METRO Forward
TRANSIT FOR TOMORROW

Comprehensive Operational Analysis

SERVICE EVALUATION
JANUARY 2016

PREPARED BY:

TMD
TRANSPORTATION MANAGEMENT & DESIGN, INC.

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Service Evaluation

Introduction

The Service Evaluation provides a data-driven analysis of the Santa Cruz METRO transit system by examining service system-wide, as well as by service role and by route. The following analysis will provide background on the existing METRO network, identify current successes and challenges in the Santa Cruz METRO service area, and present opportunities for maintaining and growing ridership in light of upcoming fiscal challenges. The results from the service evaluation will contribute to the development of service alternatives and recommendations.

- **METRO Service Overview** describes the existing transit system, as well as provides some historical context for the transit agency.
- **Existing Conditions** reviews overall system ridership and system-wide patterns, as well as the productivity and financial effectiveness of the current system. These key findings on ridership, productivity, and financial performance are also presented at the individual route and service category level. Service categories are defined by the network role (Intercity, Local, Rural) or by specific service characteristics (Highway 17 Express, UCSC).
- **Service Evaluation Key Findings** presents a summary of the findings, both system-wide and at the route-level, and presents initial thoughts on recommendations for service changes.

Data for this analysis was compiled using a variety of sources. Farebox data from Fiscal Year 2015 was used for ridership by route and by time period. Specific routes that warranted further evaluation were analyzed using a partial ridecheck that was conducted between October 13 and October 18, 2015. Ride checks are used to identify specific locations where passengers board and alight from buses along the route. This partial ridecheck focused primarily on rural routes, local routes in Santa Cruz and Watsonville, and segments of higher ridership routes that warranted further analysis. The following routes had stop-level information collected: 3, 4/4W, 8, 19, 33, 40, 41, 42, 54, 55, 56, 72, 74/74S, 75, 77, and 79. Additionally, ridechecks were conducted on Route 12 between Capitola and Laurel/Pacific, Route 35 north of Boulder Creek, Route 68 from Pacific Station to East Cliff Village, and Route 71 between Watsonville Transit Center and Freedom/Soquel. The surveyors collected information on passenger boardings, alightings, and load data at all stops for these routes in addition to arrival and departure times at timepoints for weekday, Saturday, and Sunday trips.

Santa Cruz METRO Service Overview

Santa Cruz METRO operates fixed-route, semi-express, and express services throughout the majority of Santa Cruz County. In addition, Santa Cruz operates the Highway 17 Express, a service funded jointly by Santa Cruz METRO, Santa Clara Valley Transportation Authority, Caltrans, Amtrak, and the Capitol Corridor Joint Powers Authority. Santa Cruz Metro provides service to the following communities: Santa Cruz, Watsonville, San Lorenzo Valley, Scotts Valley, Soquel, Capitola, Live Oak, Aptos, Felton, as well as other unincorporated areas of Santa Cruz County.

Annual ridership for Santa Cruz was growing consistently in the mid 2000s. However, as a result of the financial crisis in 2008 and subsequent funding instability, service was cut in Fall 2010 and several routes were eliminated. Fall 2011 brought another round of service cuts, which resulted in even lower ridership in 2012. In 2011 and 2012 alone, service was cut by 8 percent. While revenue hours and miles have returned to pre-cut levels, it is important to recognize that the service has not been fully restored in all parts of Santa Cruz County. During this time period, the Watsonville Transit Planning Study made recommendations to improve the network around Watsonville, and as a result of this study, many of the service increases have focused on improving Watsonville service rather than countywide.

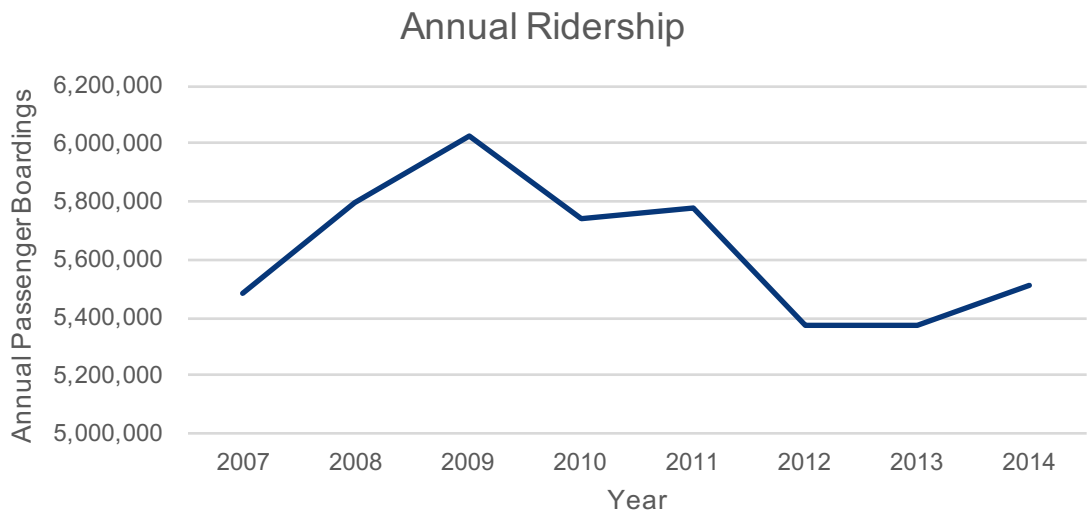


FIGURE 1: ANNUAL RIDERSHIP

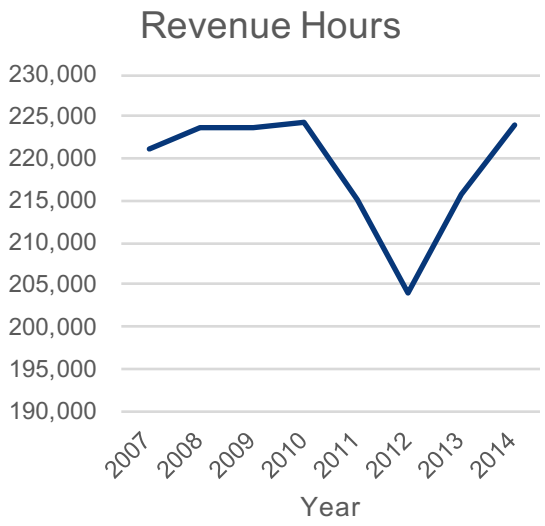


FIGURE 2: REVENUE HOURS

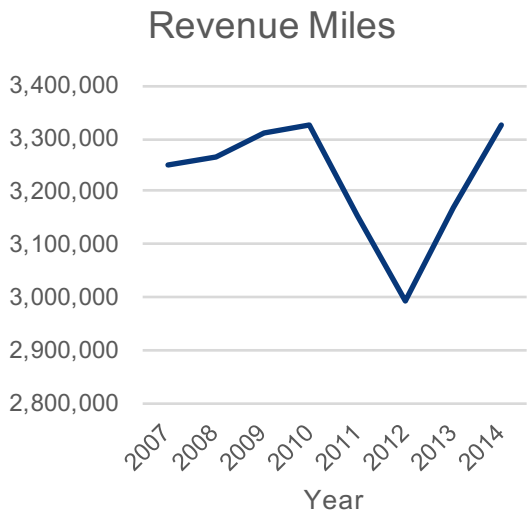


FIGURE 3: REVENUE MILES

Additionally, operating expenses have increased significantly, rising 25 percent over the past five years. As a result, costs per revenue hour have been steadily increasing over the past several years, exceeding $180 per revenue hour in 2014. In the same period, farebox revenues only increased by 7.5 percent. As a result METRO needs to identify methods to narrow the gap between operating costs and fares.

