block group	Percent of population living in a block group with this housing density					
	0-0.99 units/acre	1-1.99 units/acre	2-2.99 units/acre	3-3.99 units/acre	4 or more units/acre	Total
No service mapped	72%	34%	17%	7%	16%	60%
Intercity only	0%	1%	2%	1%	1%	1%
Demand Response only	23%	16%	21%	16%	3%	22%
Demand Response & Intercity only	0%	1%	3%	2%	0%	1%
Fixed route LOS 1, no intercity	0%	1%	3%	1%	0%	0%
Fixed route LOS 2, no intercity	1%	10%	9%	9%	6%	3%
Fixed route LOS 3, no intercity	1%	13%	15%	17%	29%	4%
Fixed route LOS 4, no intercity	1%	14%	16%	28%	13%	5%
Fixed route LOS 5, no intercity	1%	3%	2%	5%	1%	1%
Fixed route LOS 1 & intercity	0%	0%	0%	0%	0%	0%
Fixed route LOS 2 & intercity	0%	1%	5%	6%	15%	1%
Fixed route LOS 3 & intercity	0%	3%	4%	5%	8%	1%
Fixed route LOS 4 & intercity	0%	1%	3%	2%	4%	1%
Fixed route LOS 5 & intercity	0%	1%	1%	2%	4%	0%
Total	100%	100%	100%	100%	100%	100%
Total estimated population (2007)	1,203,960	170,080	129,000	42,720	38,620	1,584,380
% of rural population living in this density category	76%	11%	8%	3%	2%	100%

NOTE: Density is based upon 2000 Census data.

Performance varies significantly between rural transit providers.

Rural transit agencies in Oregon provided over 2.6 million rides to the general public in fiscal year 2007, including about 2.13 million rides on fixed route and intercity service and about 524,000 rides on demand response service open to the general public. The number of annual fixed route trips per capita ranged from under 0.5 to nearly 40. The number of general public demand response trips per capita ranged from under 0.1 to over 11.

Better service usually means increased ridership.

There were eight providers that averaged over 10 trips per person per year. Seven of those providers shared one thing in common: most of their routes operated six or more days per week. Three of those providers are also located just outside the Portland urban area. Ridership per capita appears to increase significantly when providers include at least one day of weekend service, along with service Monday through Friday (see Figure 7.1). The higher ridership is probably not due entirely to the additional weekend service, however. Rather, providers that have weekend service are also more likely to have higher frequency service during weekdays, which will increase ridership.

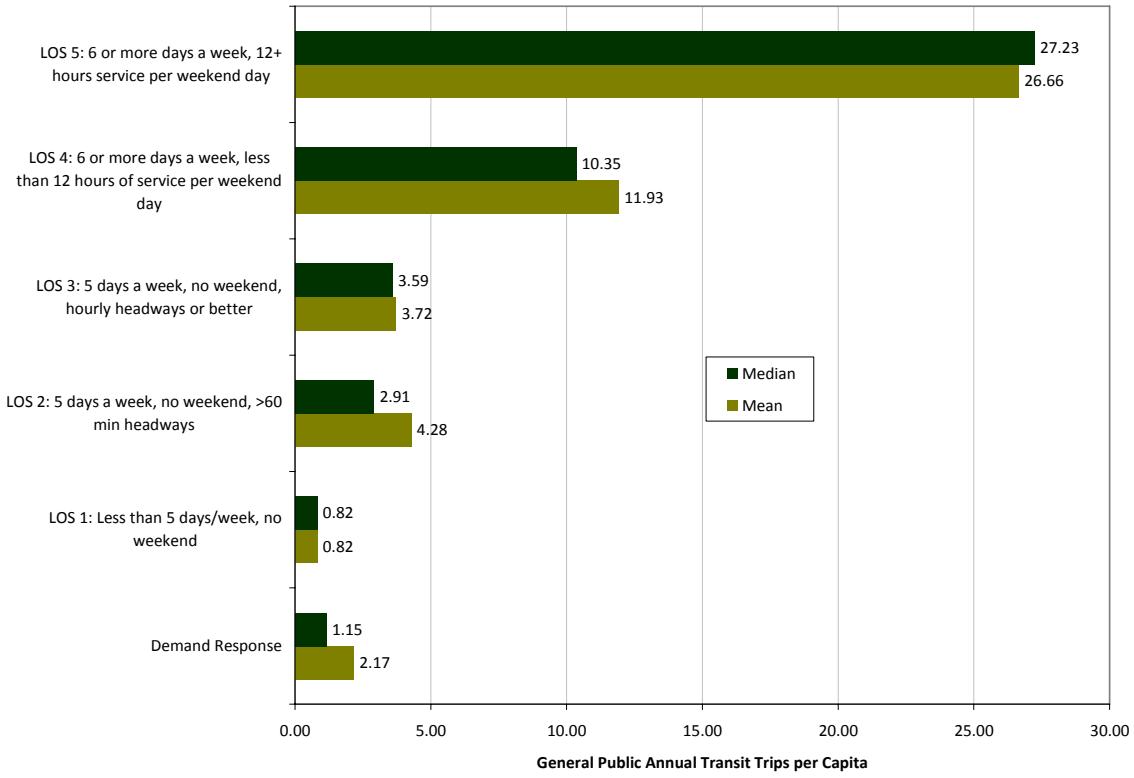


Figure 7.1: Trips per Capita by Level of Service, Oregon Rural Providers

Oregon's rural transit providers are unlikely to continue to expand service, as they have recently.

The finding that a majority of the providers responding to the ODOT survey had increased their level of service, and none reported decreasing the level of service that year, may be seen as positive: although rural transit providers are dealing with shrinking budgets as demand increases, they still found ways to increase the level of service. At the same time, it seems likely that further increases in level of service with less or even stable funding will not be likely, as providers feel they are already "getting blood out of a turnip."

Overall, lack of funding and the need to rely on grants or other assistance were prevalent themes in the comments of the rural providers responding to the survey. Taken together, the findings of the survey indicate that an increase in demand for service yet limited funding will make it challenging to increase, or even maintain, the current level of transit service in rural Oregon in the future.

Rural transit service can be expensive, although costs vary significantly.

Table 7.2 shows the operating costs per passenger trip, per revenue mile, and per revenue hour for Oregon's rural providers. The table shows the mean, median, and range of costs. Because of some outliers, the median cost figures may be a more accurate representation of typical costs. Costs are generally higher for agencies that provide only demand response service. In general, the Oregon agency performance data are similar to the national data from the rural NTD, although it is difficult to make comparisons because of difference in the data available.

Table 7.2: Operating Cost per Trip, Oregon Rural Transit Providers

Operating Cost per unlinked passenger trip	Mean	Median	Range
Fixed route only (includes complementary paratransit, if provided)	$12.80	$7.79	$2.34-$57.39 (n=17)
General public demand response only	$15.41	$13.13	$4.34-$39.84 (n=8)
Fixed route and general public demand response	$11.38	$12.40	$4.15-$16.62 (n=7)
All services	$13.14	$8.20	$2.34-$57.39 (n=32)

Rural transit providers rely largely on local funding and on many unstable sources.

Oregon's rural transit providers are highly dependent upon local sources of operating funds, somewhat more so than rural operators in most other states. Statewide, about half of

the rural transit service provided to the general public in Oregon is generated locally, either through fares (about 10%) or other local sources (about 40%). Federal sources make up about 35% of operating revenues, while state subsidies represent about 15%.

The sources of local funds are diverse. However, few of Oregon's rural transit providers have a dedicated source of local funding, such as a payroll or property tax. This may lead to less stability in service provision and greater difficulties in making long-term investments. Aside from fares, the largest of the local sources of operating revenues were human service agencies, followed by property taxes imposed by the transit district, other dedicated local taxes for transit (such as levies and payroll taxes), the Business Energy Tax Credit, general fund contributions, program revenue, donations, and other miscellaneous sources. Less than one-third of the rural providers are located within local taxing jurisdictions that impose transit-specific taxes or fees, such as an ad valorum tax, an employer payroll tax, or a local property tax dedicated to transit.

The gap between a minimum level of service and current levels is relatively small.

If the state wanted to provide a minimum level of service that included fixed route LOS 4 or 5 (includes some weekend service) for higher density areas and demand response service for moderate density areas (by rural standards), the gap that needs to be filled represents a small share of the population living in those areas. For areas with a density of at least three housing units per acre, there are about 57,800 rural residents (3.7% of all rural Oregonians) who do not have any transit service or have only intercity service, only demand response service, or fixed route service that does not operate on weekends (Table 7.3). Fewer than 9,000 of those people live in an area that is currently not served by any type of transit, aside from intercity service. In addition, there are about 83,900 residents (5.3% of all rural Oregonians) living in areas with at least one, but less than three, housing units per acre who have no service or only intercity service, which is unlikely to meet daily mobility needs.

If resources were available, filling that gap could largely be accomplished by expanding existing service.

Most of the service area gaps identified are located adjacent to existing transit service. The exceptions are the cities of Reedsport, Nyssa, Myrtle Creek, Lakeview, Hermiston, and Umatilla. In October 2009 the Confederated Tribes of Umatilla added transit service to Hermiston (Hermiston Hopper) which was not included in this mapping effort because it was too new and data were not available.

Table 7.3: Identifying Rural Transit Service Gaps

<table>
<tr><th rowspan="2">Type of transit service available in block group</th><th colspan="5">Percent of Oregon's rural population</th></tr>
<tr><th>0-0.99 units/acre</th><th>1-1.99 units/acre</th><th>2-2.99 units/acre</th><th>3-3.99 units/acre</th><th>4 or more units/acre</th></tr>
<tr><td>No service</td><td rowspan="2">54.6% (~866,200)</td><td colspan="2" rowspan="2">5.3% (~83,900 people)</td><td colspan="2" rowspan="3">3.7% (~57,800 people)</td></tr>
<tr><td>Intercity only</td></tr>
<tr><td>Demand Response only</td><td colspan="3" rowspan="4">Already served by demand response or fixed route: 34.9%</td></tr>
<tr><td>Demand Response & Intercity only</td></tr>
<tr><td>Fixed route LOS 1 or 2[1]</td></tr>
<tr><td>Fixed route LOS 3[1]</td><td colspan="2" rowspan="2">Already served: 1.5%</td></tr>
<tr><td>Fixed route LOS 4 or 5[1]</td></tr>
</table>

[1] With or without intercity service

If unmet needs were served, future demand and costs could increase significantly.

Without any improvement in service, transit ridership in rural Oregon will likely grow only at the same rate as the population.[16] This is assumed to be the "baseline" condition. In addition to this baseline estimate, two methods were used to estimate future rural transit demand if there were a significant improvement in service to meet currently unmet demand, beyond what is identified above as a gap in service. The analysis shows that there may be a gap in needs of 50-75% currently, and that this gap would increase to 54-68% in the year 2030, compared with the baseline.

With an optimistic assumption that current funding sources would keep up with inflation, the funding gap to provide the higher level of service to meet unmet demand is $16-$26 million per year in 2015 and $32-$70 million per year in 2030.

These estimates do not include the cost of replacing existing vehicles or purchasing new vehicles for the additional service assumed. Providing an accurate estimate of capital needs is not possible without knowing how agencies would need to expand service to meet the demand estimated. Undoubtedly, the capital costs would be significant, perhaps adding 50-75% to the operating costs shown above.

Priorities for Research and Data Collection

Although the analyses presented here improved the level of information and understanding of transit in rural Oregon, there were several limitations that warrant further study and

[16] One exception to this assumption would be a very large increase in gas prices. However, it is unclear how large of a price increase would be necessary to boost transit demand in rural areas. Moreover, such an increase would need to be sustained over time, and it is impossible to project such an event.

data collection. Many of these topics are not unique to Oregon and reflect a need for a better understanding of rural transit nationally. Our specific suggestions include the following:

- **ODOT should work with rural transit providers to improve the quality of data on ridership and costs.** For example, ridership and cost data for demand response, complementary paratransit, and fixed route service should be separated when more than one form of service is provided by one agency. Providers may need more guidance on and tools for collecting data and tracking costs, as well as feedback on the usefulness of such data. Finally, improved quality control on the data submitted to ODOT would improve the accuracy of analyses.
- **The rural NTD data may be a useful source of information in the future for identifying best practices agencies.** Since 2007 was the first year the rural data were collected, the quality in some cases is suspect. We anticipate that the quality of the data will improve over the next few years, making it more useful to ODOT and others interested in analyzing transit performance and cost-effectiveness.
- **ODOT, other state DOTs, and transit providers should carefully document the ridership before and after changes in rural transit service.** Our literature review revealed few sources that could be used to estimate how ridership might change if rural service was improved. If more agencies documented such changes, and shared that information, the practice would benefit. To help this effort, some standard data collection and reporting techniques would be useful.
- **Researchers should work to improve methods to estimate rural transit needs.** Although several national and state studies have attempted to estimate demand for transit in rural areas, many are based upon small samples, do not differentiate between service for the general public and service limited to older adults and people with disabilities, or require data inputs that are not readily available. Moreover, some of the methods tested for these analyses significantly underestimated existing ridership, indicating room for improvement.