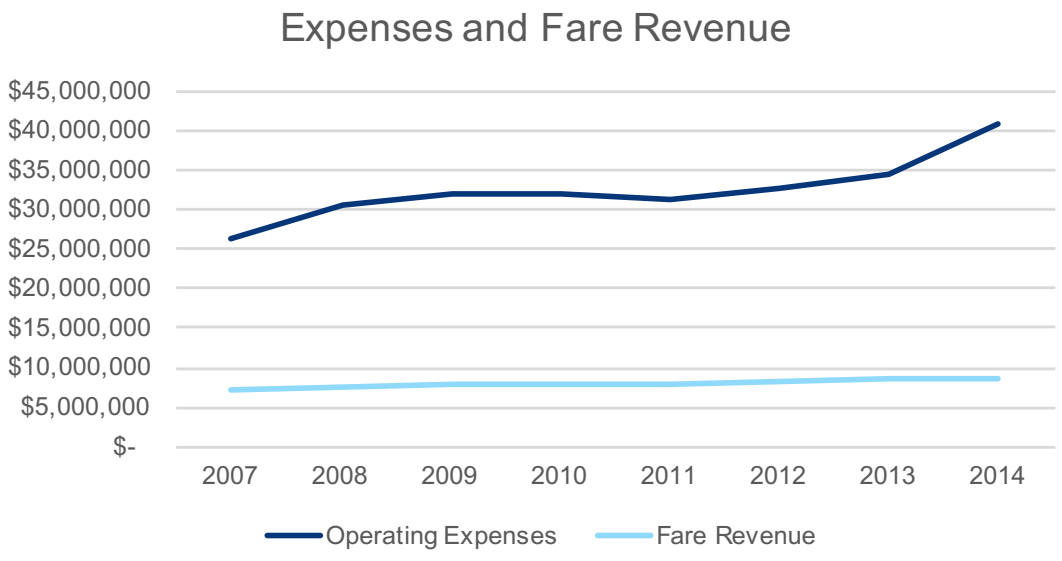


FIGURE 4: EXPENSES AND FARE REVENUE

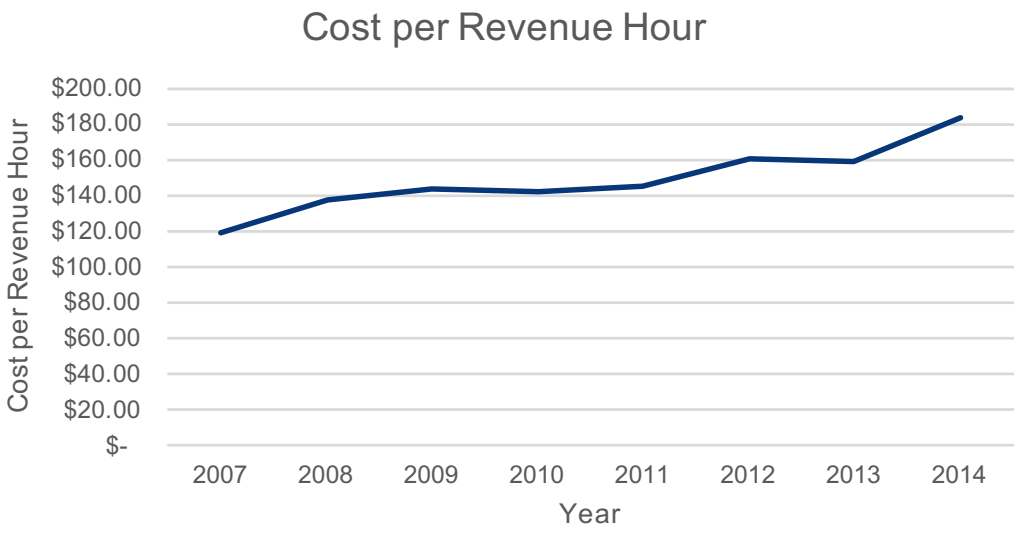
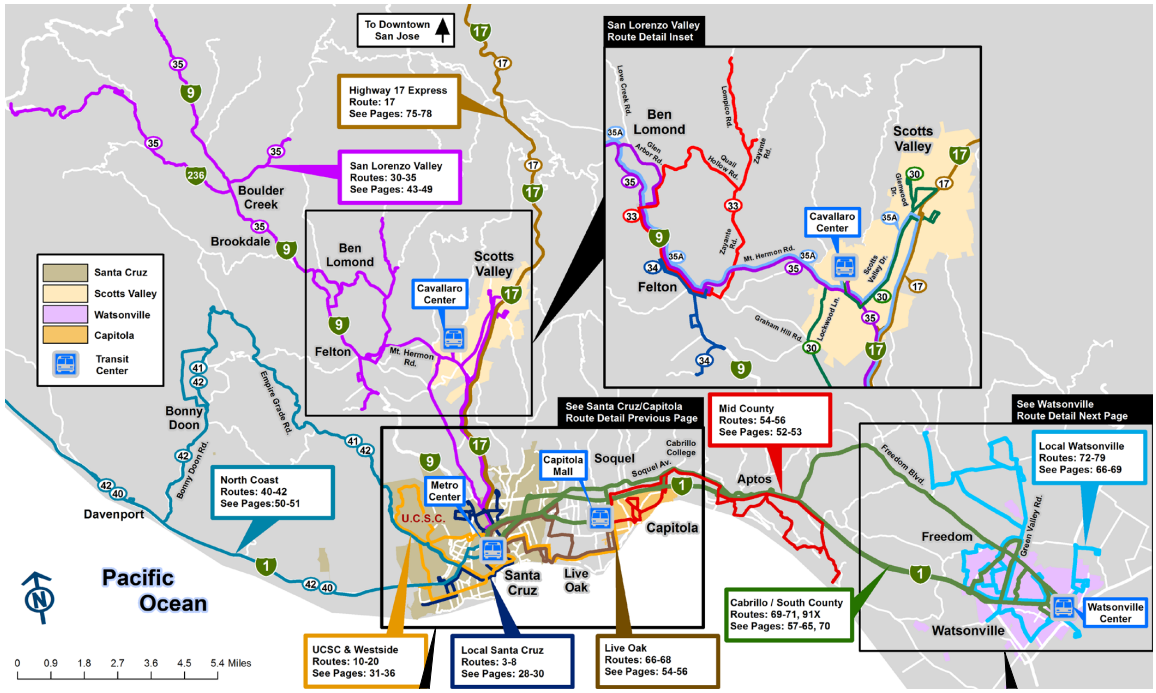