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9. Appendix

Transit Service Area Maps

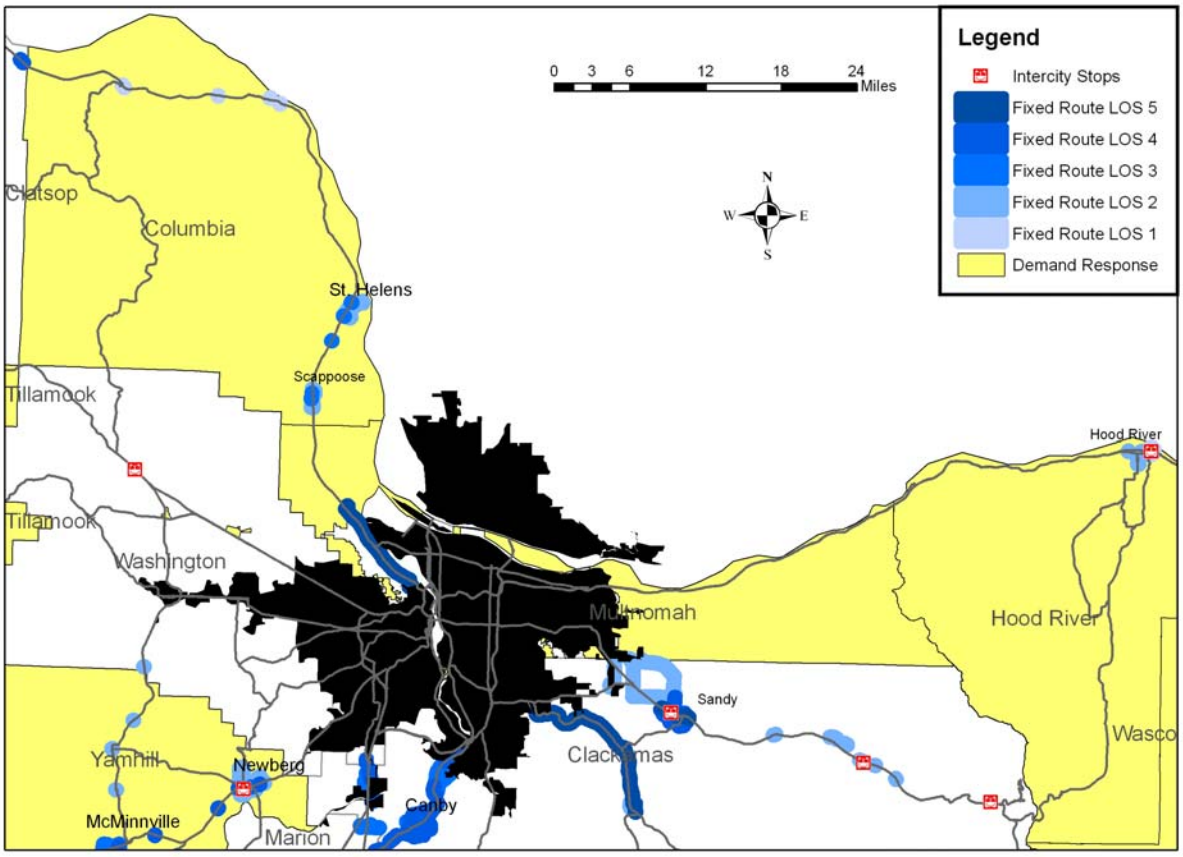


Figure 9.1 ODOT Region 1 Transit Service Coverage

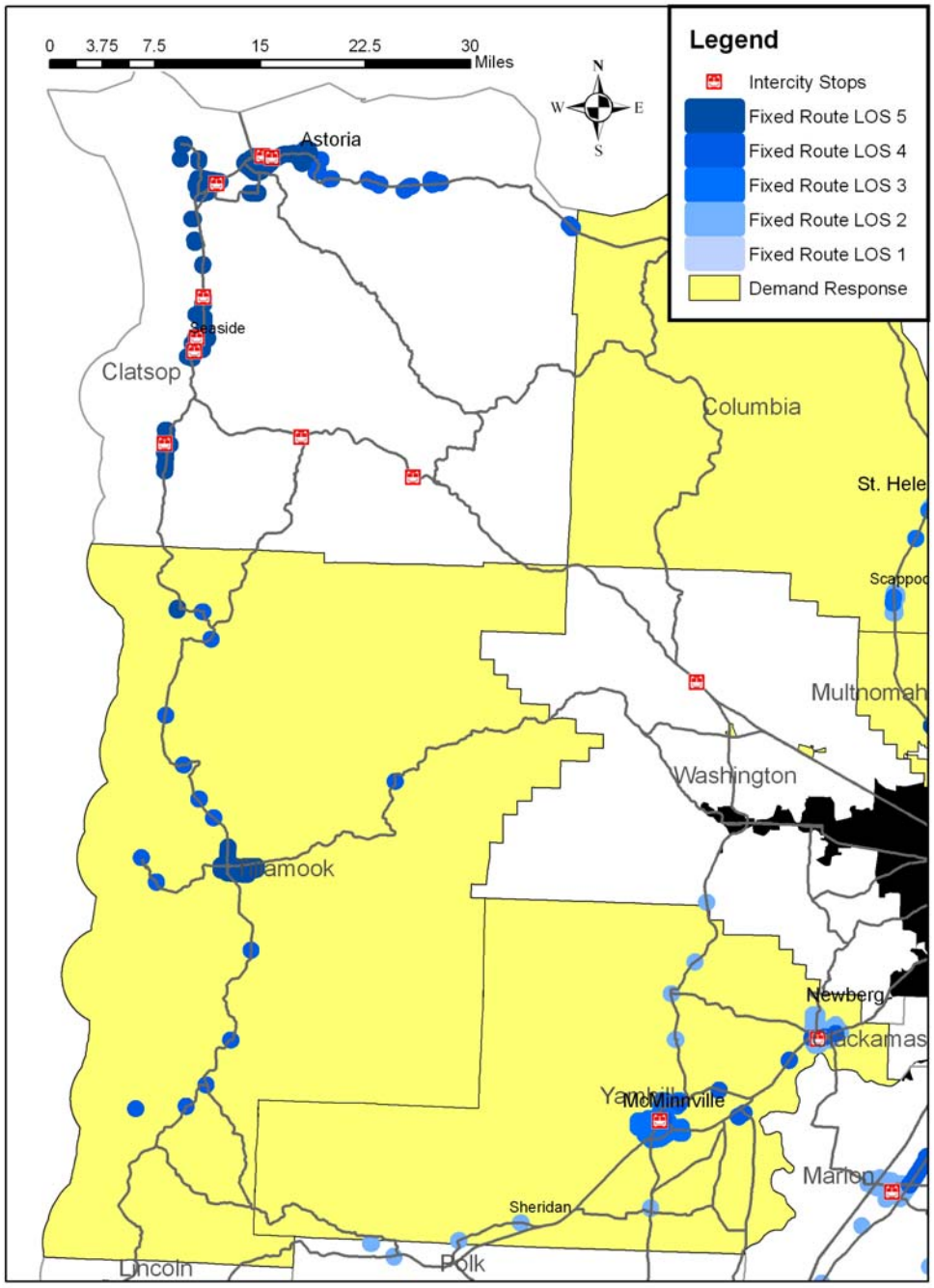


Figure 9.2 ODOT Region 2 (North) Transit Service Coverage

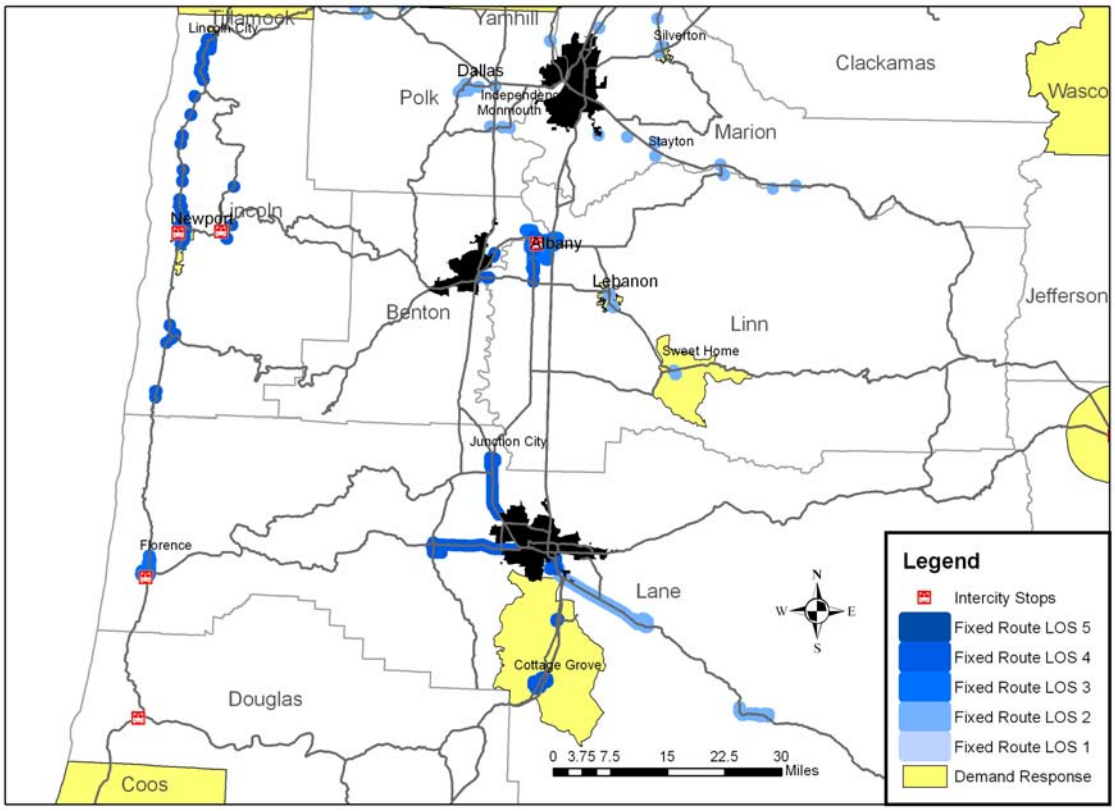


Figure 9.3 ODOT Region 2 (South) Transit Service Coverage

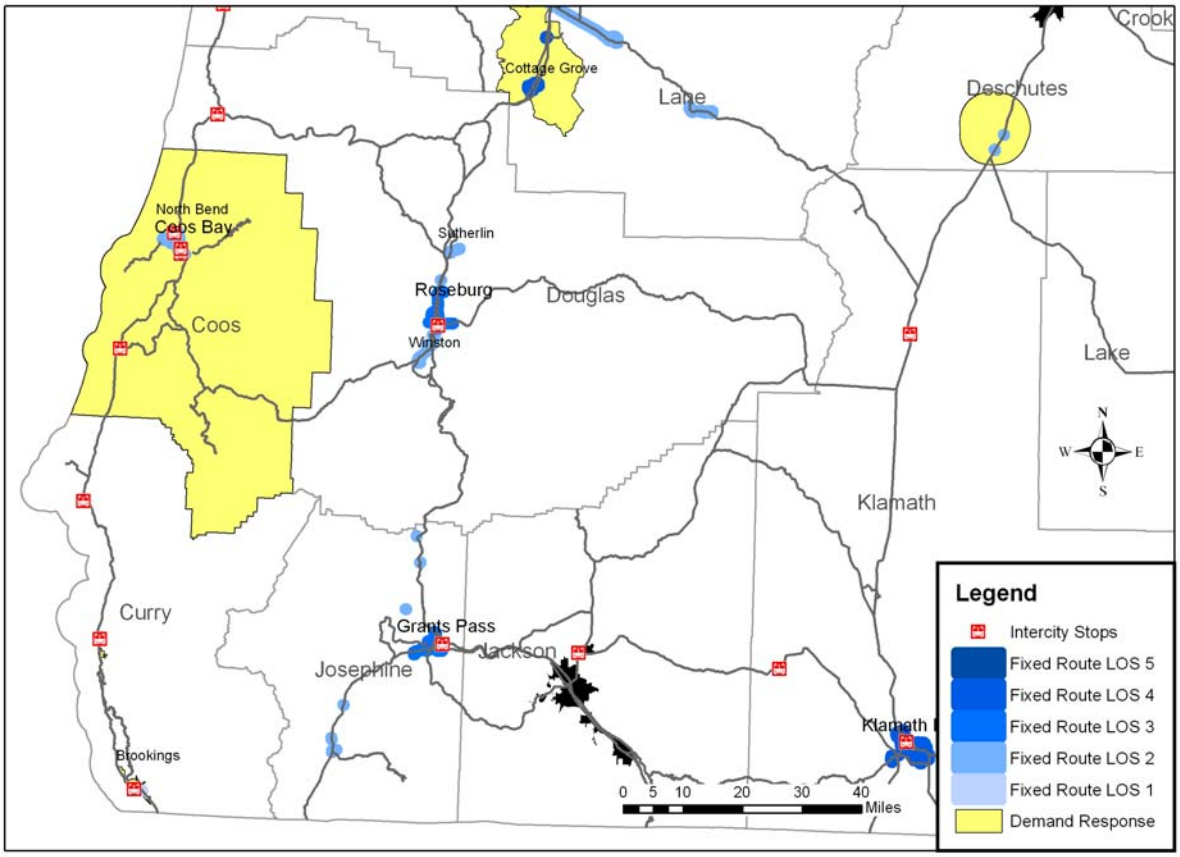


Figure 9.4 ODOT Region 3 Transit Service Coverage

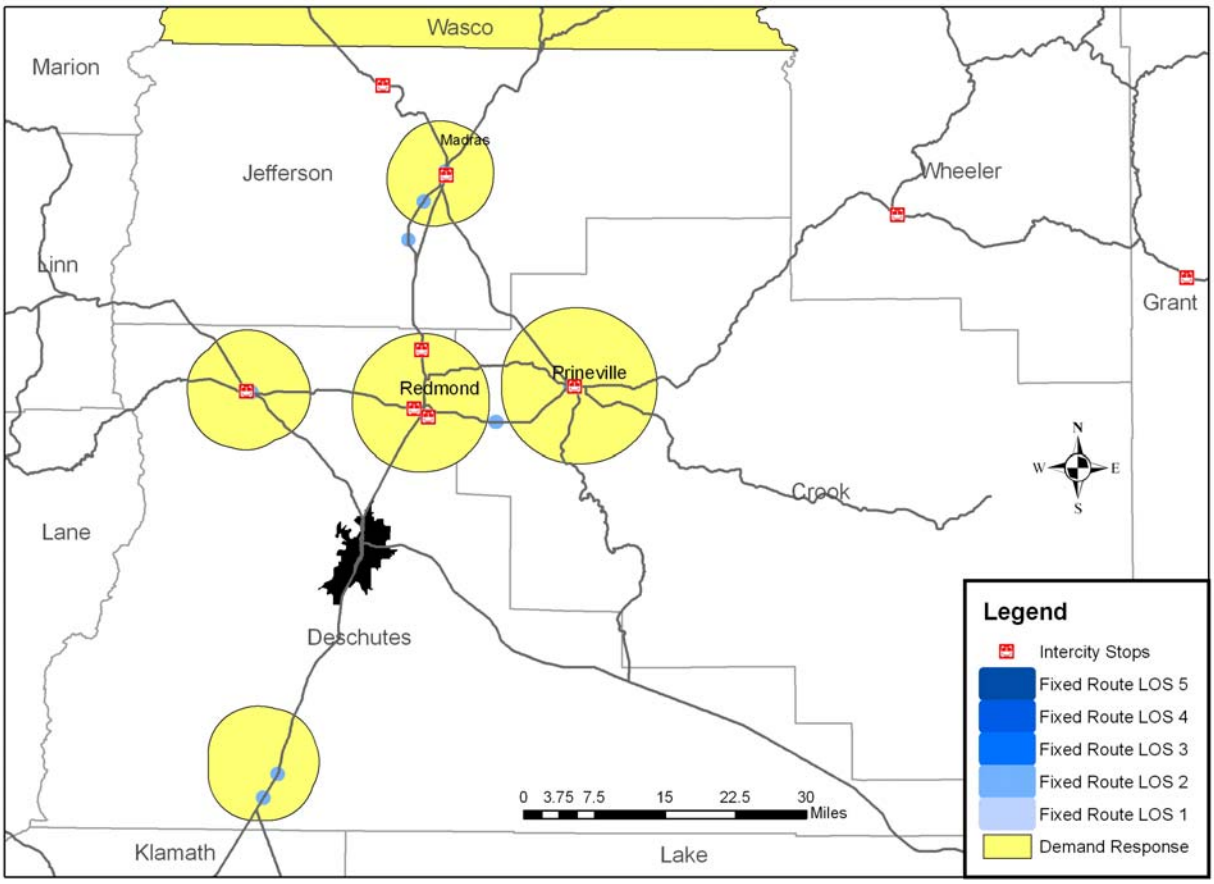


Figure 9.5 ODOT Region 4 (Central) Transit Service Coverage

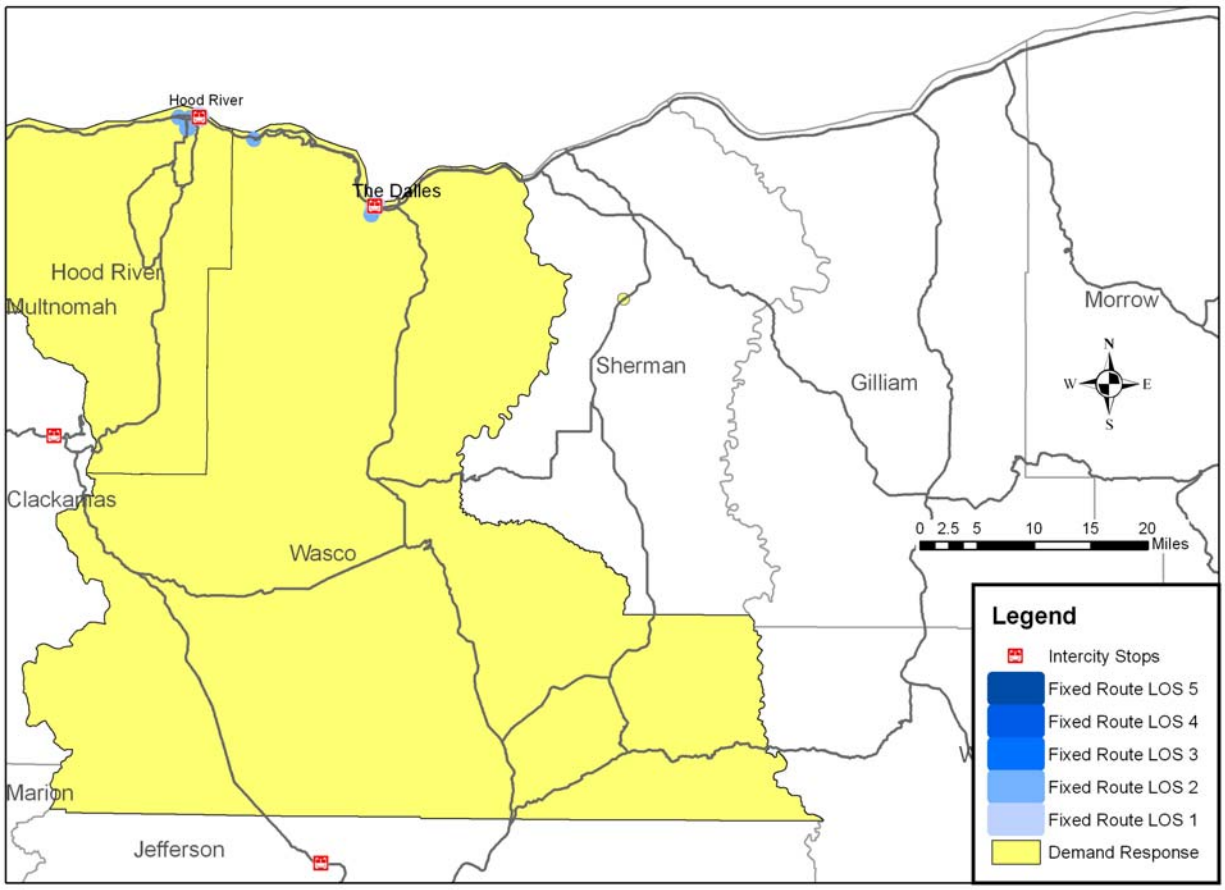


Figure 9.6 ODOT Region 4 (North) Transit Service Coverage

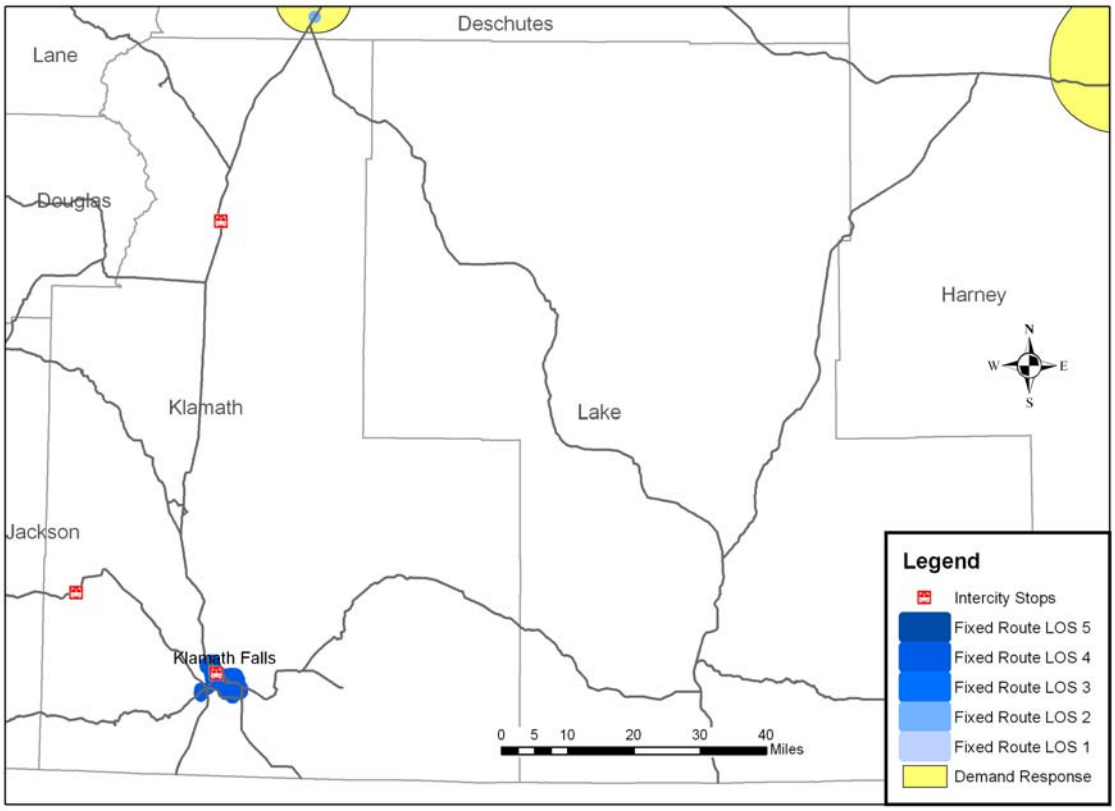


Figure 9.7 ODOT Region 4 (South) Transit Service Coverage

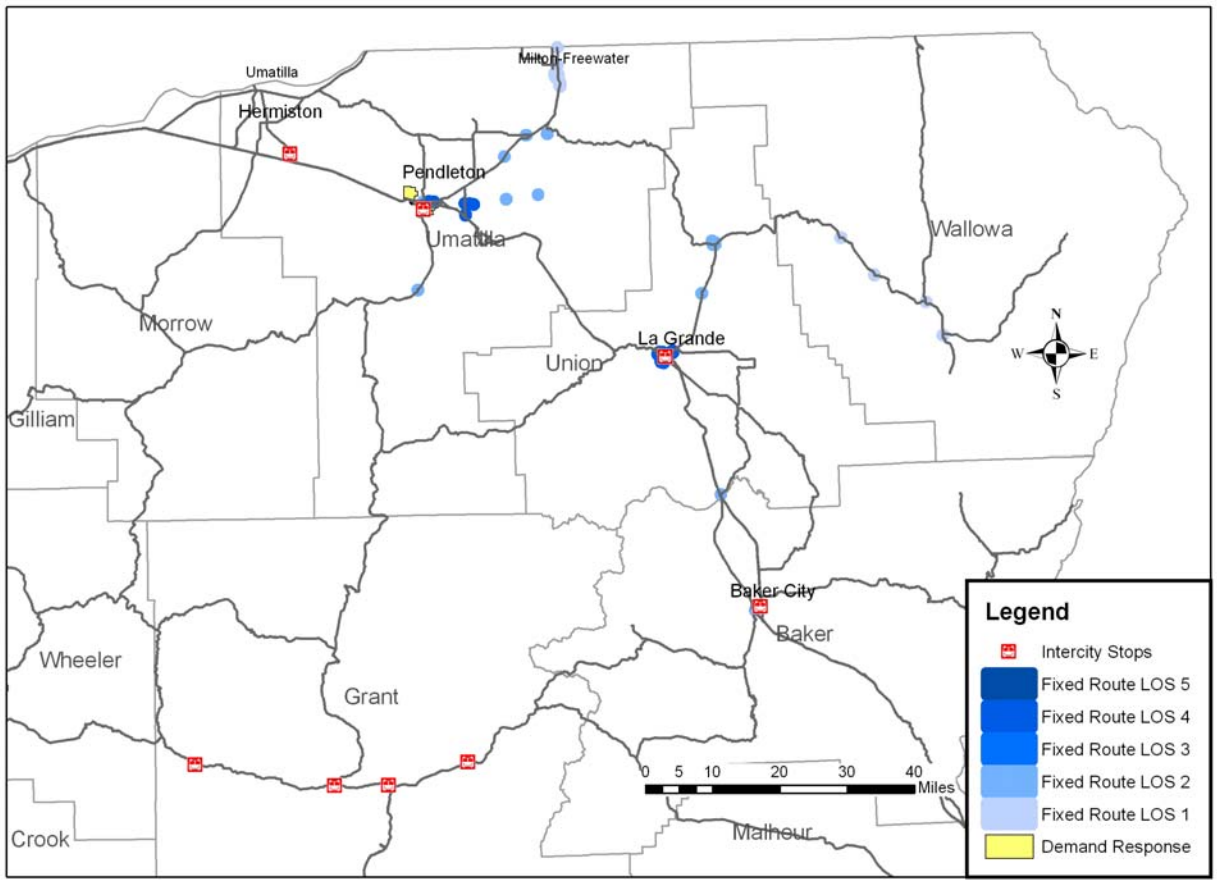


Figure 9.8 ODOT Region 5 (North) Transit Service Coverage

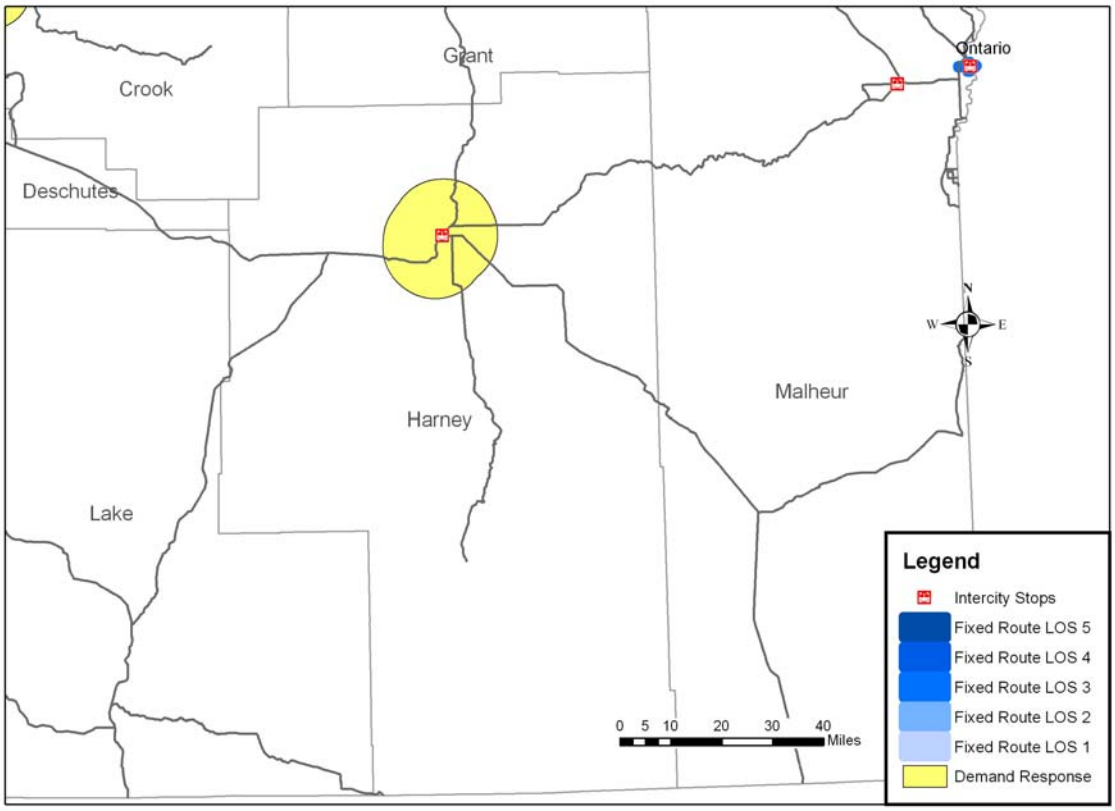


Figure 9.9 ODOT Region 5 (South) Transit Service Coverage

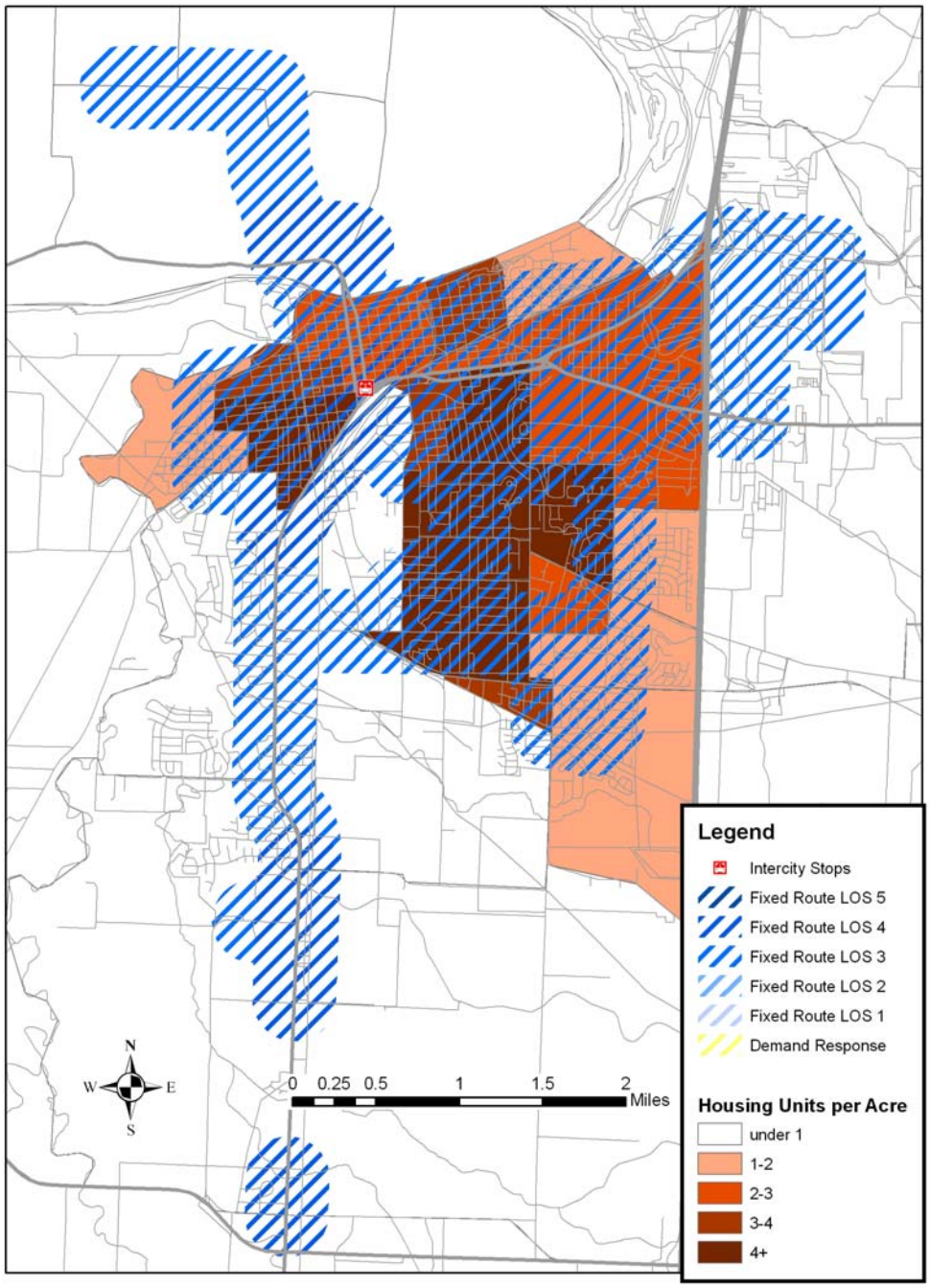


Figure 9.10 City of Albany Transit Service Coverage

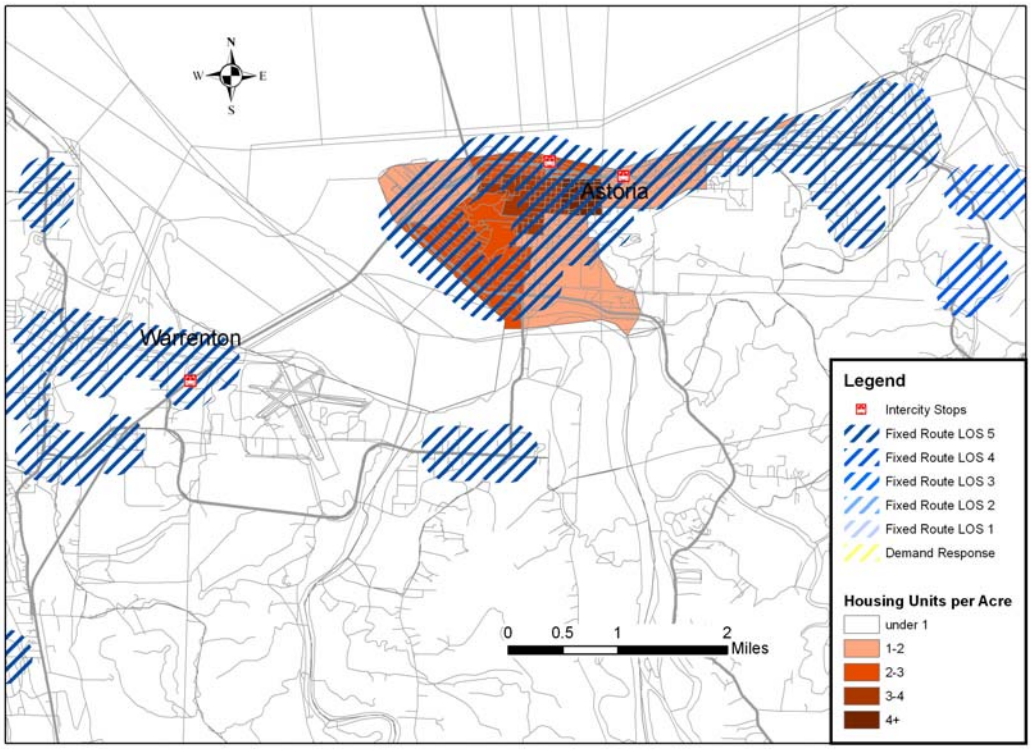


Figure 9.11 City of Astoria Transit Service Coverage

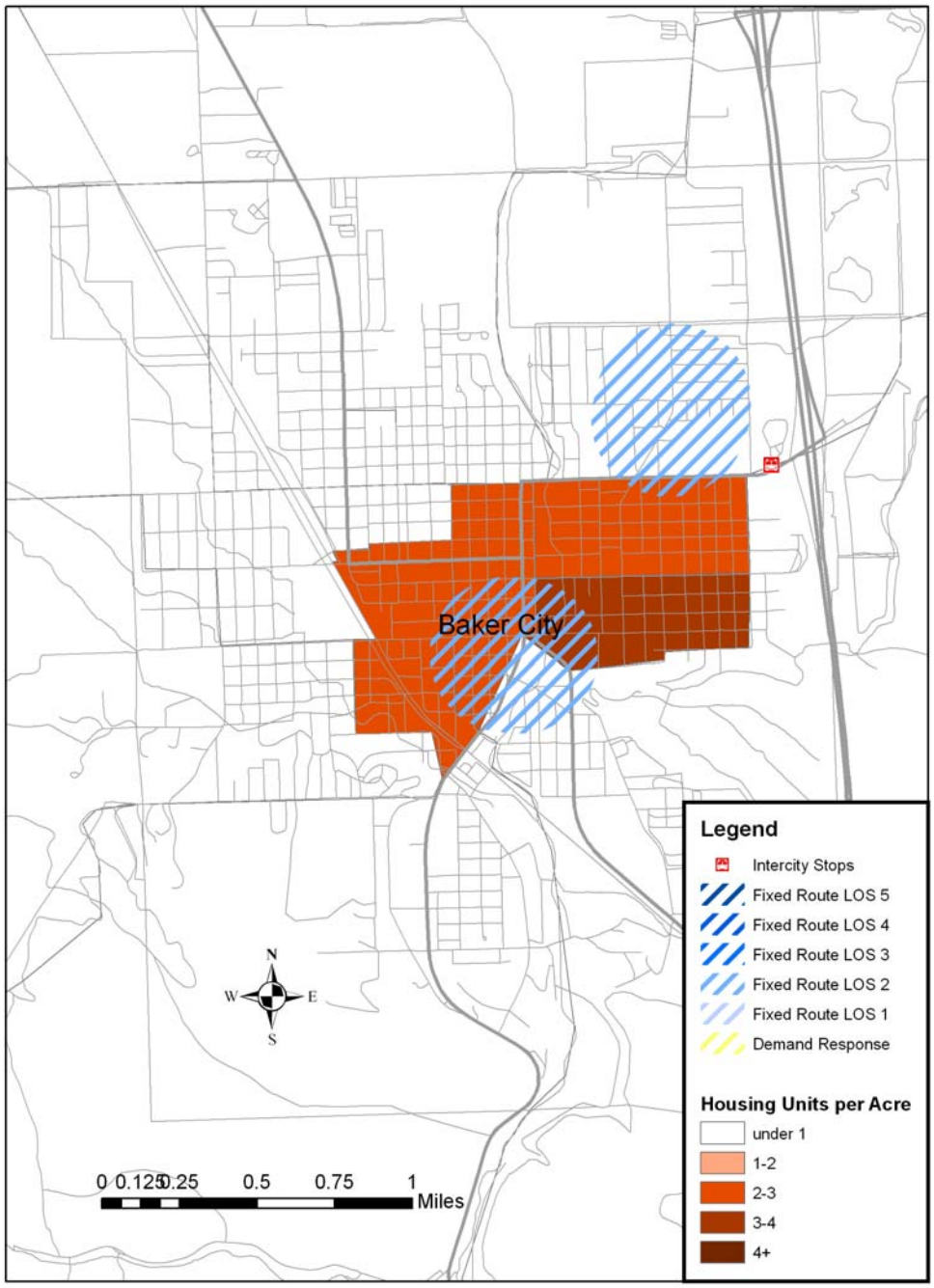


Figure 9.12 City of Baker City Transit Service Coverage

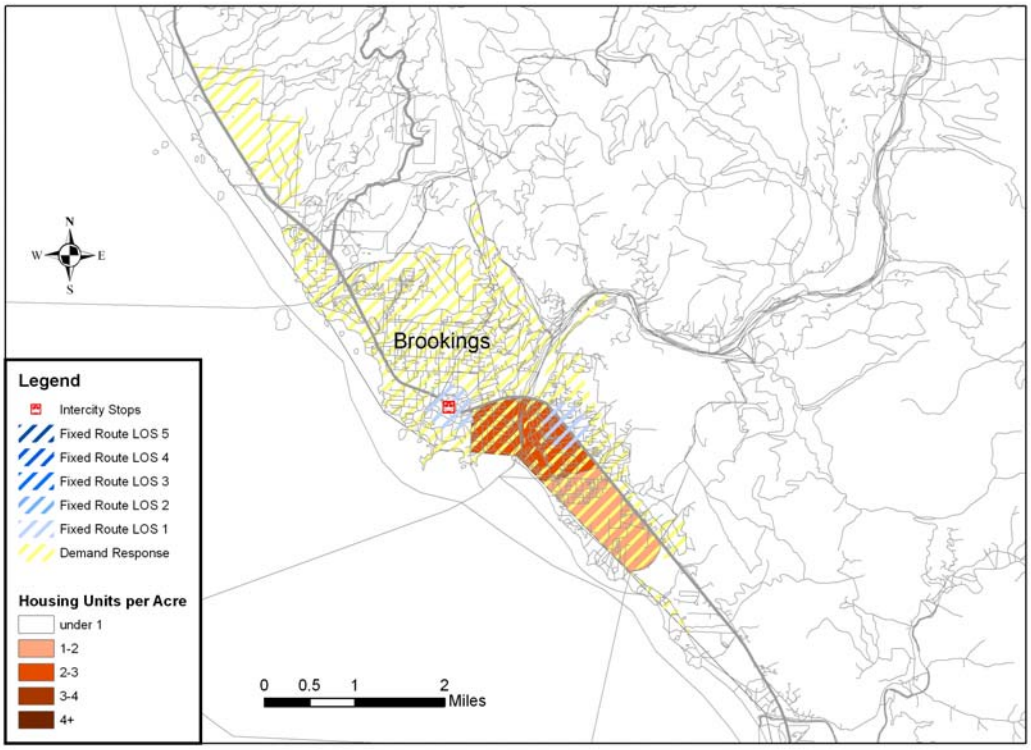
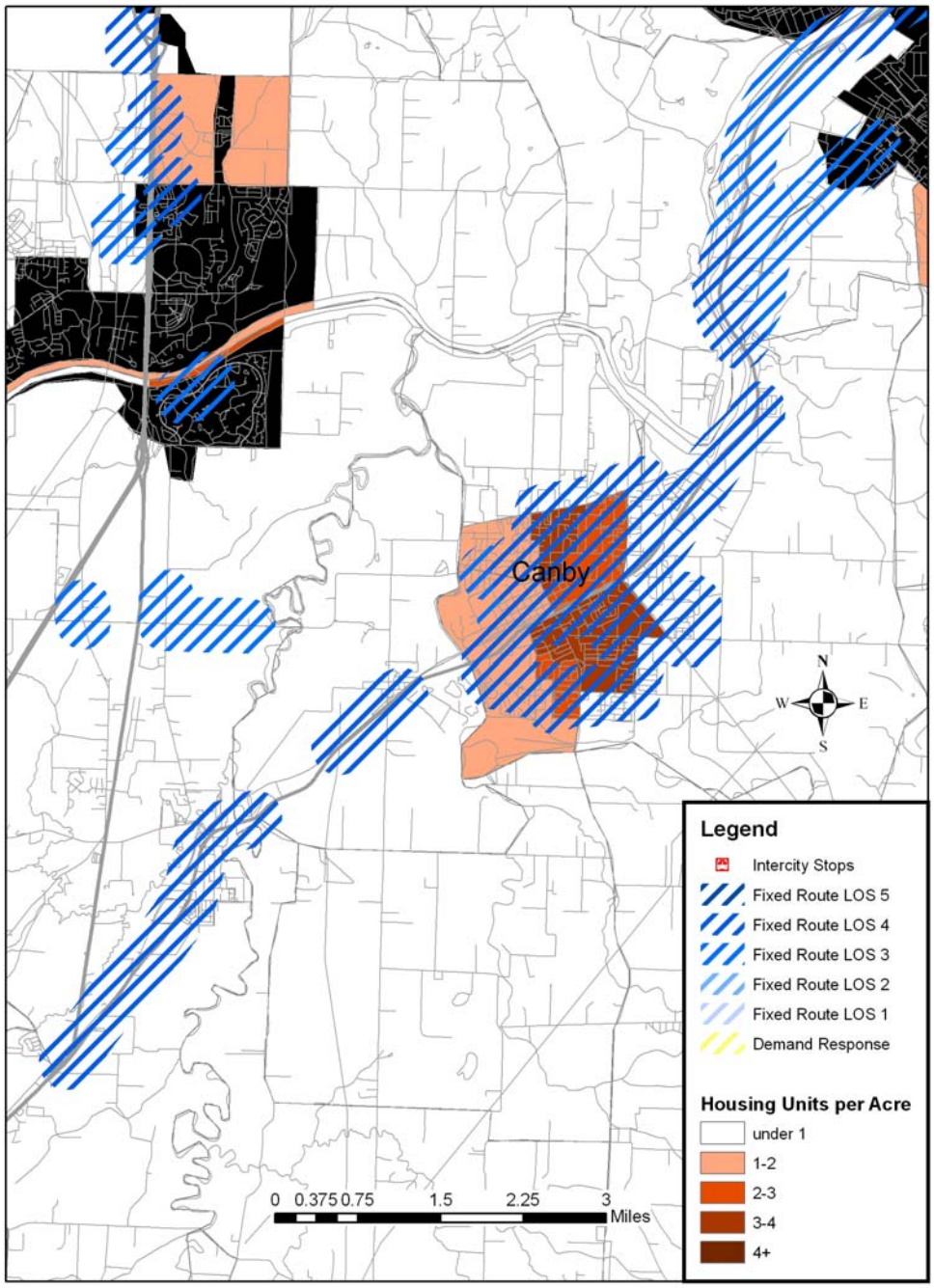


Figure 9.13 City of Brookings Transit Service Coverage



Note: Black areas are within an urbanized area.