FIGURE 5: COST PER REVENUE HOUR

Routes and Service Characteristics

Santa Cruz METRO currently operates 32 fixed routes throughout Santa Cruz County. The METRO system consists of local and intercity routes based out of four transit centers: the Santa Cruz Pacific Station in downtown Santa Cruz, the Capitola Mall Transit Center, the Watsonville Transit Center, and the Cavallaro Transit Center in Scotts Valley. One fixed route operates along Highway 17 between Santa Cruz and San Jose where it connects to Amtrak, Caltrain, and other bus services. Two METRO routes only operate when UC Santa Cruz is in session, while two other routes only operate when San Lorenzo Valley schools are in session.

The most frequent Santa Cruz routes operate every 15 minutes to UC Santa Cruz. These routes operate additional supplemental trips during the UCSC school year to address over-crowding issues. Intercity routes operate every 30 minutes, while local routes predominantly operate every 60 minutes. Certain local routes and rural routes such as Routes 30, 33, and 34 operate peak-only services that correspond with school bell times. Other services such as Routes 40, 41, and 42, serve rural locations that cannot support frequent transit service, and currently operate every two to four hours. The following table lists Santa Cruz Metro routes by category, weekday frequency, and weekday span.



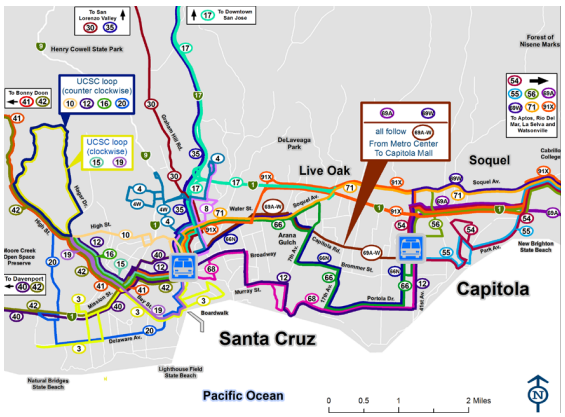


FIGURE 6: SANTA CRUZ METRO SYSTEM MAP

Route	Description	Category	Weekday Frequency	Weekday Span
3	Mission / Natural Bridges	Local	60	6:50 AM – 5:50 PM
4	Harvey West / Emeline	Local	60	6:45 AM – 4:45 PM
8	Emeline	Local	1 trip	7:35 AM
10[1]	UCSC Via High	UCSC	30	6:50 AM – 7:20 PM
12[1]	UCSC / East Side Direct	UCSC	1 trip	7:10 AM
15[1]	UCSC via Laurel West	UCSC	15	6:40 AM – 8:50 PM
16[1]	UCSC via Laurel East	UCSC	15	6:25 AM – 11:15 PM
17	AMTRAK Hwy 17 Express	Highway 17	20-60	4:45 AM – 10:55 PM
19[1]	UCSC via Lower Bay	UCSC	30	7:30 AM – 11:30 PM
20[1,2]	UCSC via Westside	UCSC	30	7:20 AM – 10:20 PM
30	Graham Hill / Scotts Valley	Local	2 trips	6:45 AM – 2:15 PM
33[3]	Lompico SLV / Felton Faire	Rural	2 trips	6:53 AM – 2:50 PM
34[3]	South Felton	Rural	2 trips	7:25 AM – 3:30 PM
35	San Lorenzo Valley	Intercity	2 trips	6:00 AM – 11:00 PM
40	Davenport / North Coast Beaches	Rural	4 trips	6:40 AM – 3:25 PM
41	Bonny Doon	Rural	4 trips	5:50 AM – 5:30 PM
42	Davenport / Boony Doon	Rural	1 trip	8:30 AM
54	Capitola / Aptos / La Selva Beach	Local	1 trip	5:35 PM
55	Rio del Mar	Local	60	7:30 AM – 4:30 PM
56	La Selva	Local	2 trips	8:00 AM – 1:55 PM
66	Live Oak via 17th	Intercity	60	6:45 AM – 10:00 PM
68	Live Oak Via Broadway / Portola	Intercity	60	6:15 AM – 6:30 PM
69A	Capitola Rd. / Watsonville Via Airport	Intercity	60	7:07 AM – 6:00 PM
69W	Capitola Rd. / Cabrillo / Watsonville	Intercity	60	6:37 AM – 8:37 PM
71	Santa Cruz / Watsonville	Intercity	15-30	6:10 AM – 11:45 PM
72	Corralitos	Local	60	5:45 AM – 6:45 PM
74	Ohlone Parkway / Rolling Hills	Local	60	6:10 AM – 6:10 PM

TABLE 1: SANTA CRUZ METRO ROUTE AND SERVICE CHARACTERISTICS

1. Routes 12 and 15 only operate during the UCSC school year, while service levels on 10,16,19, and 20 vary according to whether UCSC is in session.
2. Includes supplementary 20D service which are additional buses to address overcrowding.
3. Operates only during the San Lorenzo Valley school year.

Route	Description	Category	Weekday Frequency	Weekday Span
74S	PVHS Watsonville Hospital	Local	2 trips	7:00 AM – 3:10 PM
75	Green Valley	Local	60	5:15 AM – 7:15 PM
77	Civic Plaza / Pajaro	Local	60	6:30 AM – 6:30 PM
79	East Lake	Local	60	6:25 AM – 5:45 PM
91X	Express Santa Cruz / Watsonville	Intercity	30	6:25 AM – 5:45 PM

TABLE 1: SANTA CRUZ METRO ROUTE AND SERVICE CHARACTERISTICS CONTINUED

Existing Conditions

Performance indicators provide a way of quantifying the strength of a route's performance and comparing it with others in the system. The magnitude of a performance indicator is directly related to the number of passengers who ride a given route. Performance indicators are an important tool for evaluation because they allow routes that vary greatly in boardings, service, or cost levels to be compared directly against one another.