Figure 9.14 City of Canby Transit Service Coverage

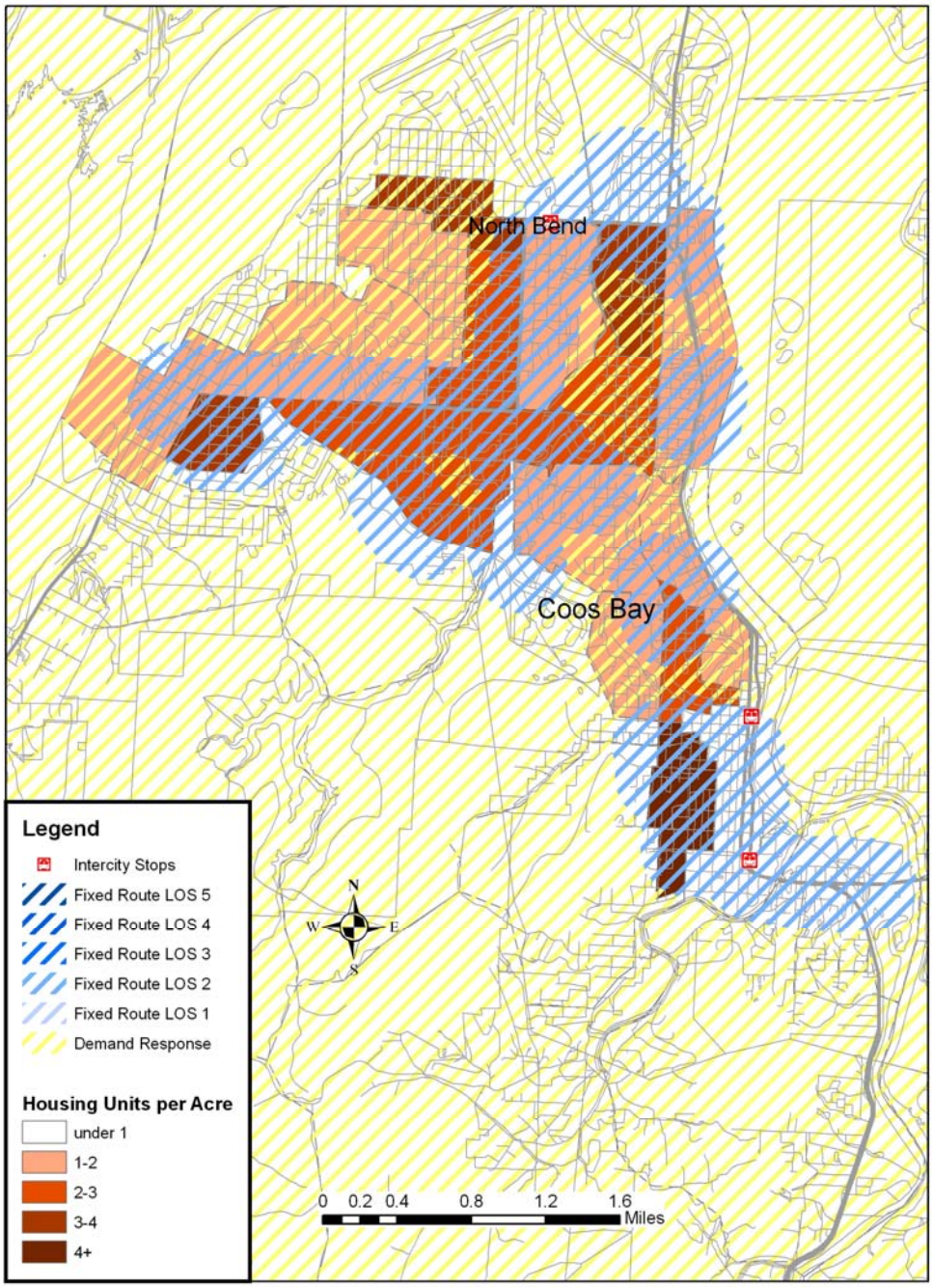


Figure 9.15 City of Coos Bay Transit Service Coverage

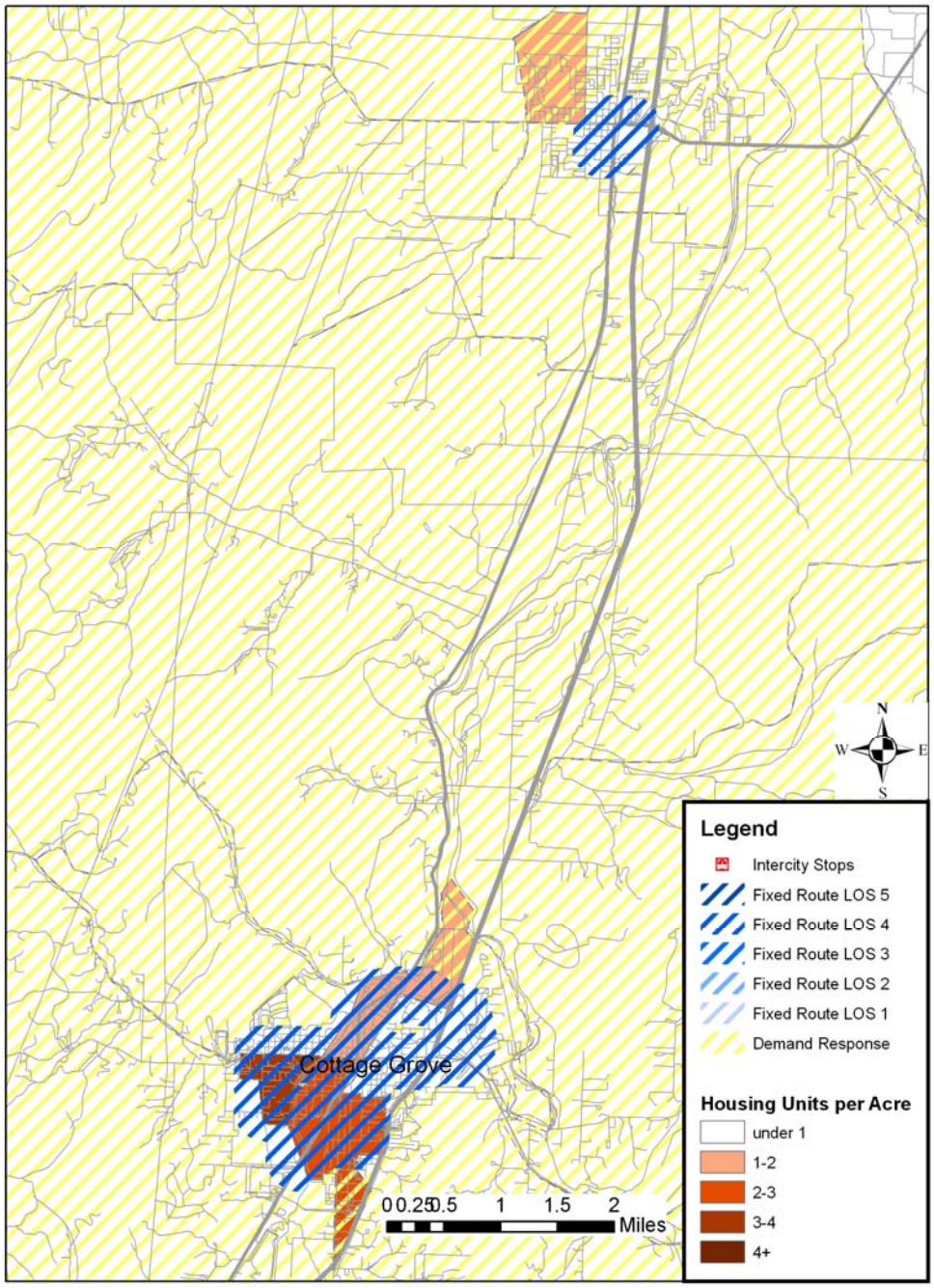


Figure 9.16 City of Cottage Grove Transit Service Coverage

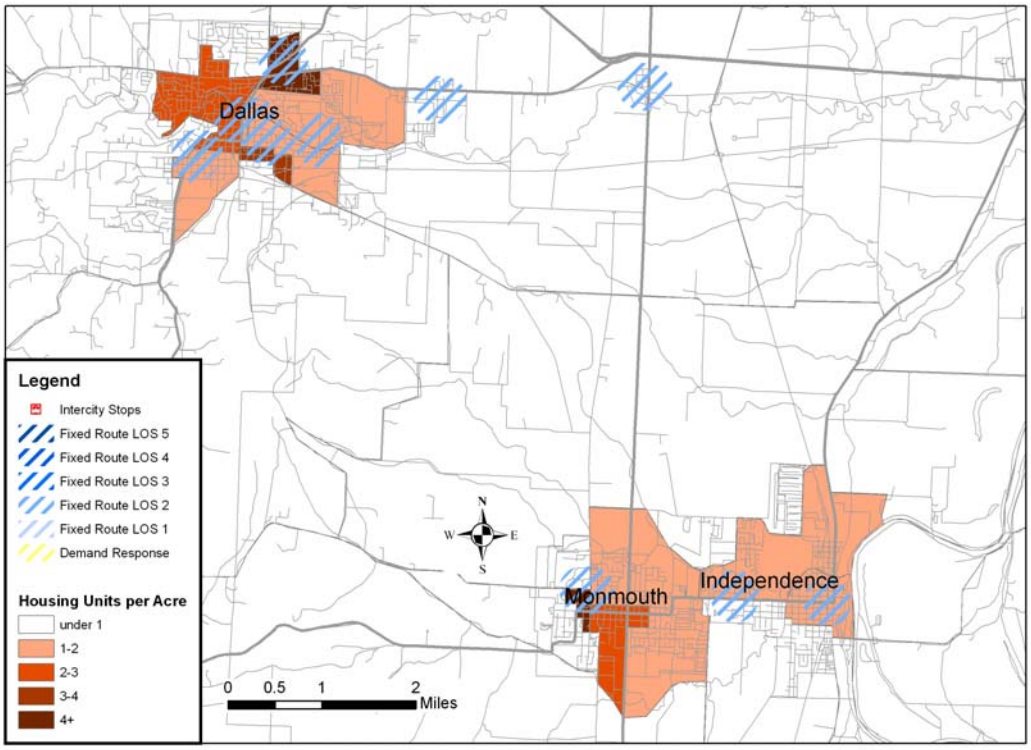


Figure 9.17 City of Dallas Transit Service Coverage

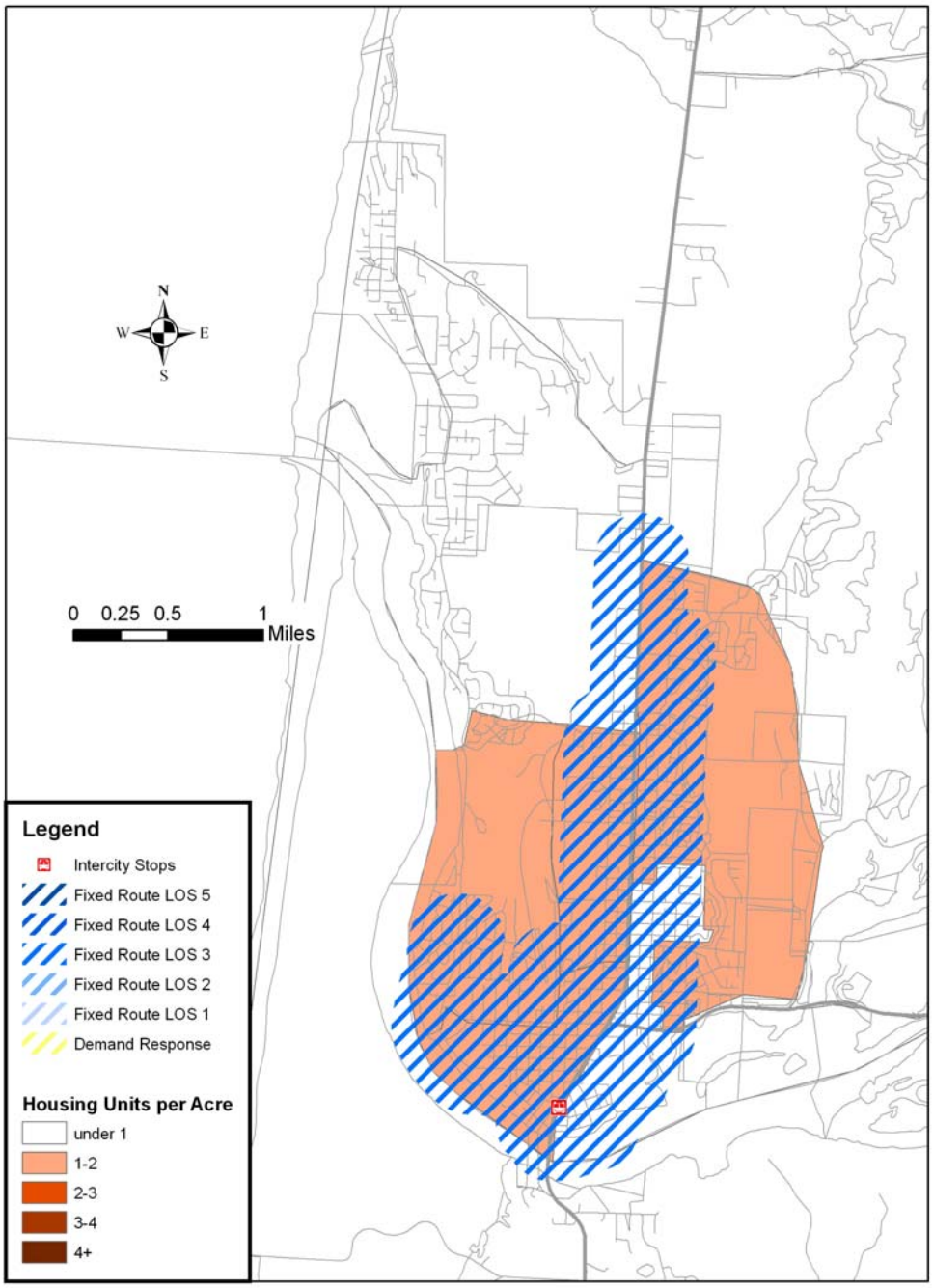


Figure 9.18 City of Florence Transit Service Coverage

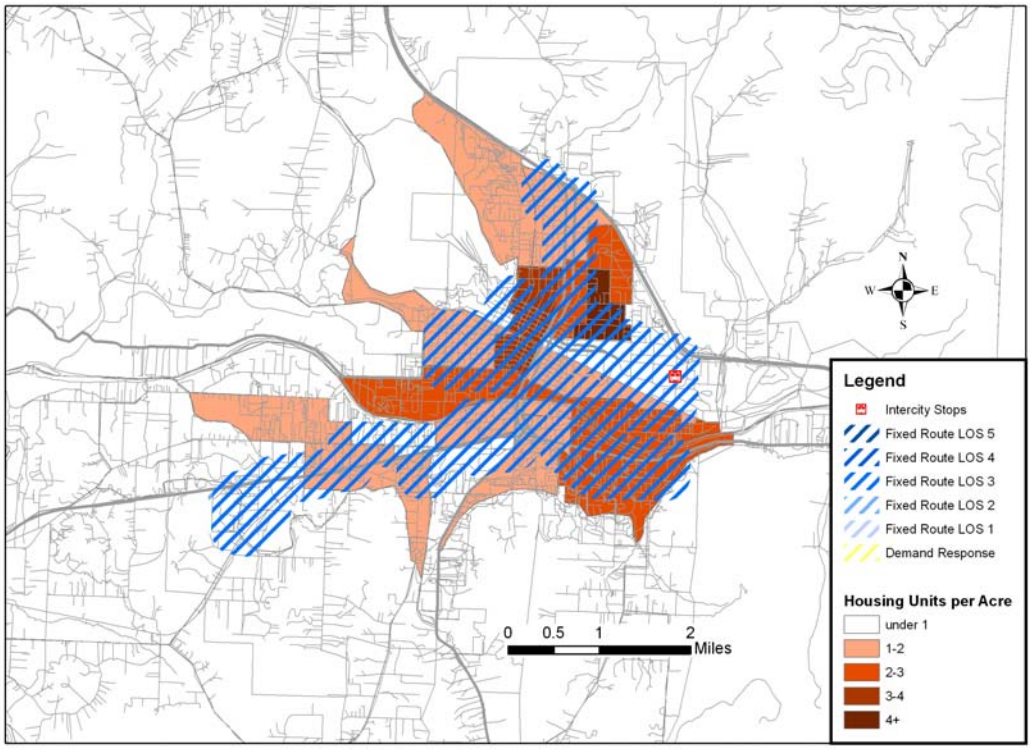


Figure 9.19 City of Grants Pass Transit Service Coverage

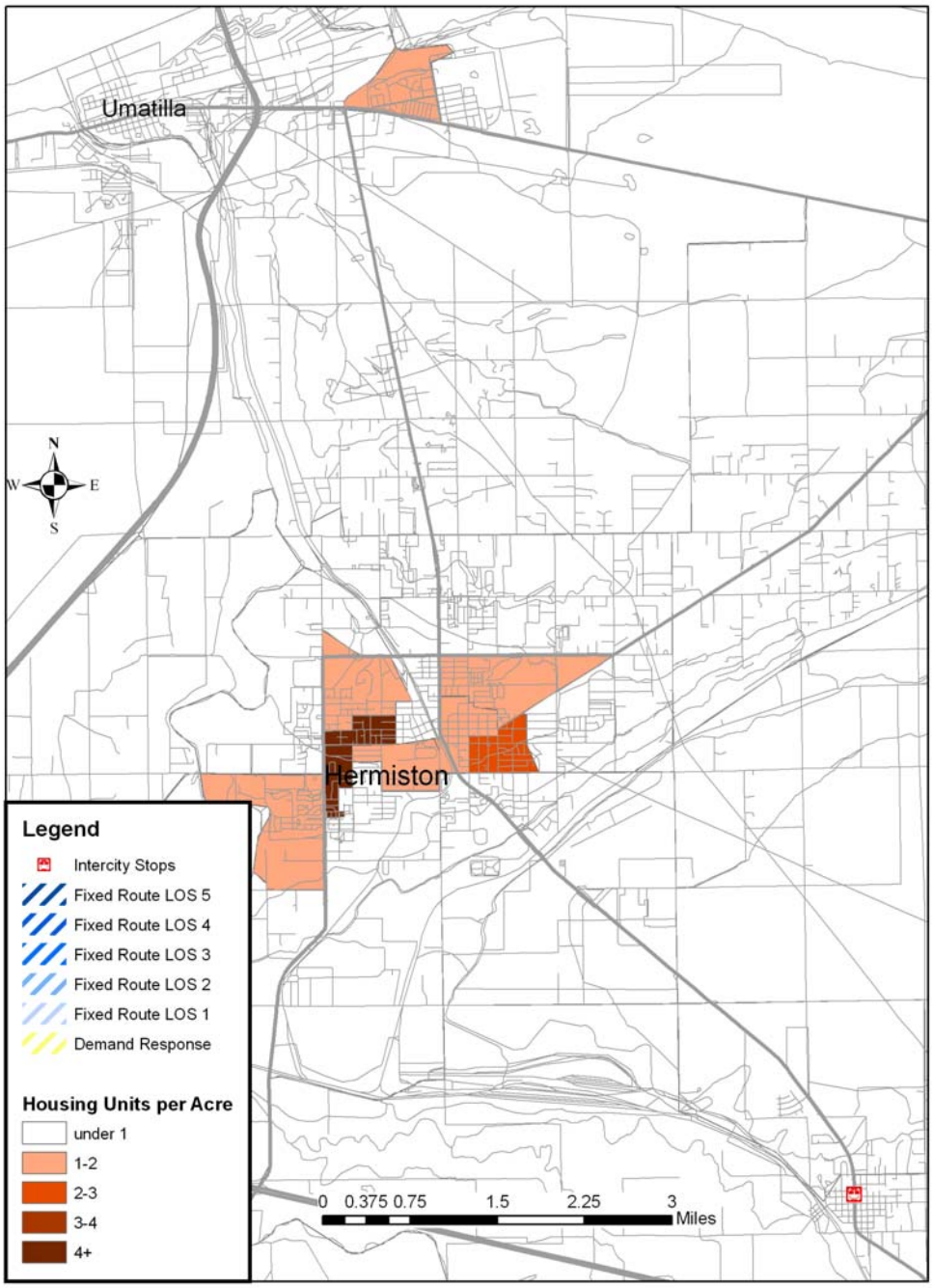


Figure 9.20 City of Hermiston Transit Service Coverage

Note: Confederated Tribes of Umatilla added service to Hermiston (Hermiston Hopper) in October 2009. That service was not included in this analysis or the map above.