- Ridership – An analysis of ridership not only evaluates how many customers use a route, but also the patterns of boardings and when customers ride.
- Productivity – Productivity is measured by dividing boardings by revenue hours to determine passengers per revenue hour. This metric shows the ridership generated per unit of service invested and provides an understanding of the effectiveness of a route.
- Farebox Recovery Ratio – The farebox recovery ratio is the ratio of fare revenue to operating costs and indicates the percentage of operating costs covered by passenger revenue. A higher farebox recovery ratio means the route requires relatively less subsidy.
- Subsidy per Passenger – Subsidy per passenger is the difference between fare revenue and operating cost on a per passenger boarding basis. It is calculated by subtracting a route's revenue from its operating cost and dividing by the number of boardings.

Ridership Patterns

Ridership fluctuates significantly month-to-month, with high ridership occurring during the UC Santa Cruz school year and lower ridership in the summer and in December, when school is not in session. Ridership is much more stable when excluding routes going to UCSC, but ridership is still higher during the fall and spring, which corresponds with additional ridership to Cabrillo College and other local schools.

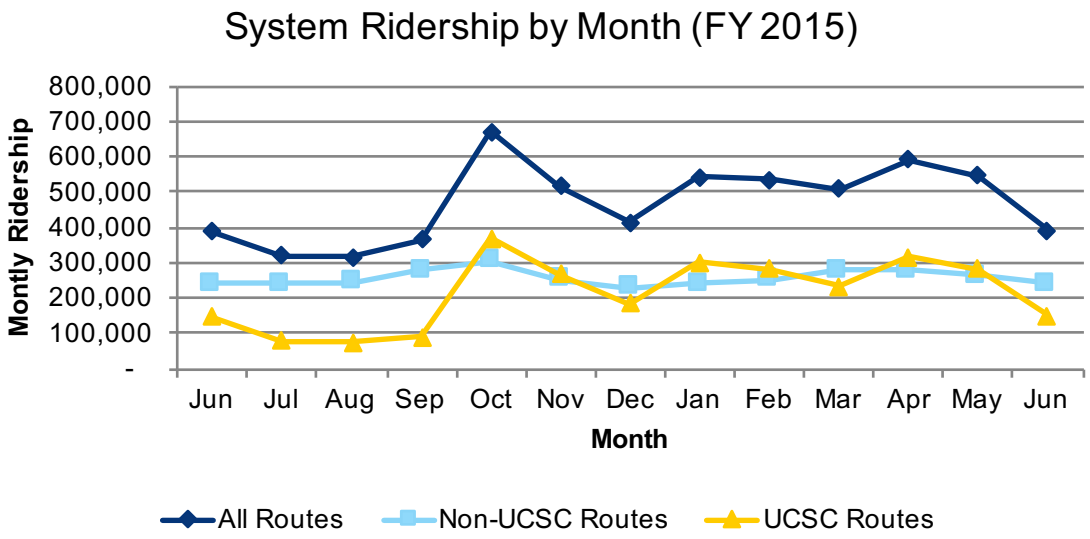


FIGURE 7: SYSTEM RIDERSHIP BY MONTH

Ridership by Time of Day

Examining ridership by time of day provides insight into how riders use the system and into the distribution of trip-making over the course of the day. Weekday ridership is fairly balanced over the day, with ridership steadily growing in the afternoon. School trips to UCSC are a significant driver of ridership, with large numbers of boardings between 7:00 AM and 6:00 PM. System-wide, the peak ridership hour is at 3:00 PM which generally corresponds to trips at the end of the school day. Excluding UCSC Routes, a traditional AM peak between 7:00 AM and 8:00 AM is present, but the afternoon peak period is more spread out. With a large percentage of services running only until approximately 6:00 PM, the corresponding evening ridership shows a decline past 7:00 PM. Ridership by time of day data suggests that METRO is able to schedule services uniformly across the entire day on most of its routes without creating significant passenger crowding issues on its vehicles during peak periods.

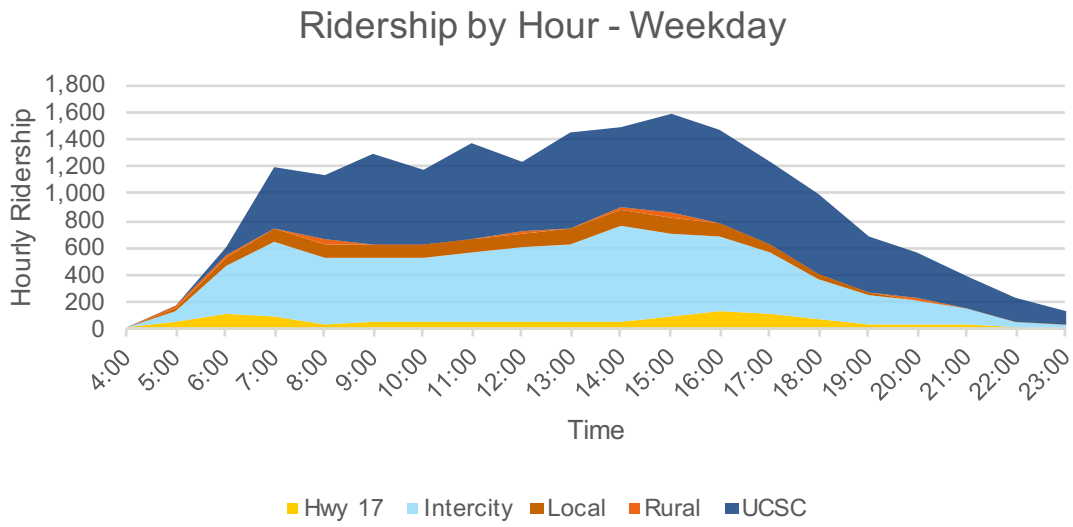


FIGURE 8: RIDERSHIP BY HOUR, WEEKDAY

Ridership on Saturdays is fairly robust, growing consistently in the morning and peaking at 3:00 PM. Note that certain routes do not operate or operate less frequently on weekends. Intercity routes and the Highway 17 Express have fairly consistent ridership between 8:00 AM to 6:00 PM, while the UCSC routes are stronger in the afternoon compared to the morning and evening time periods. Evening ridership declines in a similar fashion to weekday service, significantly decreasing after 7:00 PM.

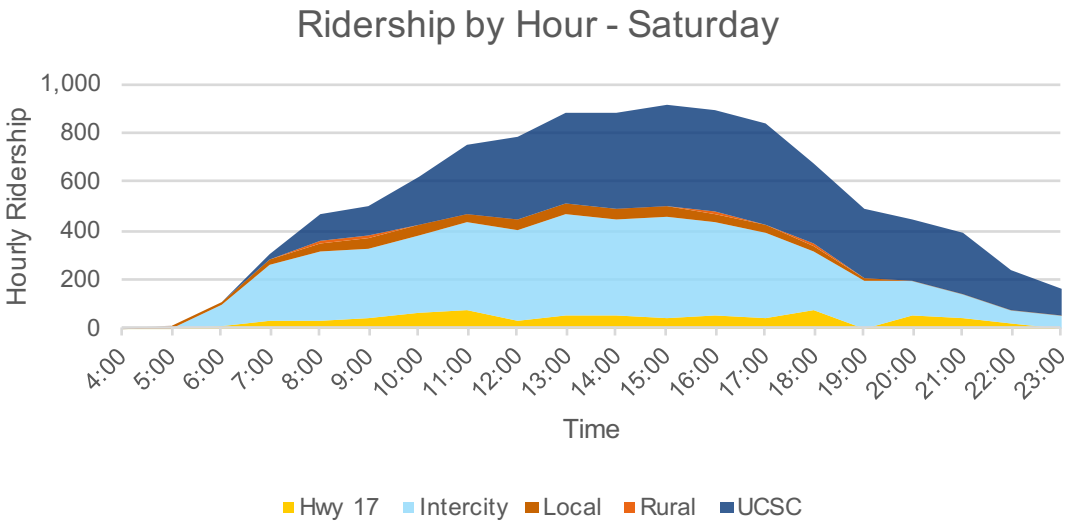


FIGURE 9: RIDERSHIP BY HOUR, SATURDAY

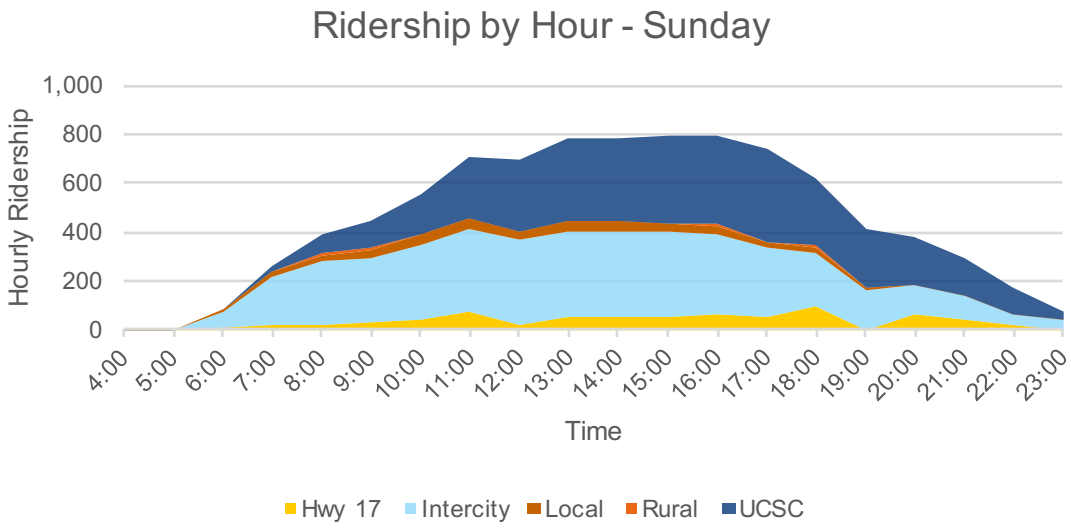


FIGURE 10: RIDERSHIP BY HOUR, SUNDAY

Ridership by Route

Weekday

Weekday boardings vary significantly by the route and service type. The highest ridership routes are Routes 15 and 16 which both serve UC Santa Cruz via Laurel Street and Bay Drive. These two routes combined carry 5,700 passengers daily, and can be considered as one route since they share an alignment prior to entering campus. Route 15, as with other odd numbered UCSC services, moves clockwise through campus while even numbered routes run counter-clockwise through campus. UC Santa Cruz service in general (Routes 10, 12, 15, 16, 19, and 20) accounts for 48 percent of all weekday ridership. Route 12 has a significantly lower ridership compared to other UCSC routes as it operates only one morning trip on weekdays. The ridecheck indicates that one-third of passengers using Route 12 board along the Route 68 segment between 41st Ave/Kings Plaza in Capitola and Pacific Station.

Route 71, the local service between Santa Cruz and Watsonville, has the highest ridership out of all the routes that do not serve UCSC. Intercity routes account for 35 percent of weekday system ridership, averaging 813 passengers per route. The Highway 17 Express service between Santa Cruz and San Jose also has significant weekday ridership, carrying 1,155 passengers per weekday.

Local routes are typically shorter routes operating infrequently (at best every hour per route), and thus have significantly lower weekday ridership, averaging 97 passengers per route. Of the local routes, Route 75 in Watsonville has the highest ridership at 242 daily boardings. Other routes such as Route 54 and Route 8 had significantly lower ridership at 7 and 5 passengers, as these routes operate only one daily trip. Rural routes also had low ridership, as the most frequent service in this tier operates four daily trips. On average these routes only carry 35 passengers on weekdays, with Route 40 to Davenport having the highest daily ridership at 78 passengers and Route 34 through South Felton only carrying 5 passengers.

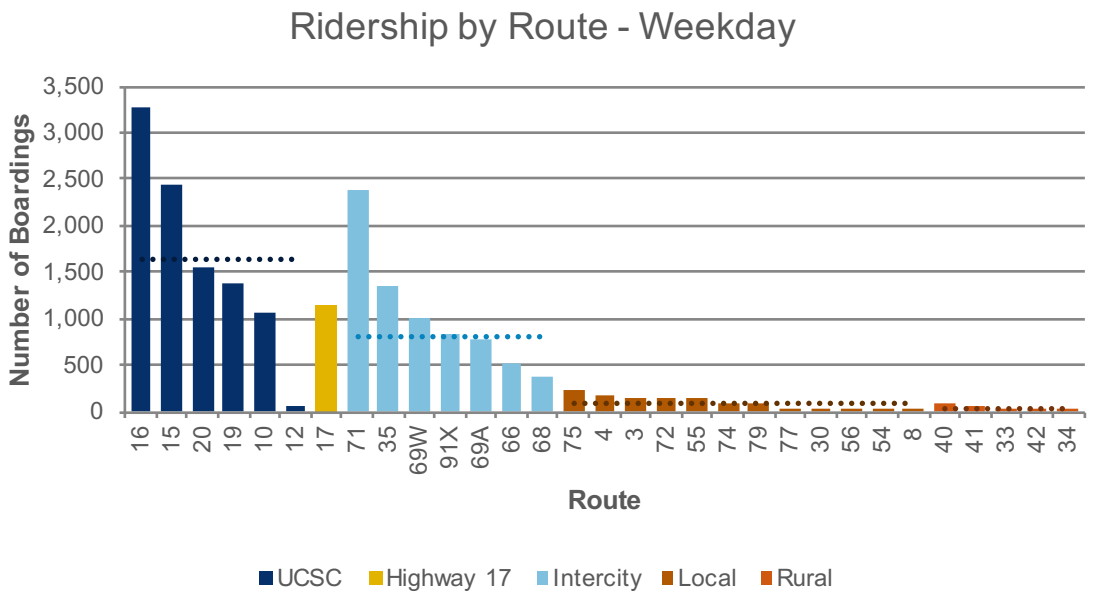


FIGURE 11: RIDERSHIP BY ROUTE, WEEKDAY

Saturday

Saturday ridership is significantly lower than weekday ridership, at approximately 51 percent of weekday ridership. UCSC routes still account for 40 percent of Saturday METRO ridership, with Route 16 having the highest ridership out of the four weekend UCSC routes at 2,100 Saturday boardings.