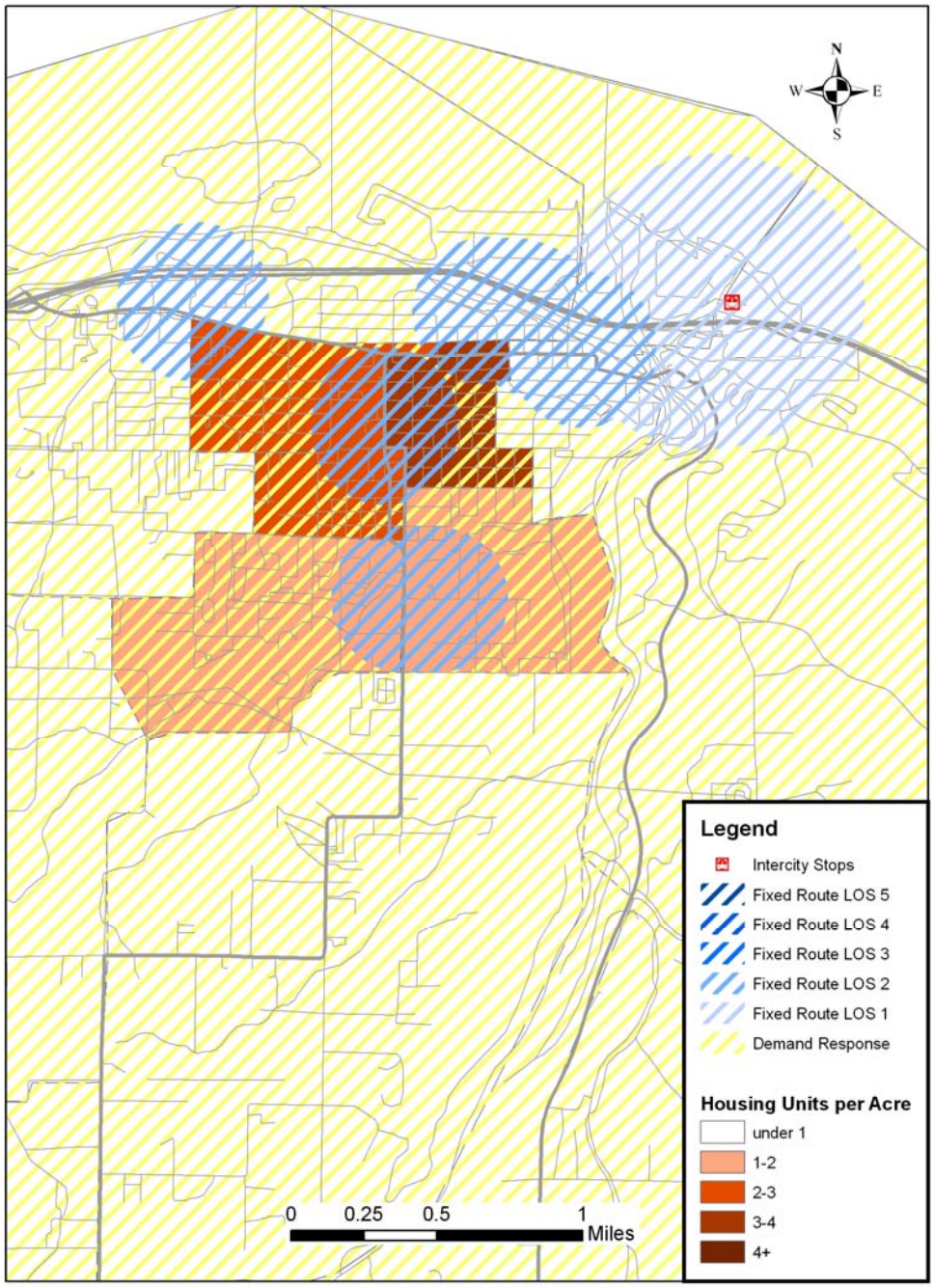


Figure 9.21 City of Hood River Transit Service Coverage

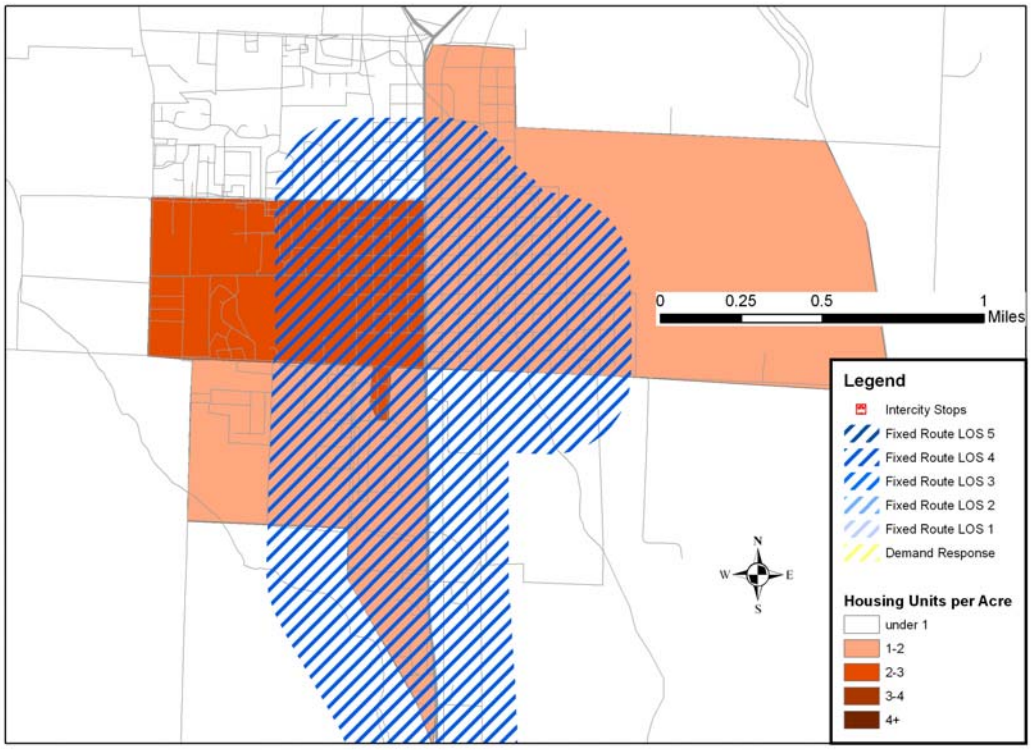


Figure 9.22 City of Junction City Transit Service Coverage

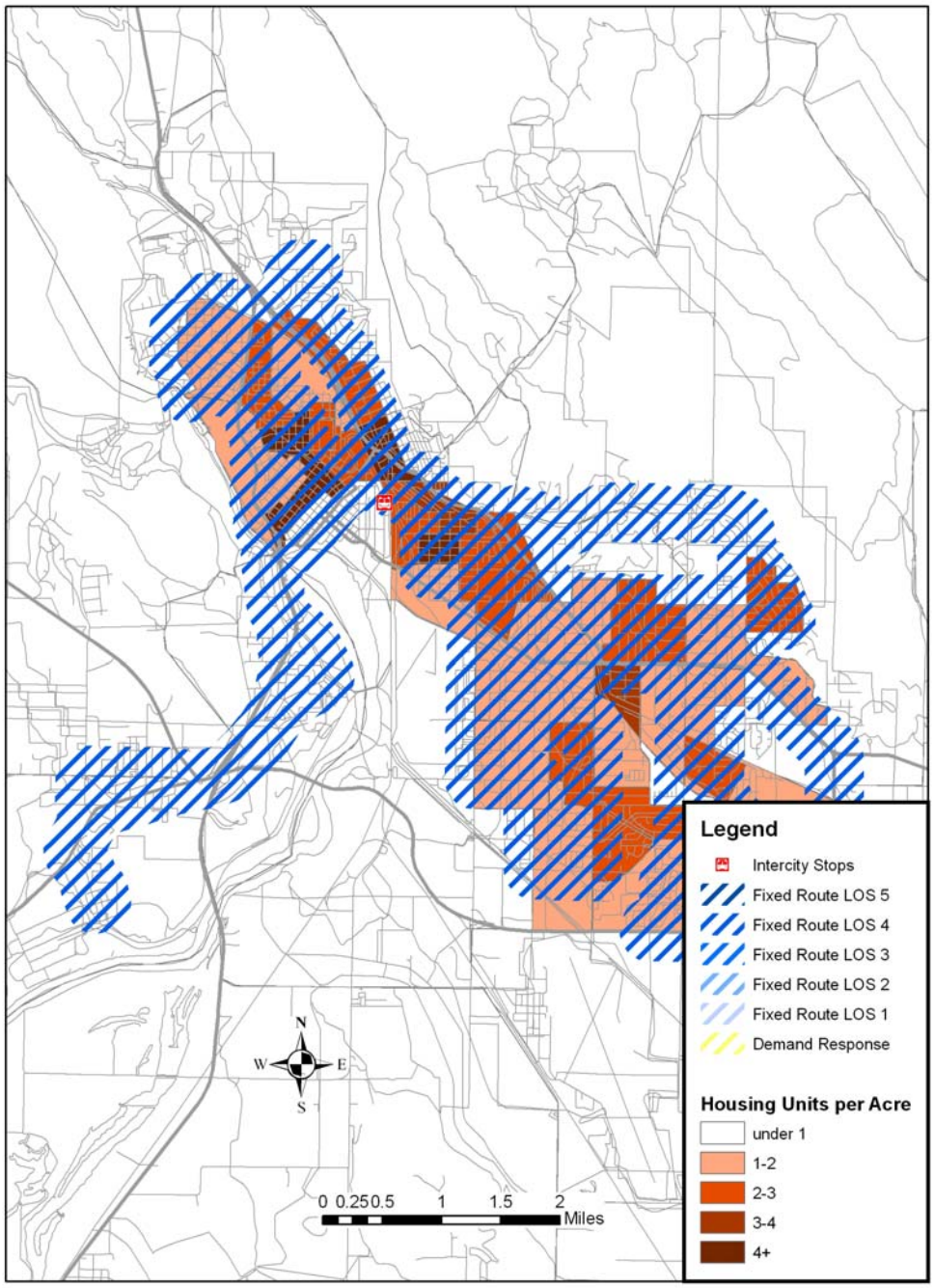


Figure 9.23 City of Klamath Falls Transit Service Coverage

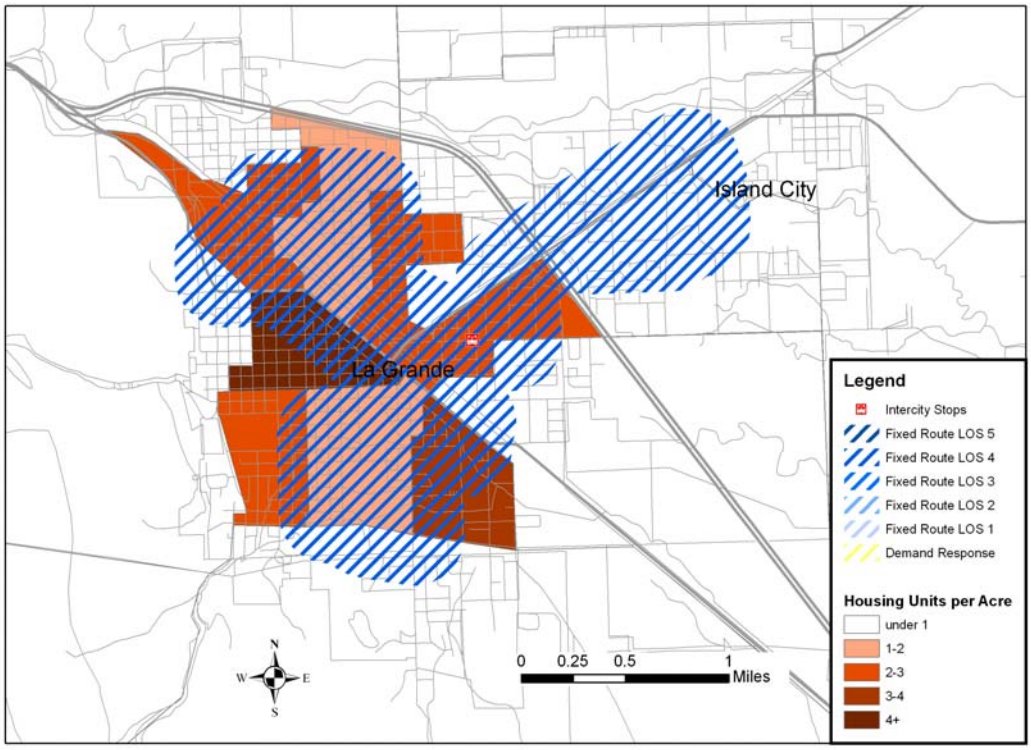


Figure 9.24 City of La Grande Transit Service Coverage

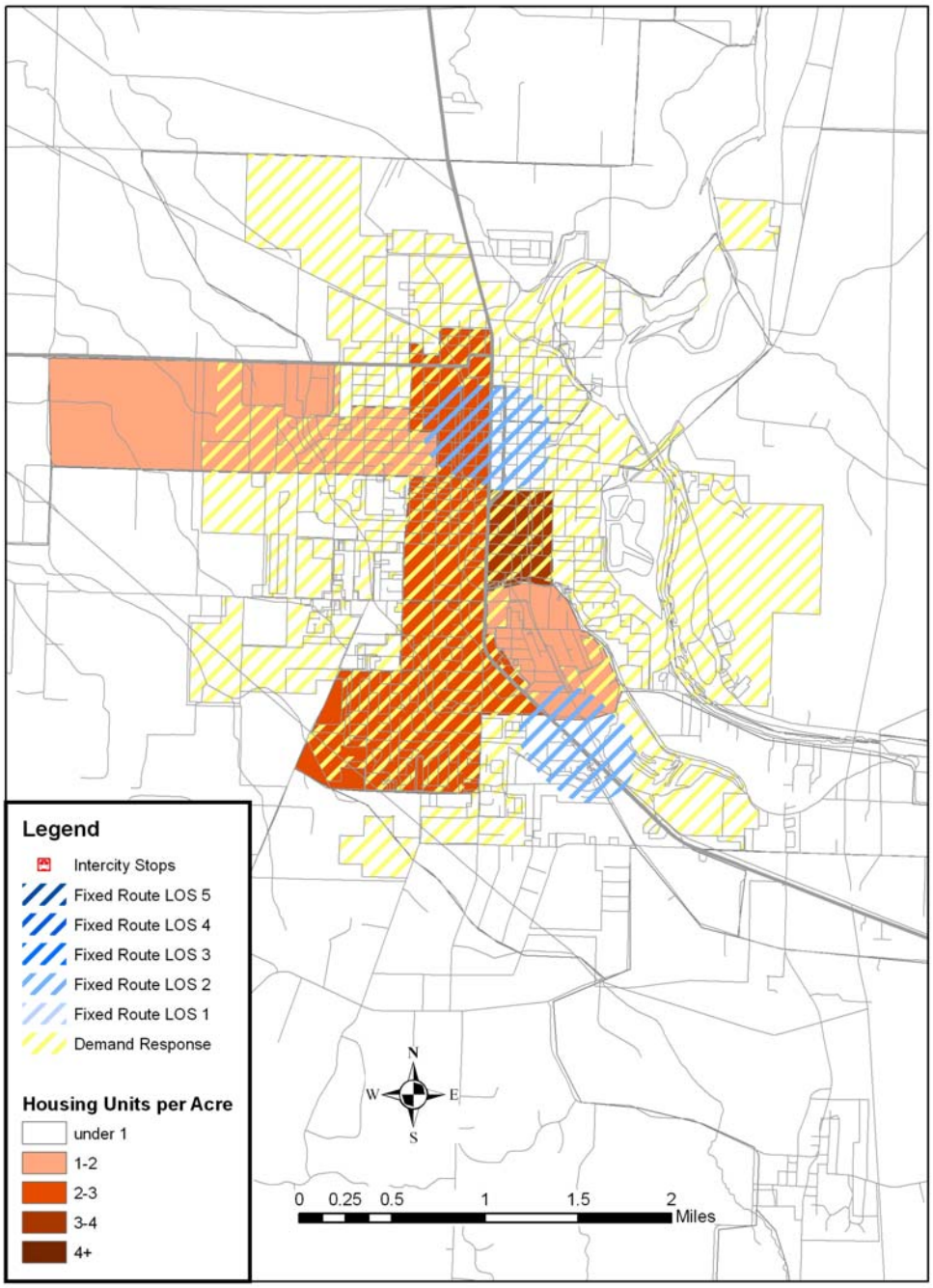


Figure 9.25 City of Lebanon Transit Service Coverage

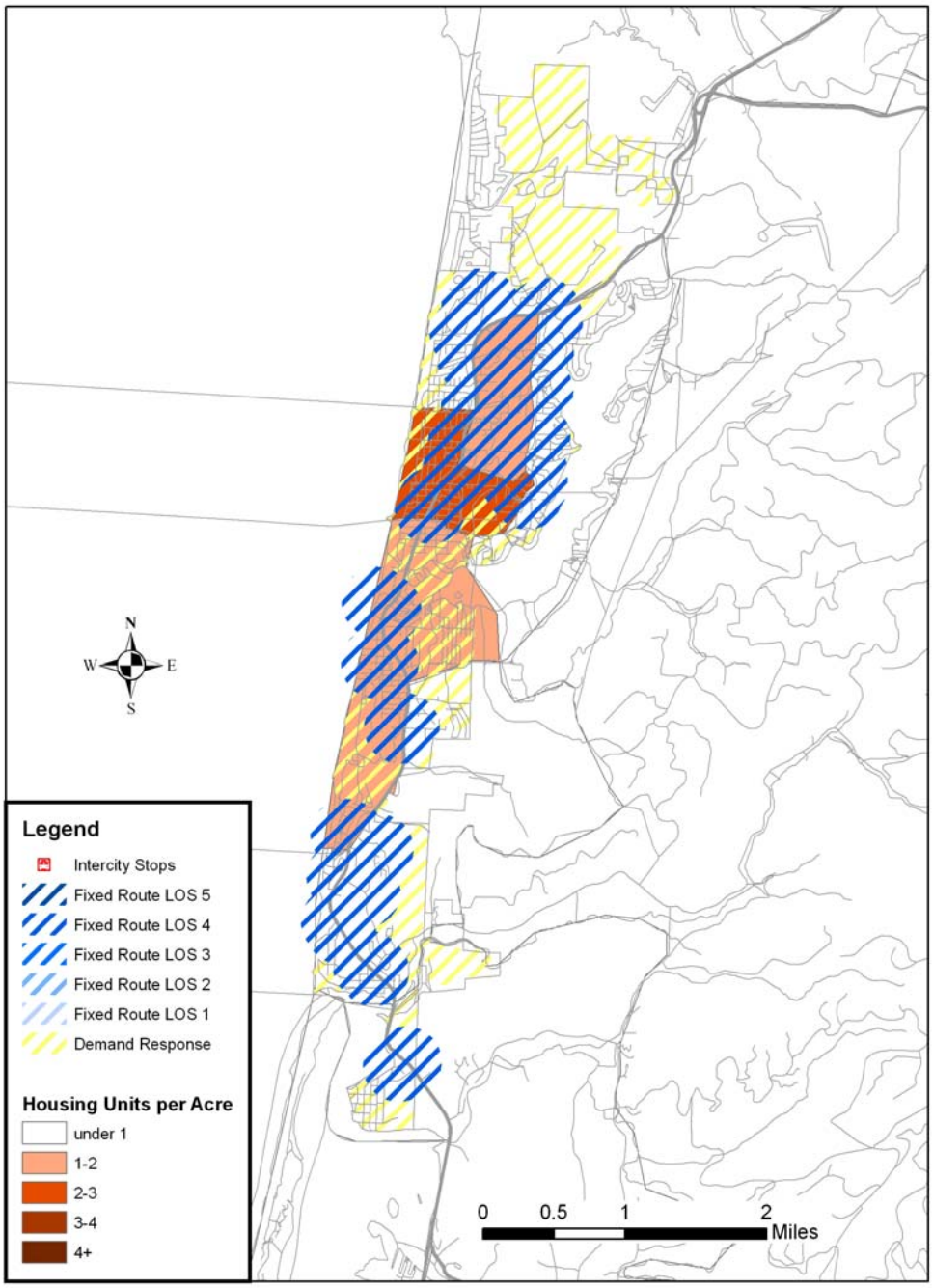


Figure 9.26 City of Lincoln City Transit Service Coverage

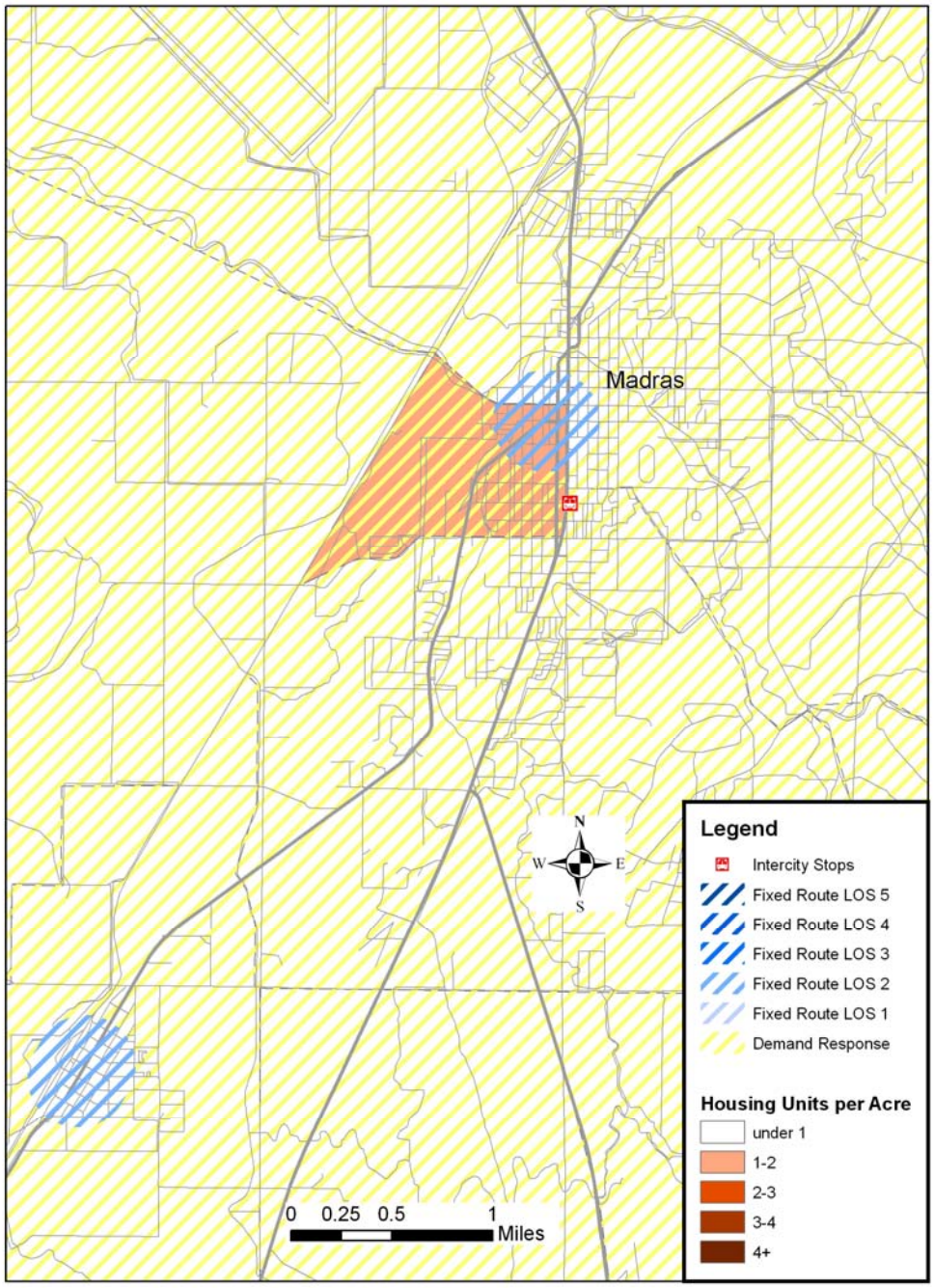