Intercity routes still had good ridership, with an average of 774 passengers per route. Route 71 continues to be the strongest non-UCSC route, with nearly 1,700 Saturday riders. The Highway 17 Express also has good ridership for an hourly service, at 740 daily passengers.

Local service, both in Watsonville and in Santa Cruz, did not perform as well on weekends as on weekdays. Route 75 serving Green Valley carried 233 passengers on Saturdays, comparable to that of weekday ridership, but all other local services averaged 20 to 50 daily boardings, indicating that few people utilize this service. Rural service also performed poorly, averaging 13 passengers per route on the four Saturday trips.

Sunday

Sunday ridership is lower compared to Saturday routes and is only 42 percent of weekday ridership. Much of the lower ridership is attributable to lower ridership on UCSC routes, as there is less activity on campus on Sundays. Route 16 remains the highest ridership route on Sundays, averaging 1,559 passengers. Of non-UCSC routes, Route 71 is the strongest route, carrying 1,500 riders. Route 75 remains a strong route in Watsonville, with the other local and rural routes having significantly lower ridership with fewer than 50 daily boardings. Rural routes on average carried 13 passengers on Sundays, with Route 40 having the highest ridership of 20 passengers.

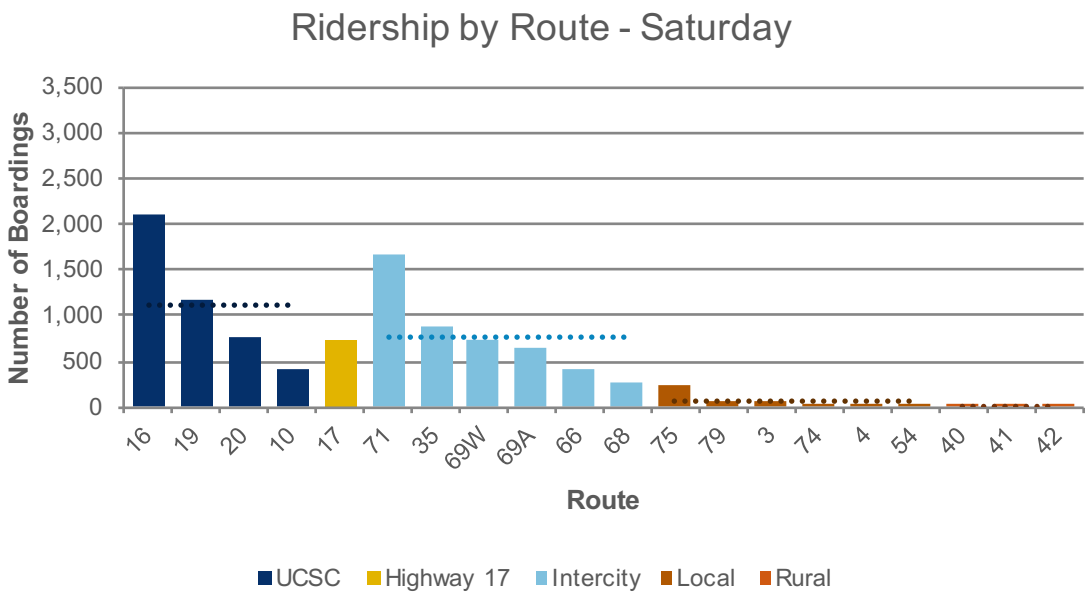


FIGURE 12: RIDERSHIP BY ROUTE, SATURDAY

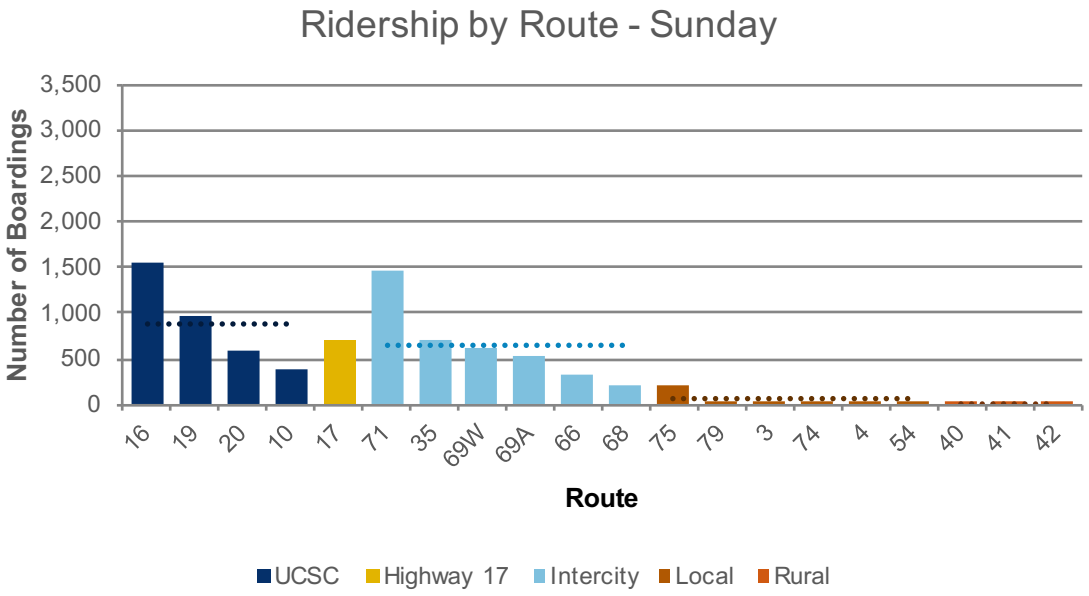


FIGURE 13: RIDERSHIP BY ROUTE, SUNDAY

Productivity

Typical productivity measures used in the transit industry are passenger boardings per revenue hour. This measure is used as it captures the effectiveness of the service used. Productivity is influenced both through market decisions and service design choices. While agencies have limited control over the market for public transit, they can mitigate poor market conditions through maximizing the efficiency of the network and effectiveness of route design.