Figure 9.27 City of Madras Transit Service Coverage

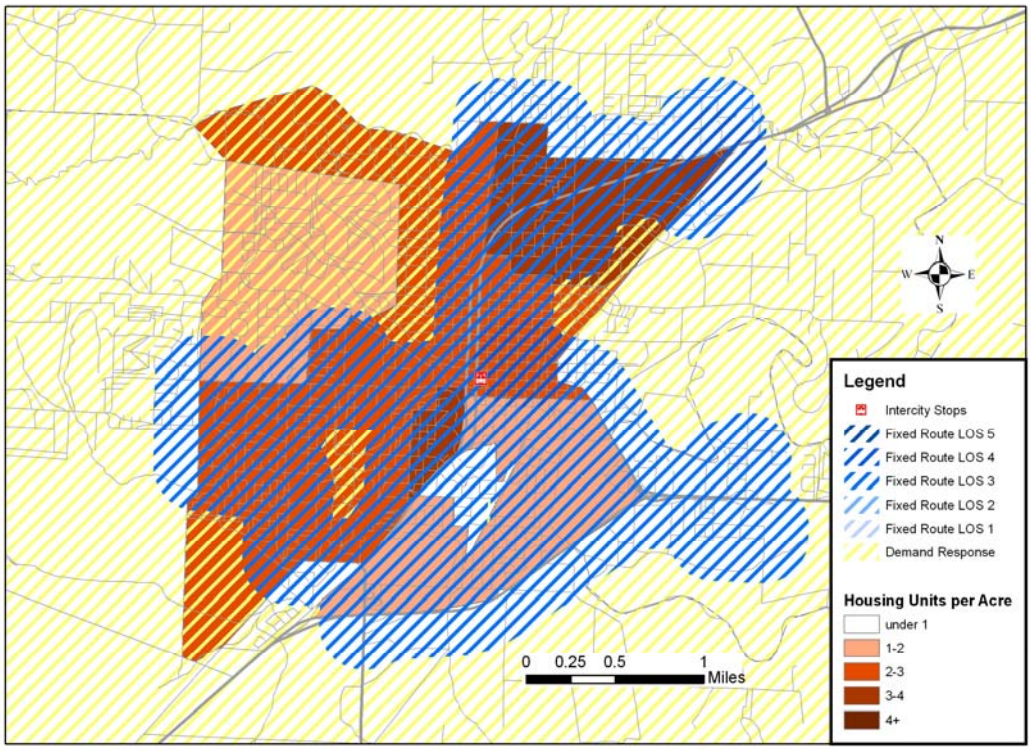


Figure 9.28 City of McMinnville Transit Service Coverage

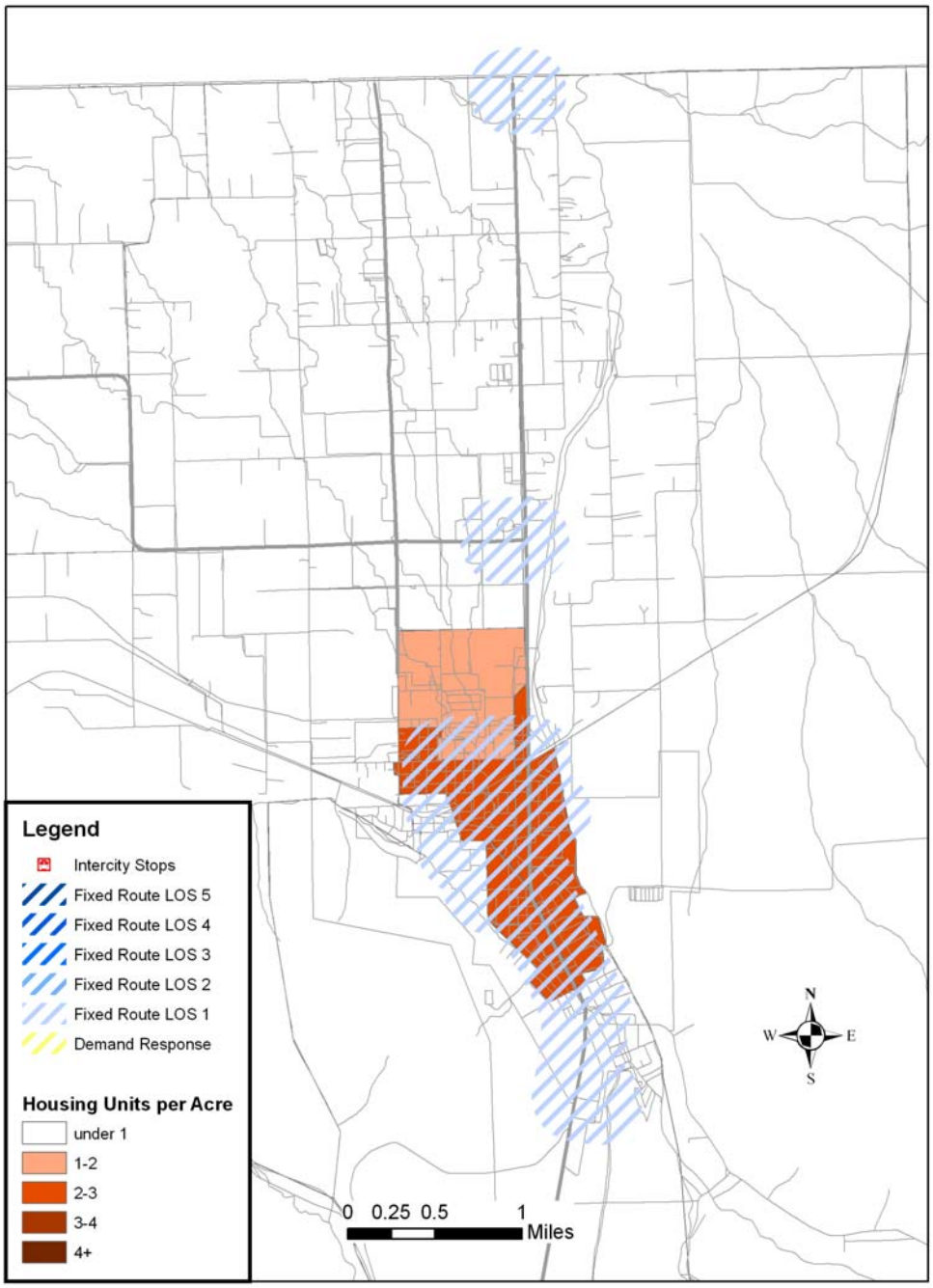


Figure 9.29 City of Milton Freewater Transit Service Coverage

Figure 9.30 City of Molalla Transit Service Coverage

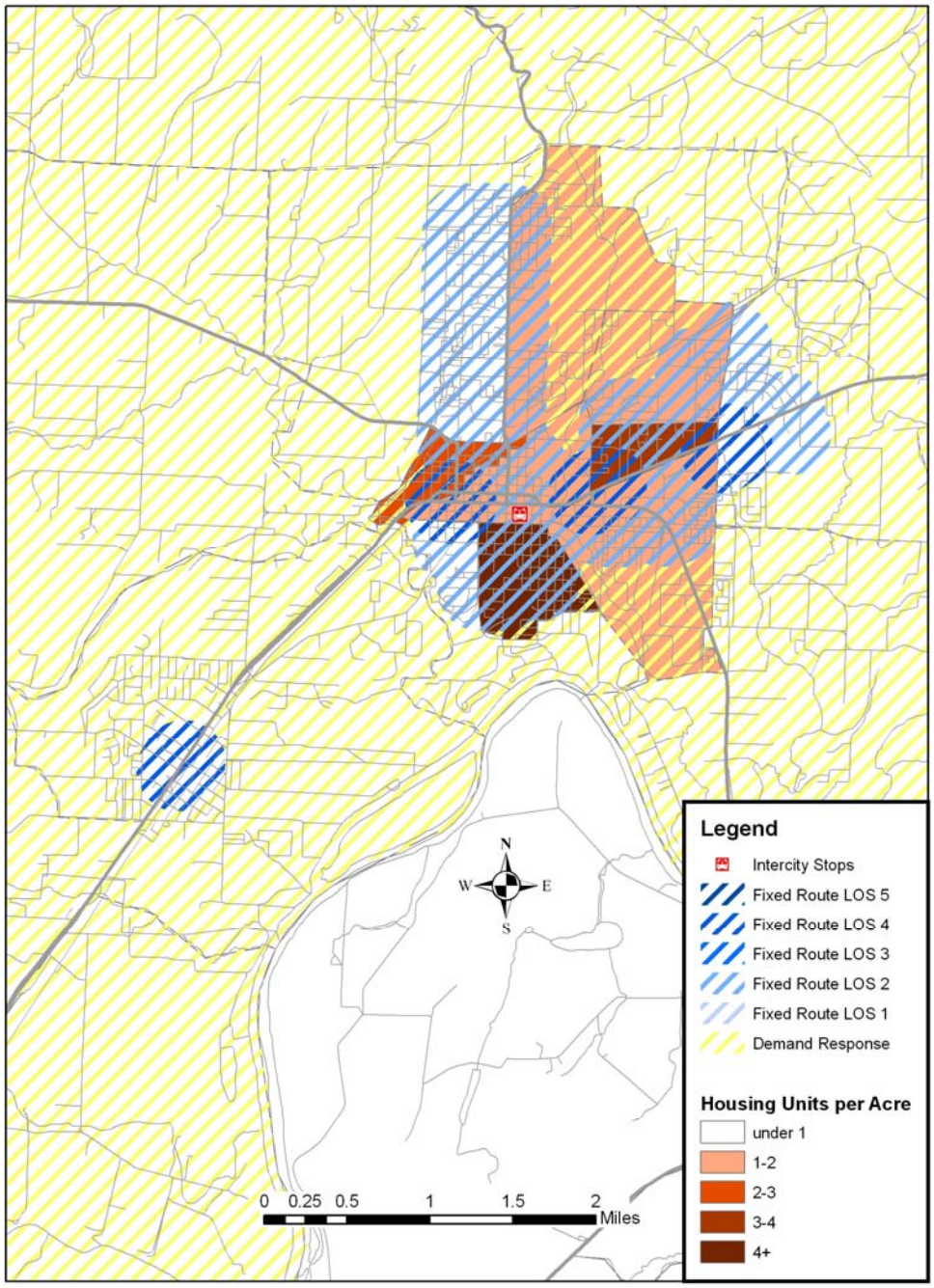


Figure 9.31 City of Newberg Transit Service Coverage

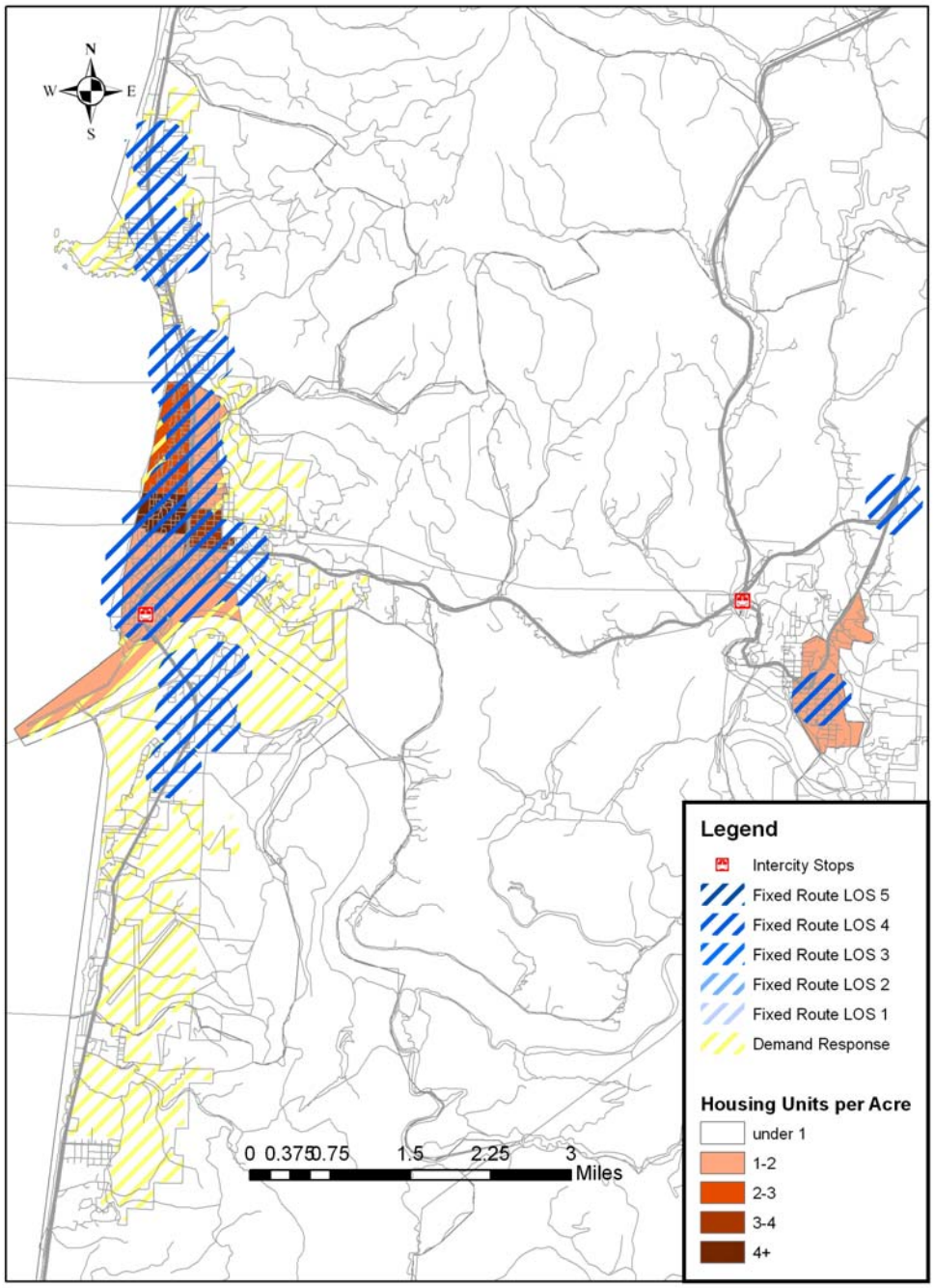


Figure 9.32 City of Newport Transit Service Coverage

Figure 9.33 City of Ontario Transit Service Coverage

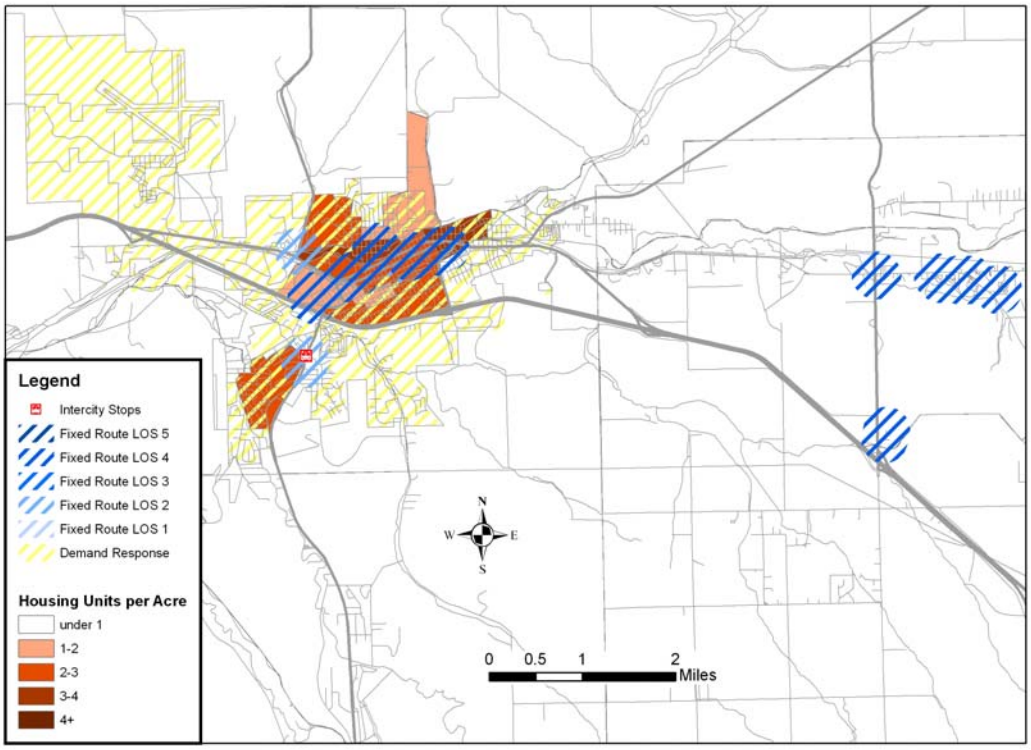


Figure 9.34 City of Pendleton Transit Service Coverage

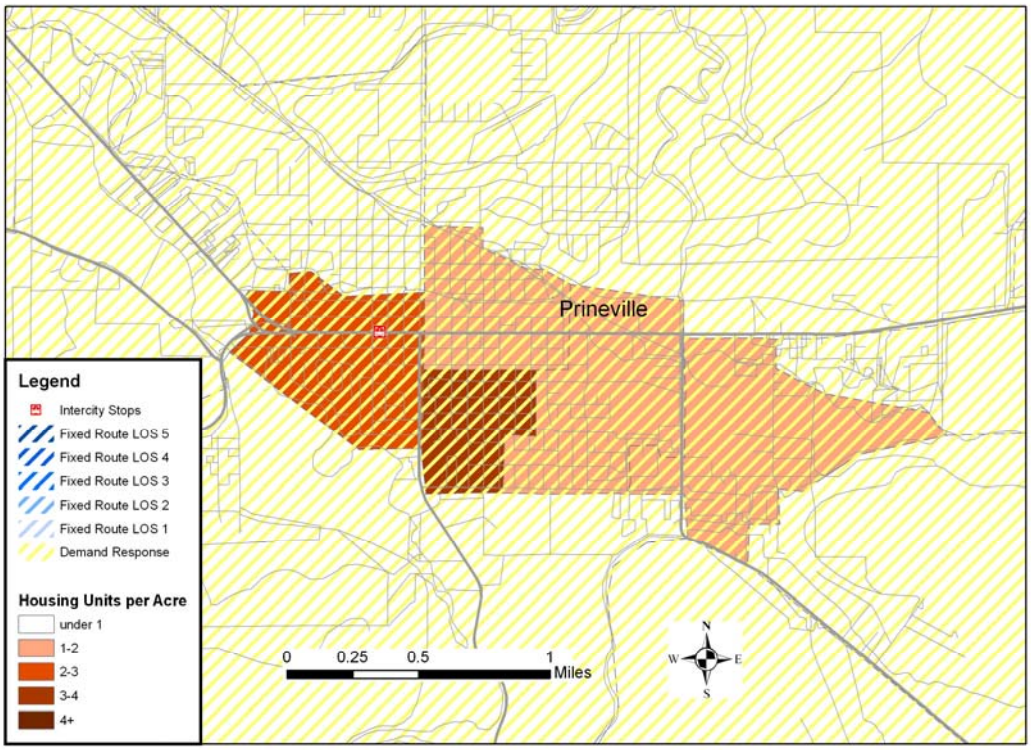


Figure 9.35 City of Prineville Transit Service Coverage

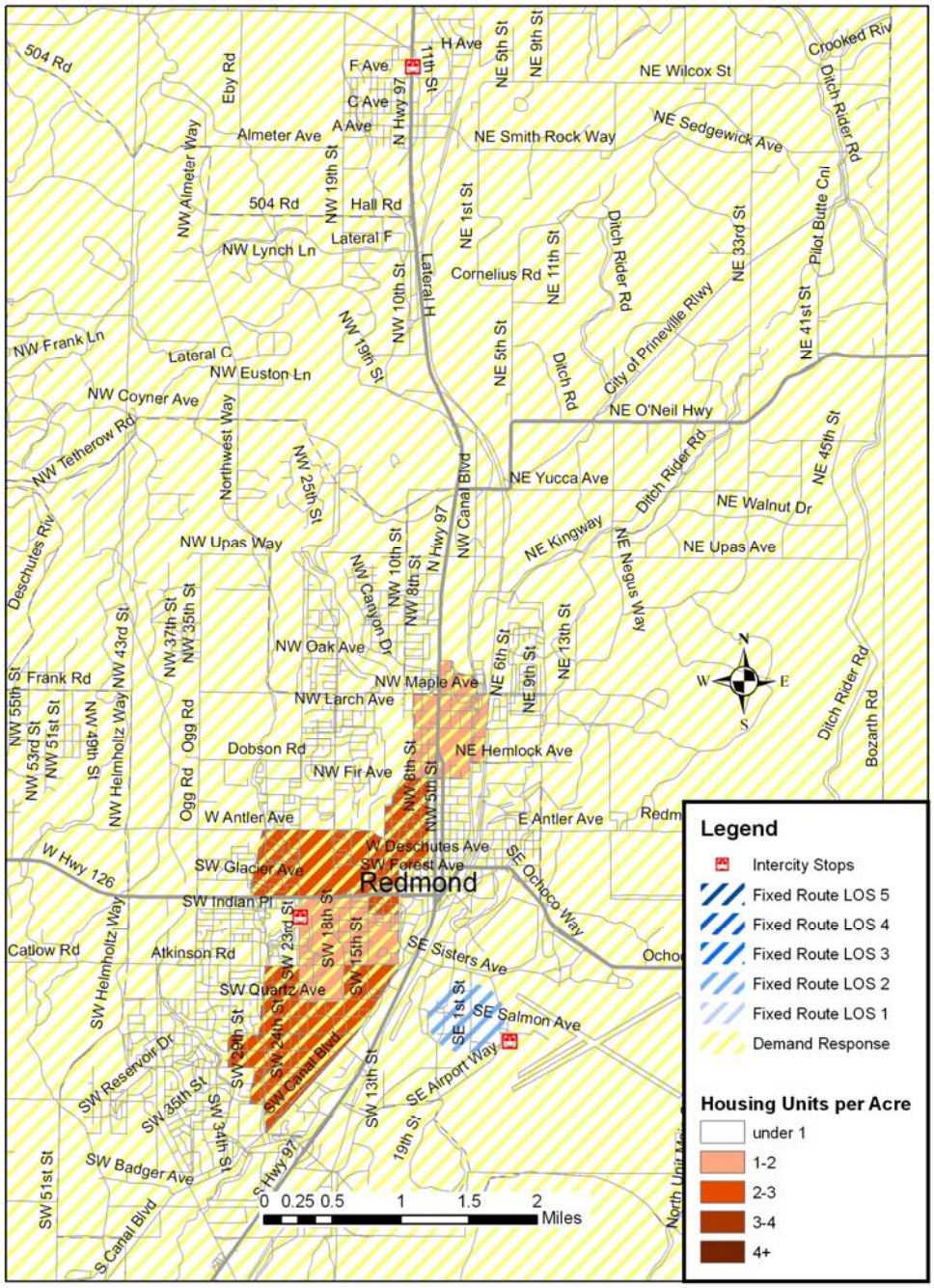


Figure 9.36 City of Redmond Transit Service Coverage

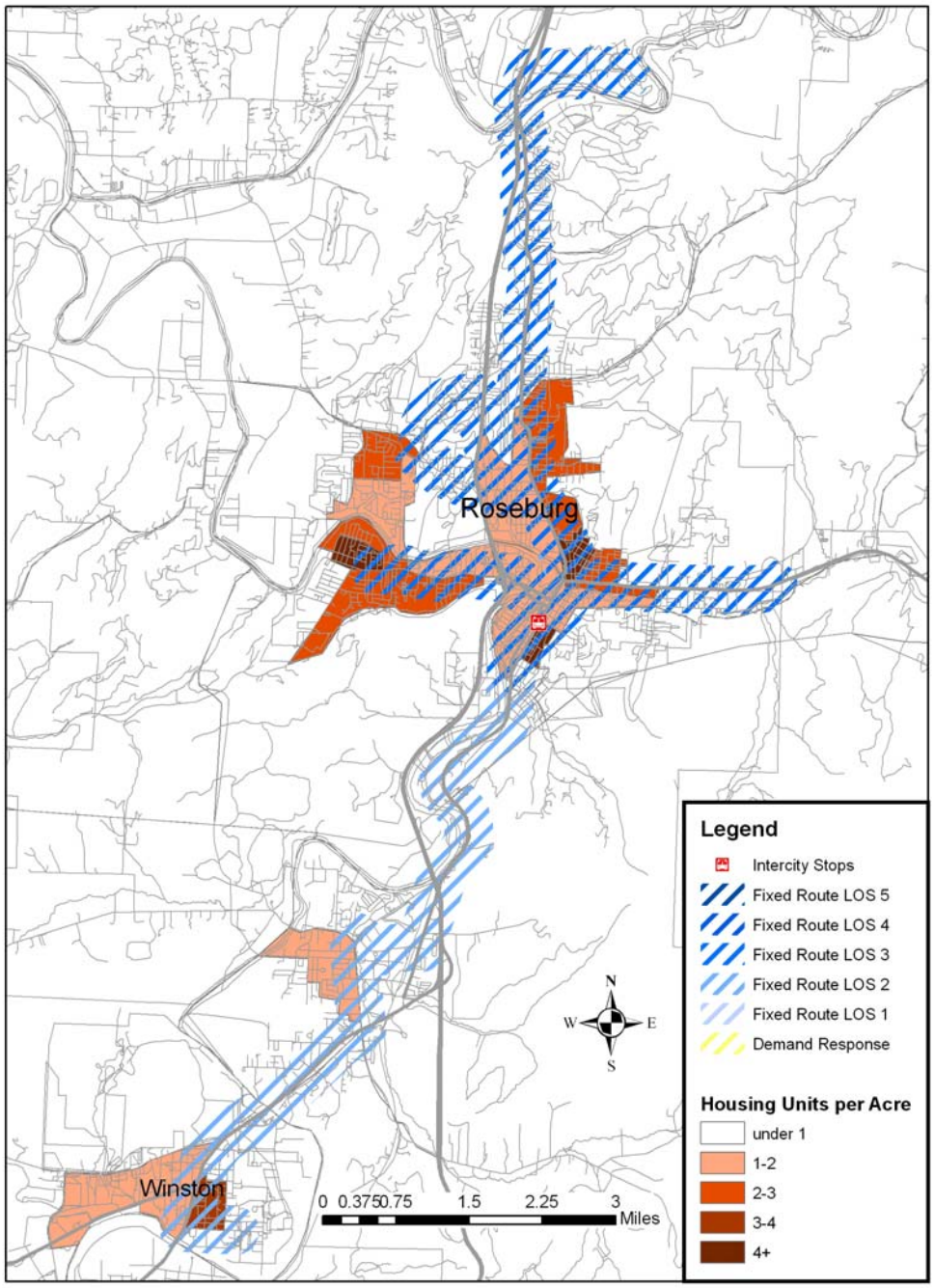


Figure 9.37 City of Roseburg Transit Service Coverage

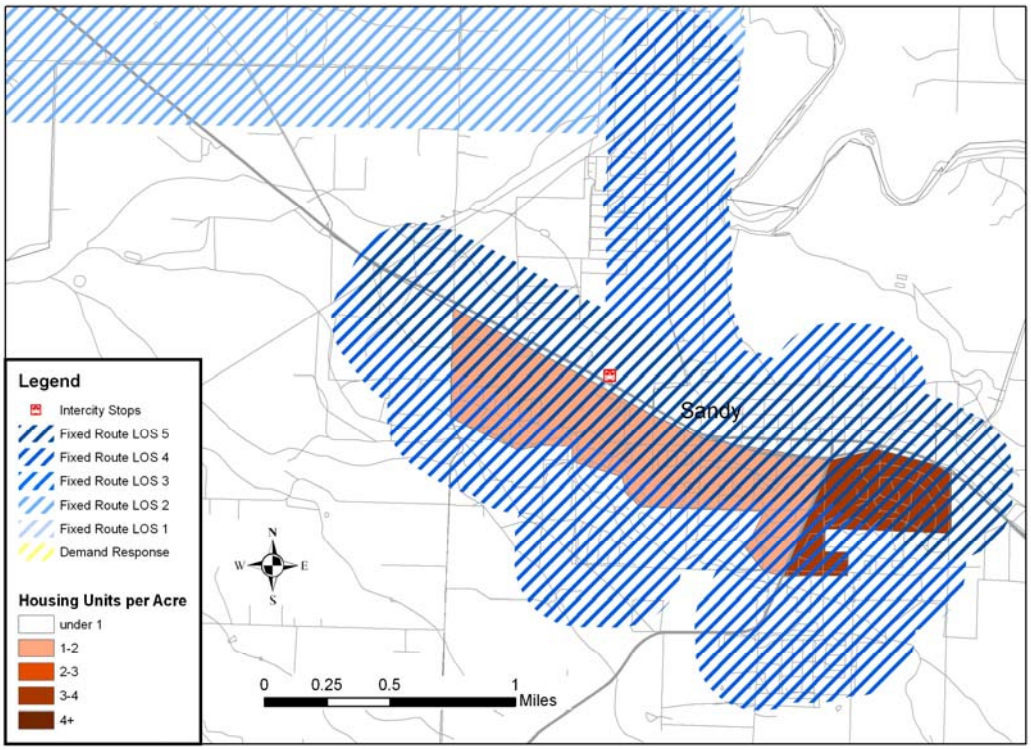


Figure 9.38 City of Sandy Transit Service Coverage

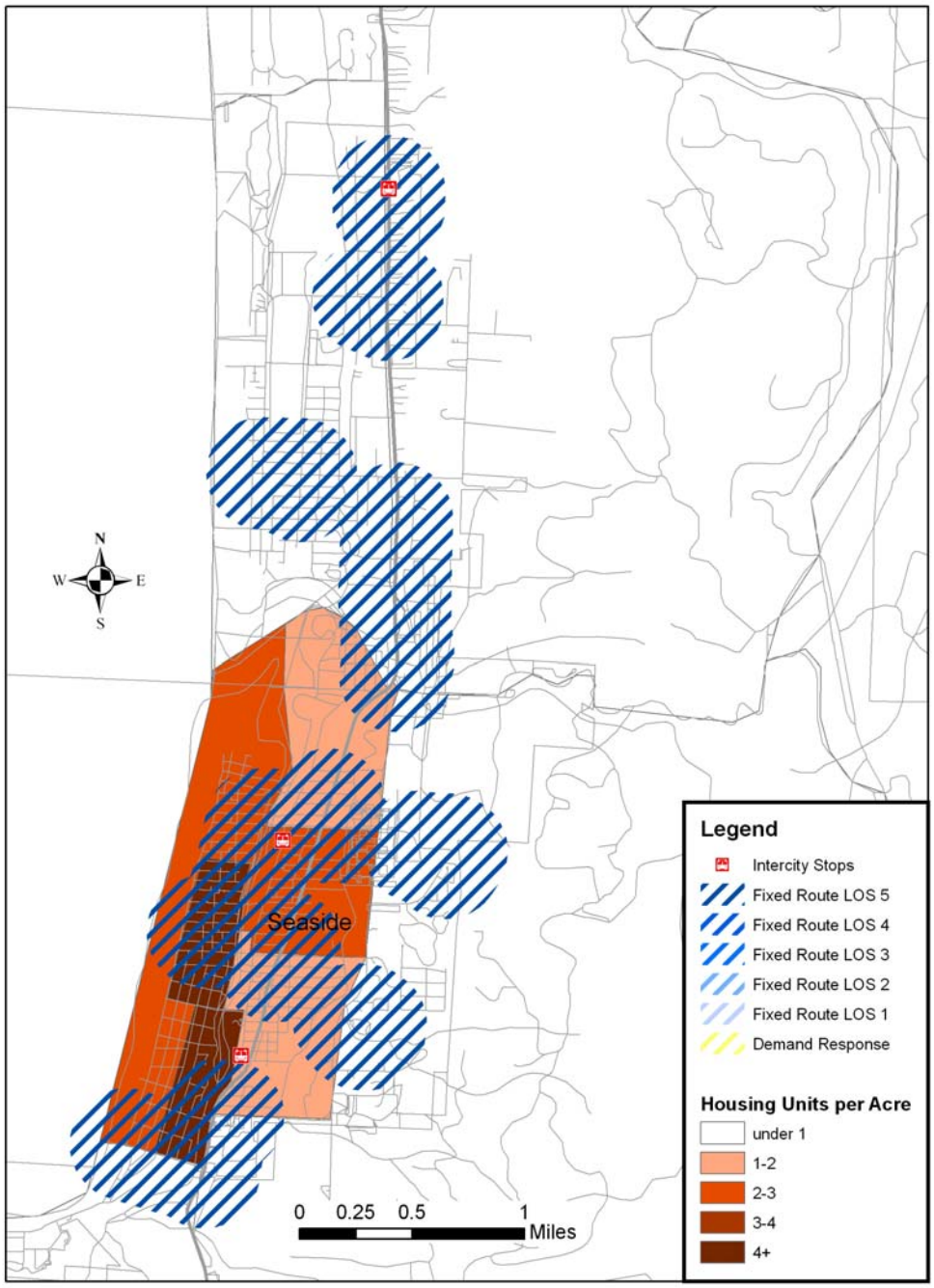


Figure 9.39 City of Seaside Transit Service Coverage

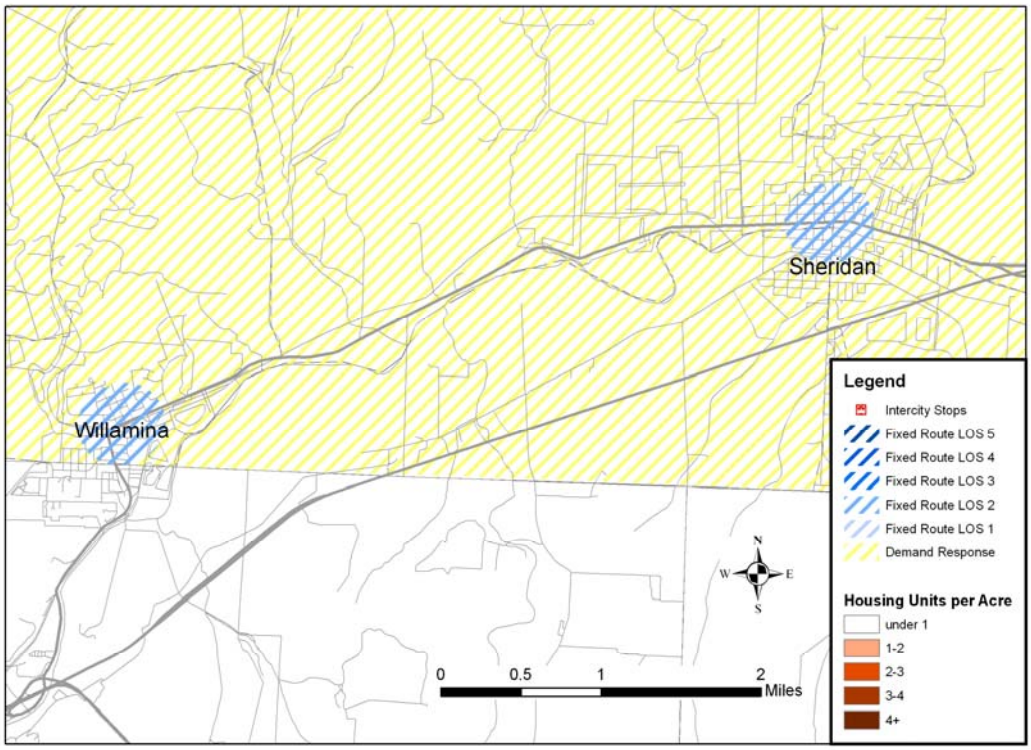


Figure 9.40 City of Sheridan Transit Service Coverage

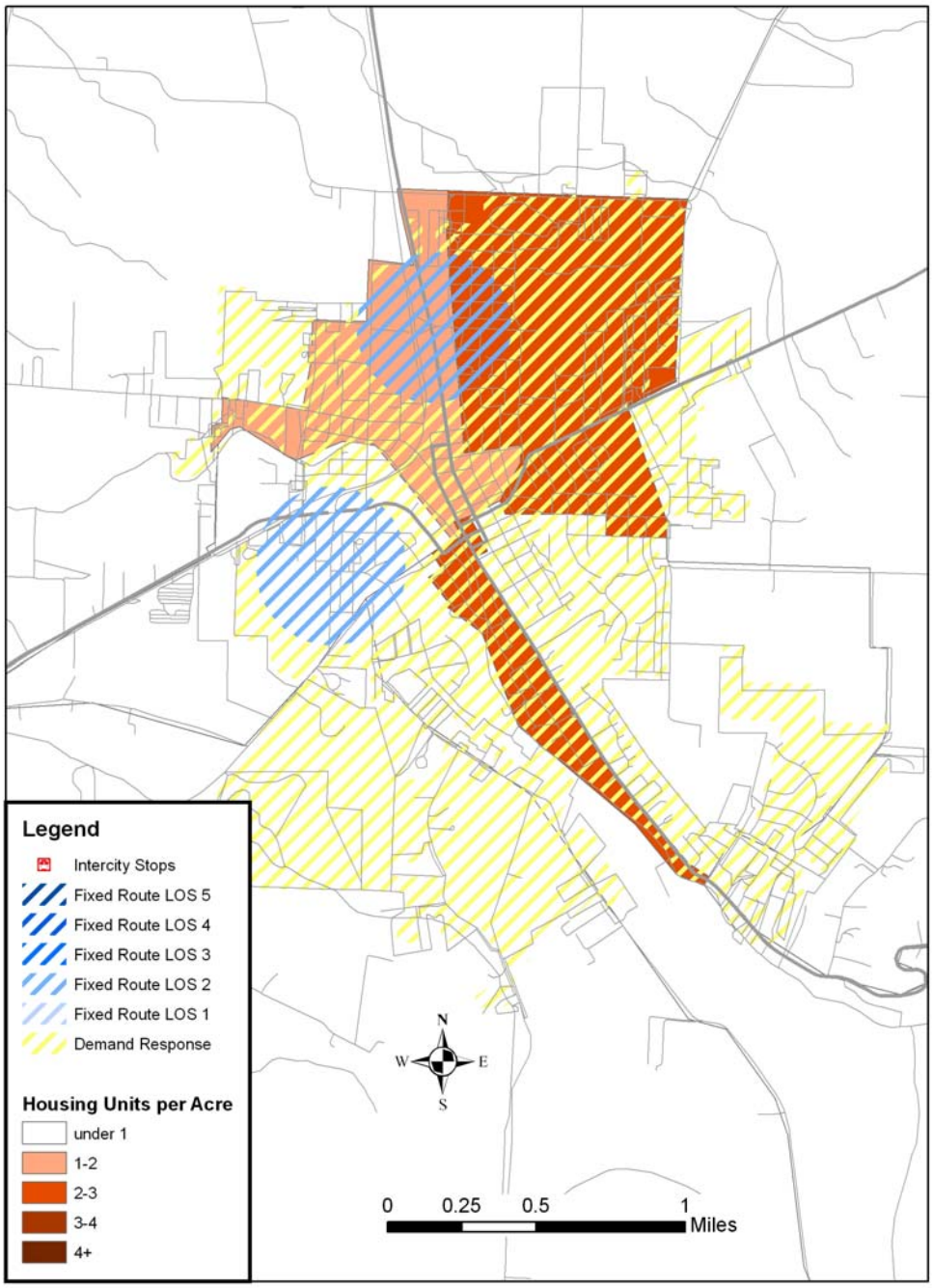


Figure 9.41 City of Silverton Transit Service Coverage