Weekday

Productivities for UC Santa Cruz routes are all high, averaging 60 passengers per revenue hour. The lowest performing route in this set, Route 12, operates one morning trip as an overlay to Routes 66 and 16, and still carries 44 passengers per revenue hour. Intercity routes on average carried 20 passengers per revenue hour, with all routes performing near this level. Route 4, with hourly service within the city of Santa Cruz, had the highest local productivity of 17 passengers per revenue hour. Watsonville routes all performed fairly poorly, with the highest productivity route, Route 75, only averaging 13 passengers per revenue hour.

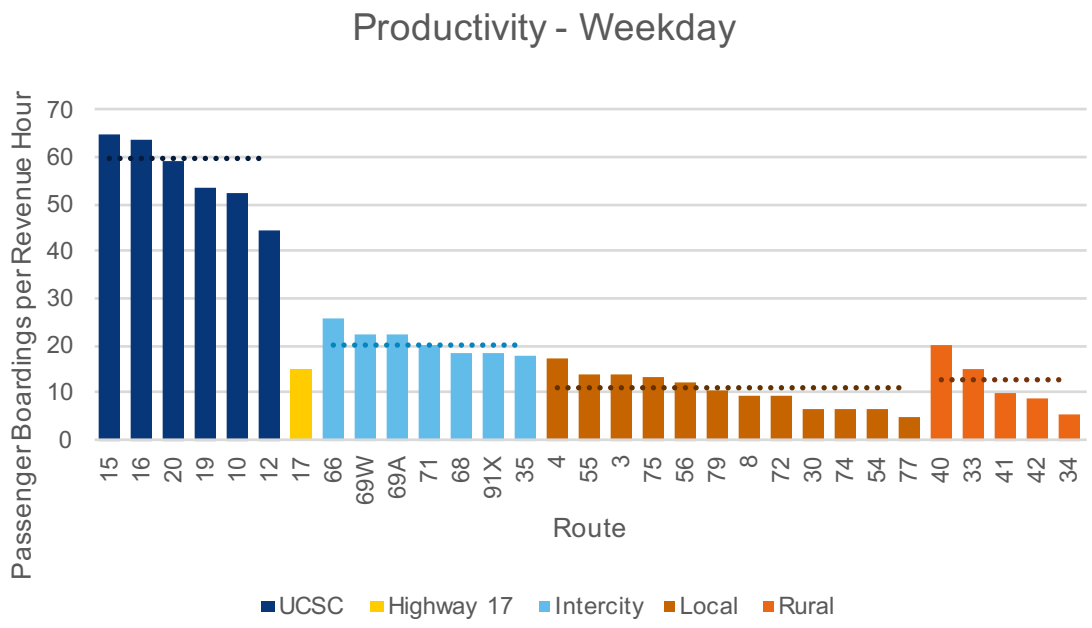


FIGURE 14: PRODUCTIVITY, WEEKDAY

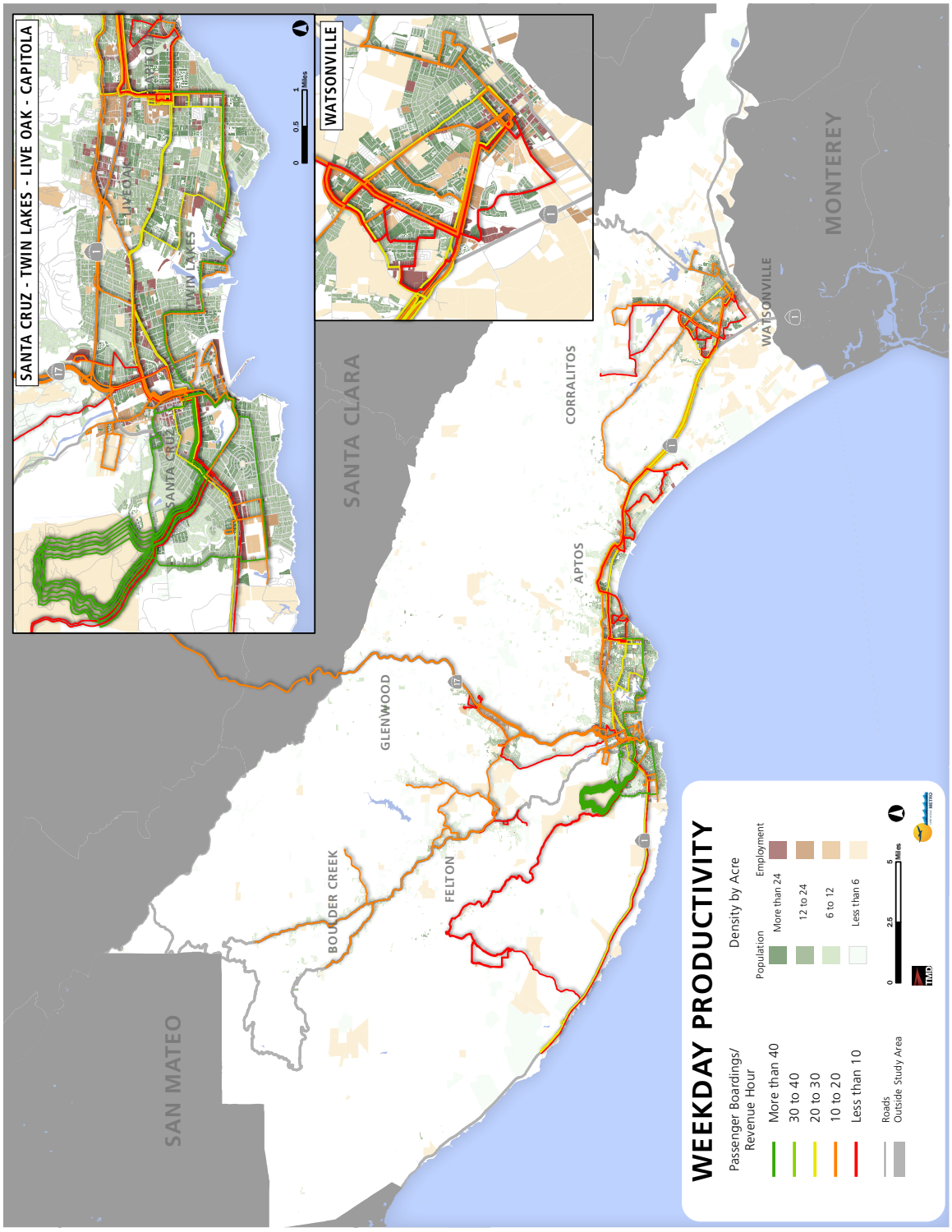


FIGURE 15: WEEKDAY PRODUCTIVITY MAP

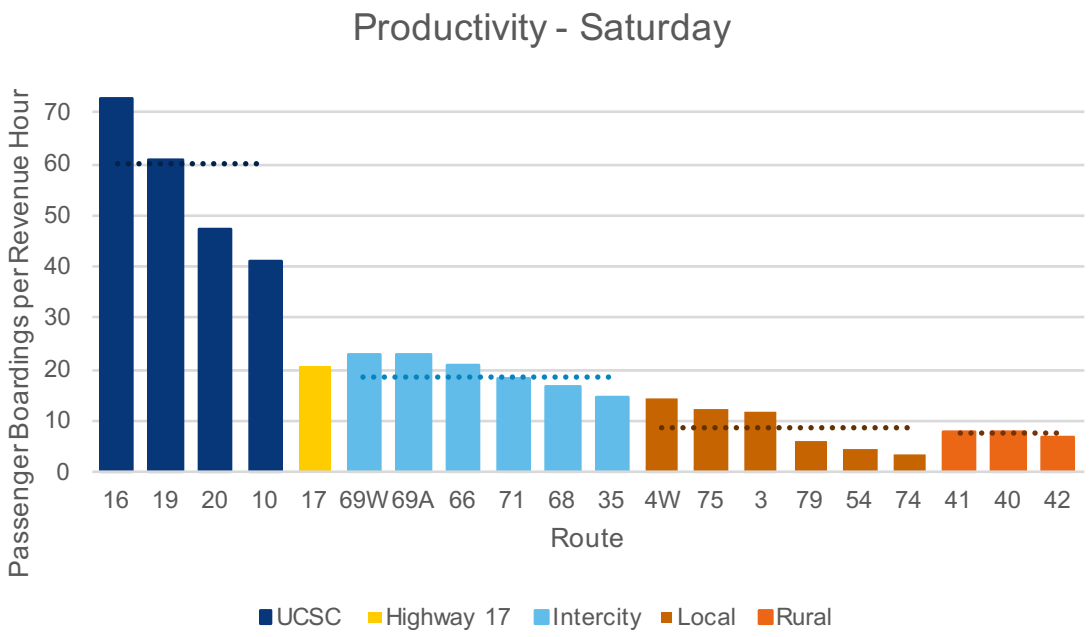


FIGURE 16: PRODUCTIVITY, SATURDAY

Saturday

Saturday productivites remained strong on UC Santa Cruz routes, with Route 16 being the most productive route at over 70 boardings per revenue hour. On average UC Santa Cruz routes were highly productive at 60 boardings per revenue hour. Route 17 productivity increased due to the reduced service frequency during due day. Intercity service had similar productivity numbers compared to weekday service, while local routes performed much worse. Routes 79, 54, and 74 all had productivities below 6 passengers per revenue hour.

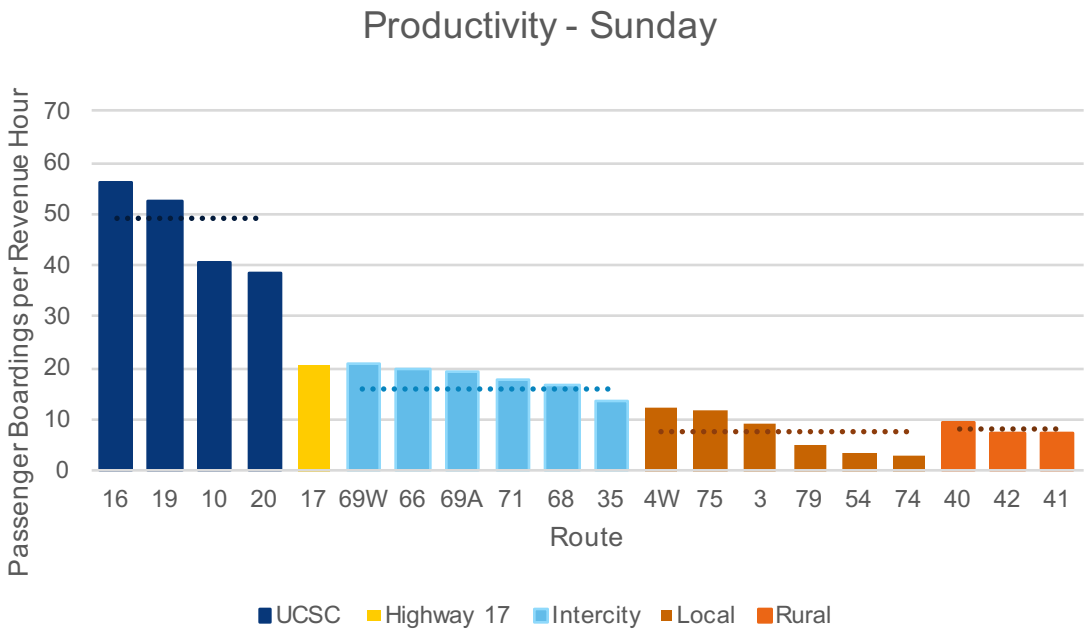


FIGURE 17: PROFUCTIVITY, SUNDAY

Sunday

Sunday productivities were slightly lower compared to Saturdays. Service provided on Sundays is identical to service provided on Saturdays, so any change in productivity is a result of changes in ridership. With fewer activities and no classes occurring on the UCSC campus, UCSC routes had a lower productivity of 50 passengers per revenue hour. As with Saturday service, Routes 79, 54, and 74 again had productivities below 6 passengers per revenue hour.