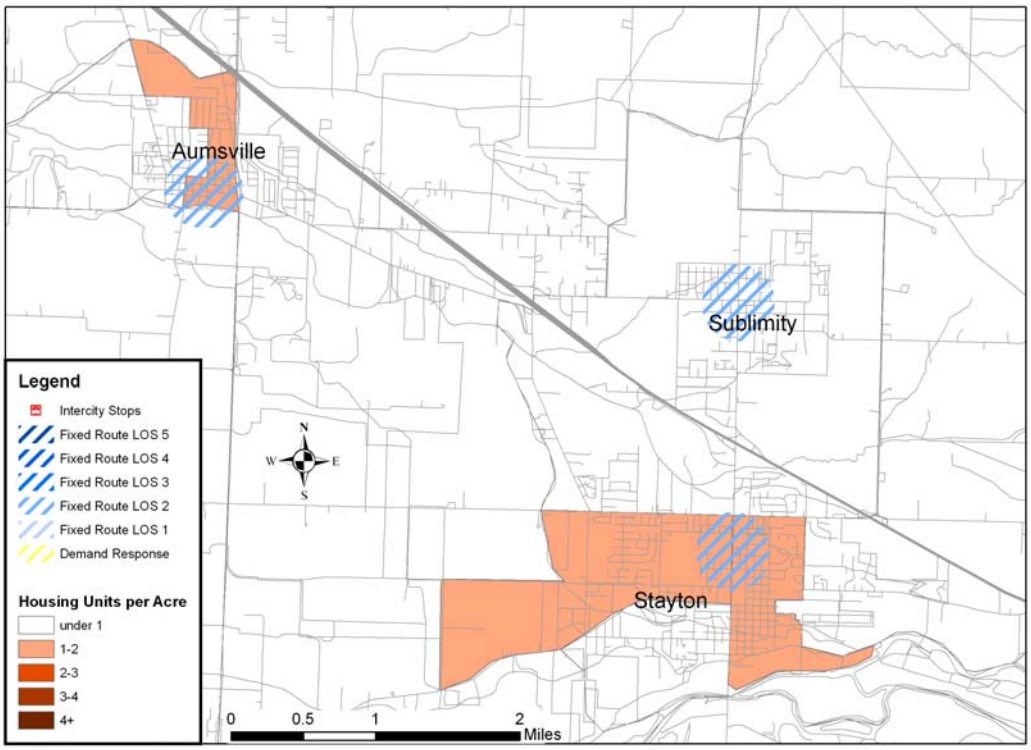


Figure 9.42 City of Stayton Transit Service Coverage

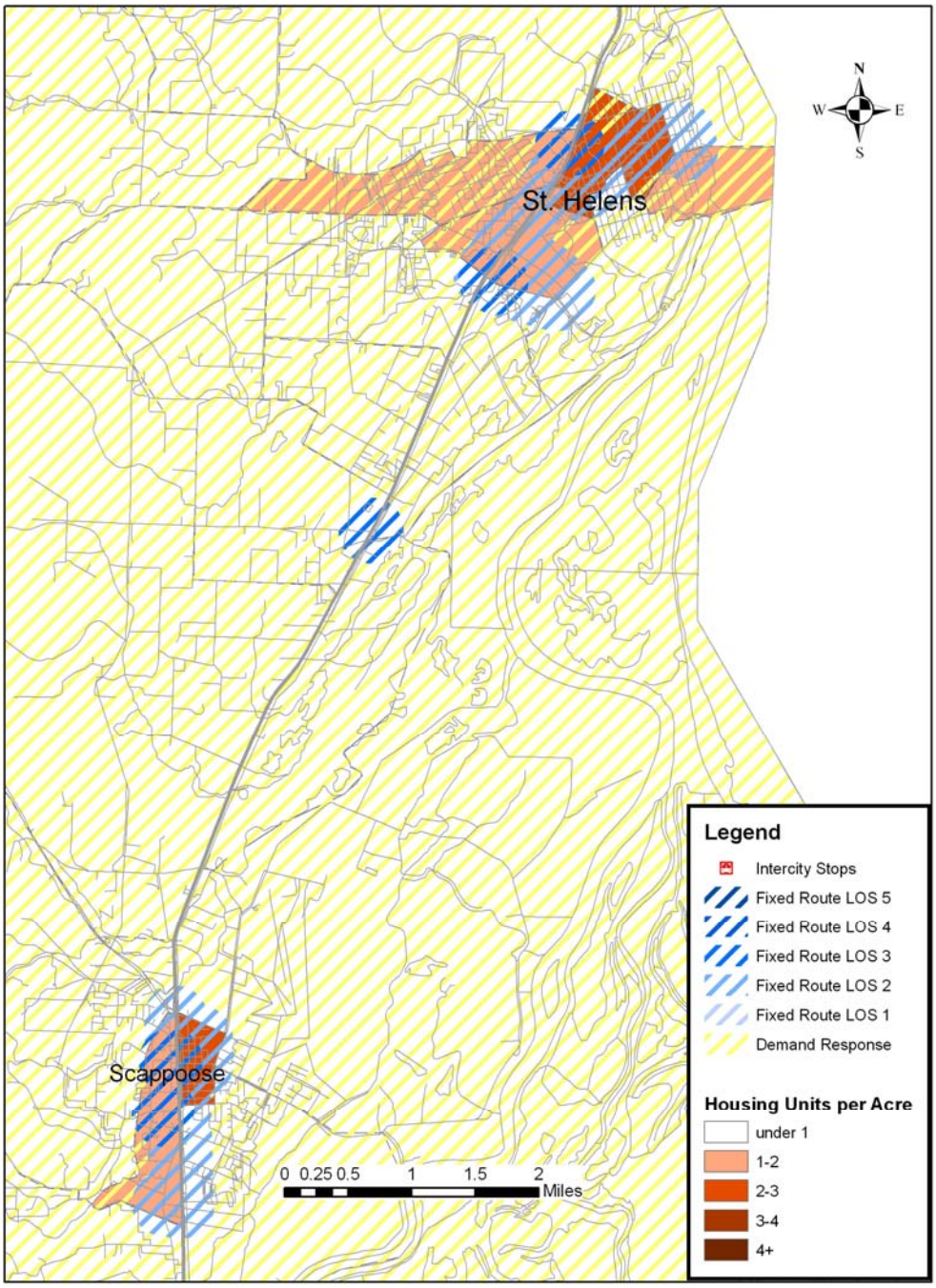


Figure 9.43 City of St Helens Transit Service Coverage

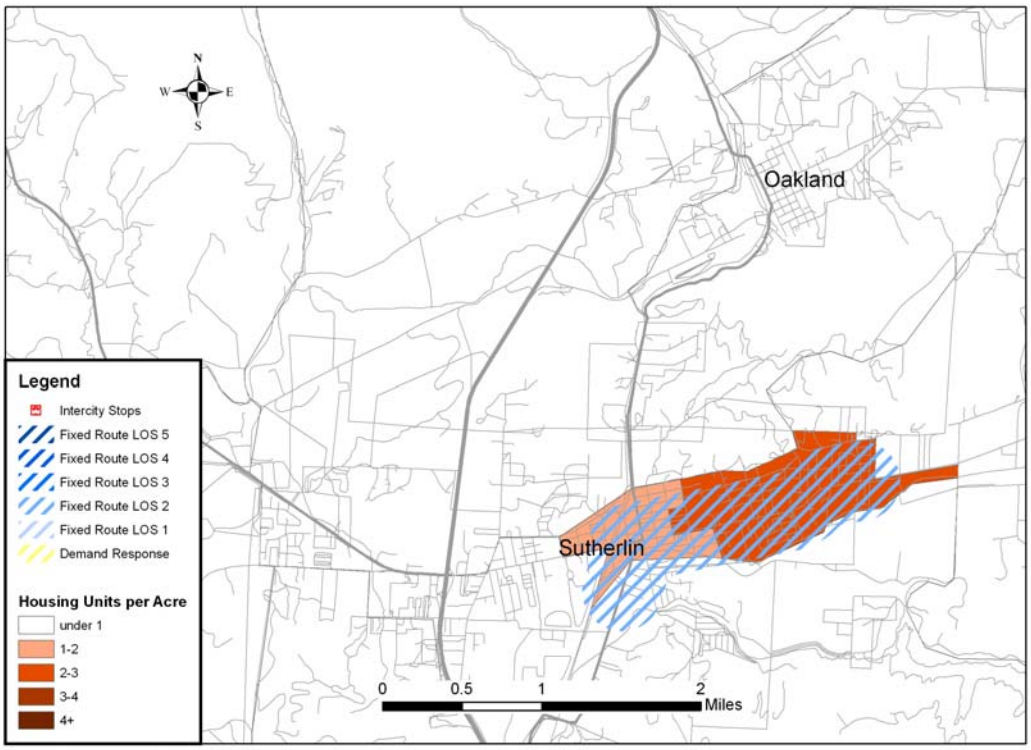


Figure 9.44 City of Sutherlin Transit Service Coverage

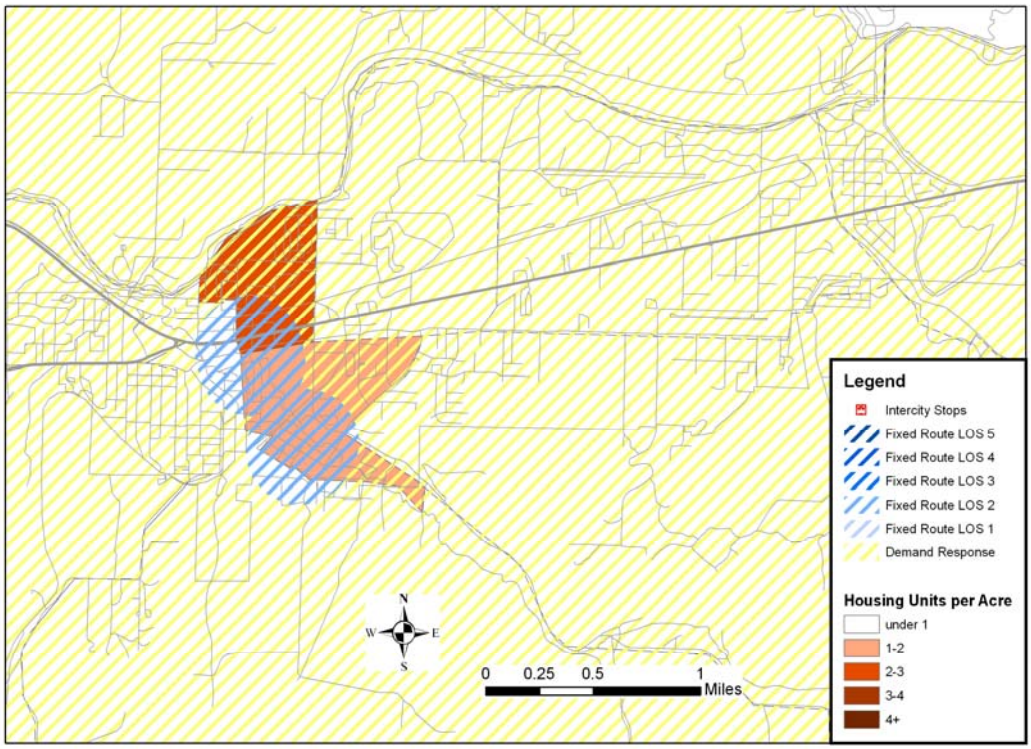


Figure 9.45 City of Sweet Home Transit Service Coverage

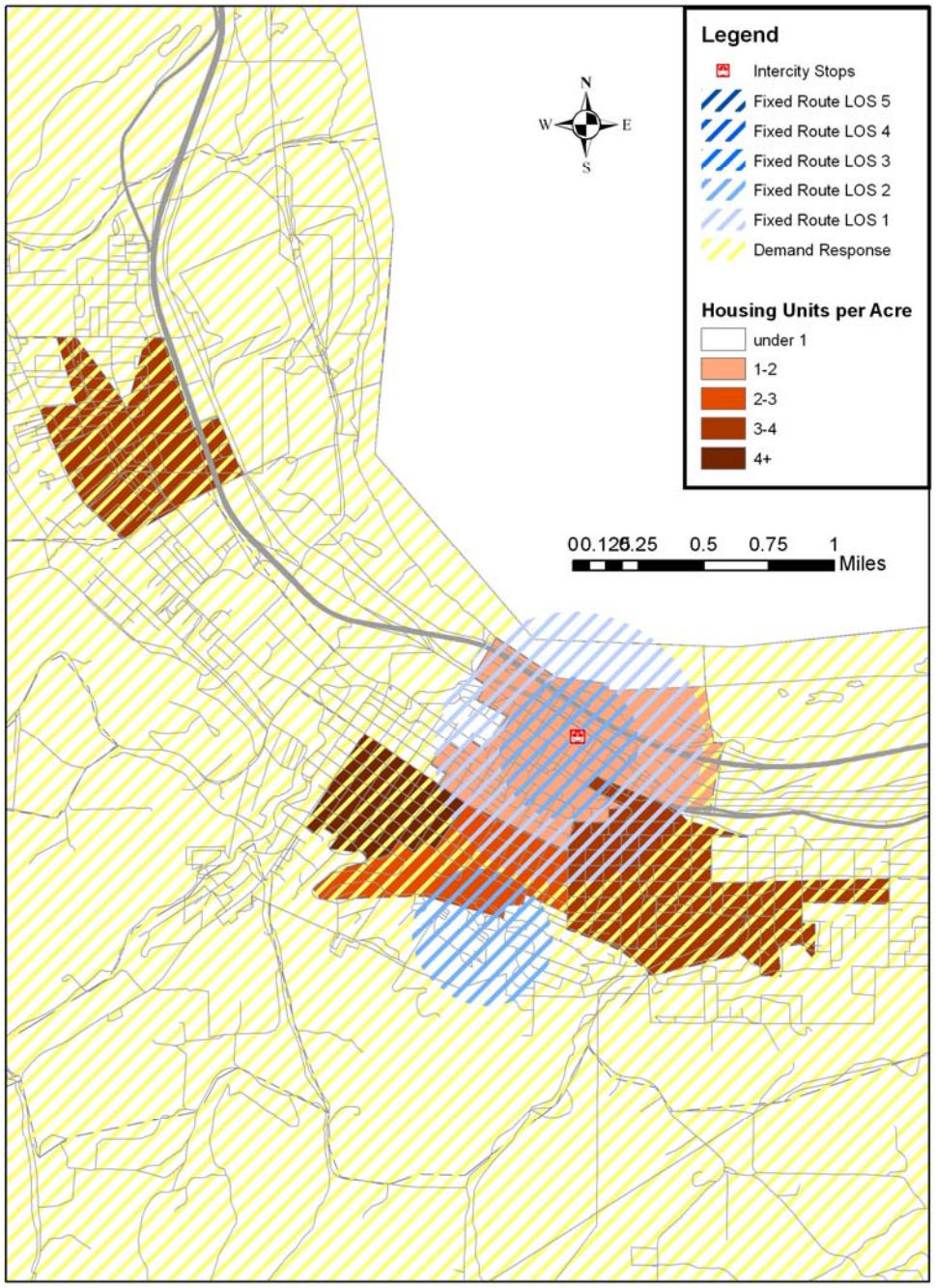


Figure 9.46 City of The Dalles Transit Service Coverage

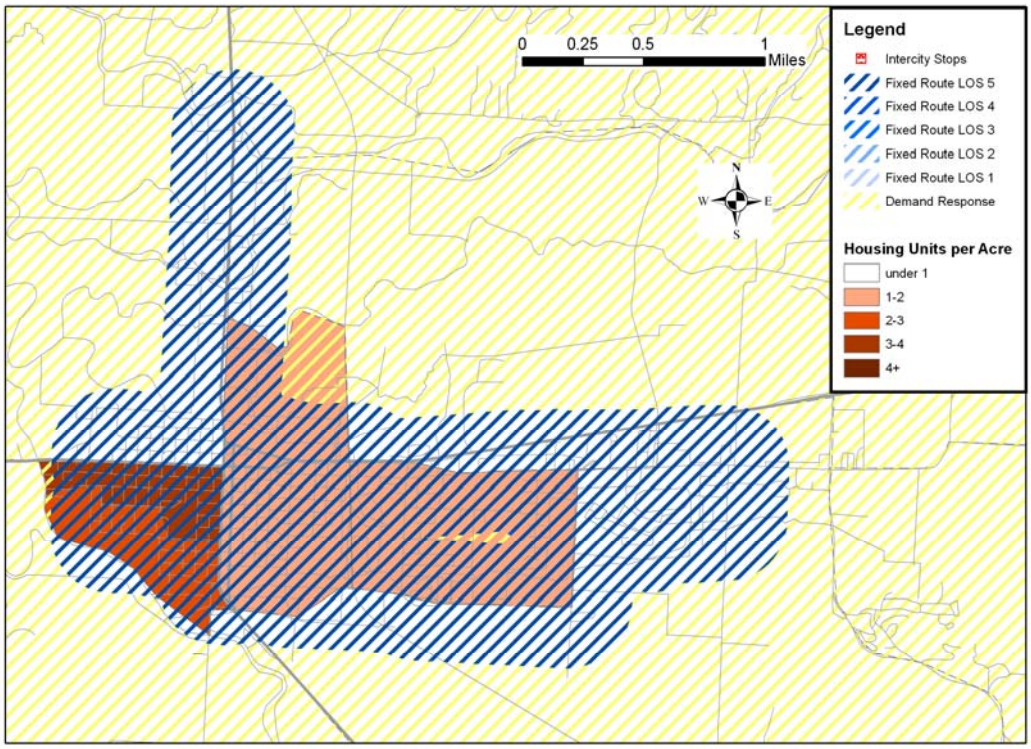


Figure 9.47 City of Tillamook Transit Service Coverage

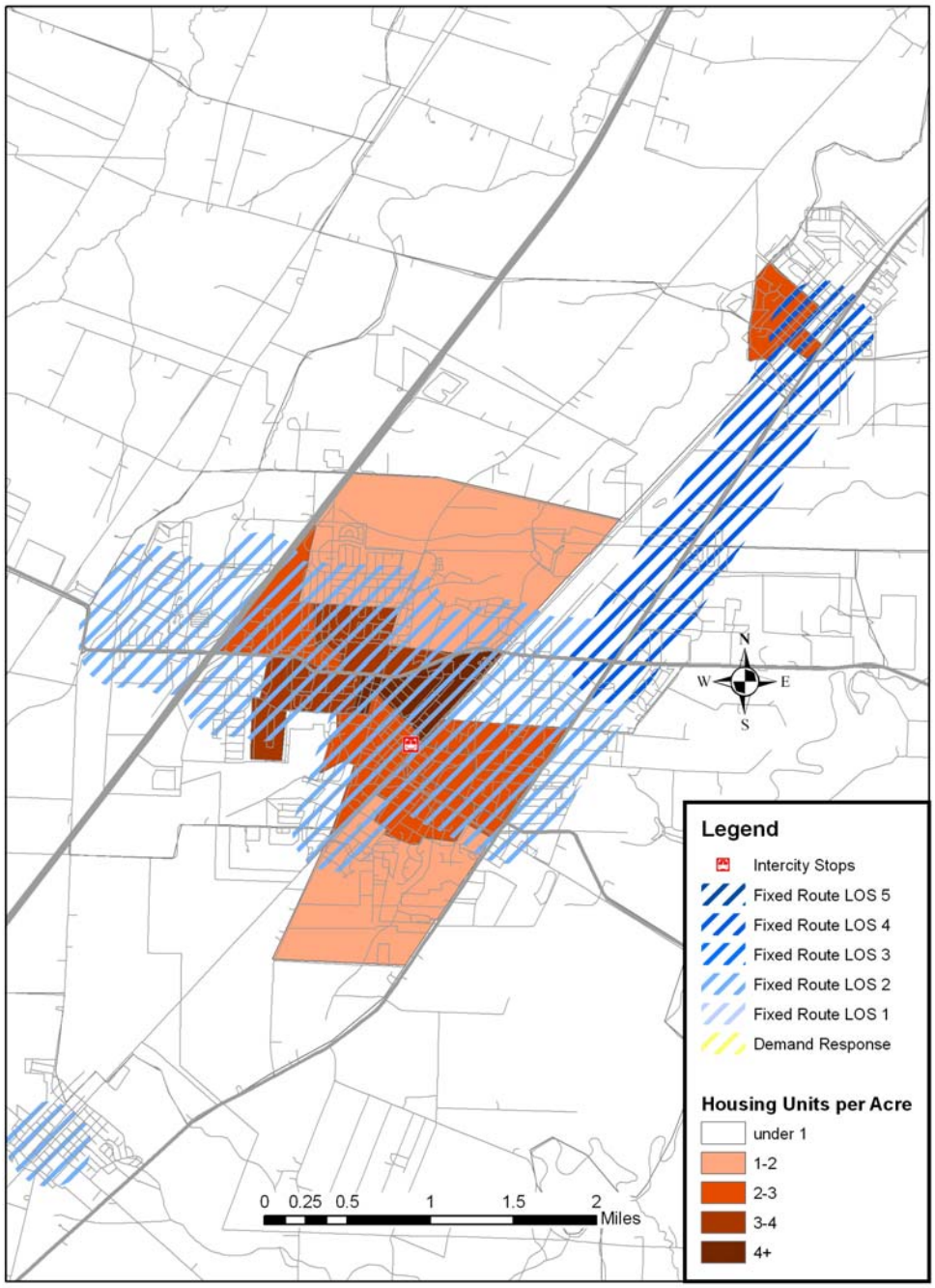


Figure 9.48 City of Woodburn Transit Service Coverage