Financial Effectiveness

Financial stability is crucial to the success of any transit network, and it is developed by efficiently managing resources and route investment. The financial effectiveness of a system can be analyzed through farebox recovery ratio and subsidy per passenger at the system-wide and route levels. Identifying which routes are most or least costly to run can help result in a more efficient allocation of resource investment. Routes with strong financial effectiveness are candidates for additional investment while routes with weak financial effectiveness may not warrant additional resources.

Farebox Recovery Ratio

Farebox recovery ratio is the ratio of fare revenue to operating costs. Higher farebox recovery ratios indicate higher cost-effectiveness and measure the portion of operating costs covered by passenger fares. The higher the farebox recovery ratio, the lower the subsidy a route needs to operate, leaving more funding available to operate more service.

Weekday

Weekday farebox recoveries systemwide average 23 percent, which exceeds the state funding threshold of 20 percent defined by the California's Transportation Development Act (TDA). While individual routes do not need to meet the 20 percent threshold, it is valuable to evaluate the farebox recovery ratios of different services to determine where service is heavily reliant on other revenue sources. UCSC routes performed well, with an average farebox recovery of 47 percent. Highway 17, while much less productive, also commands a higher fare which resulted in a 34 percent farebox recovery. Intercity routes averaged a 15.8 percent farebox recovery, while rural and local routes averaged 8.6 percent and 10 percent, respectively. Restructuring of these routes may be warranted as a means to maintain future financial sustainability.

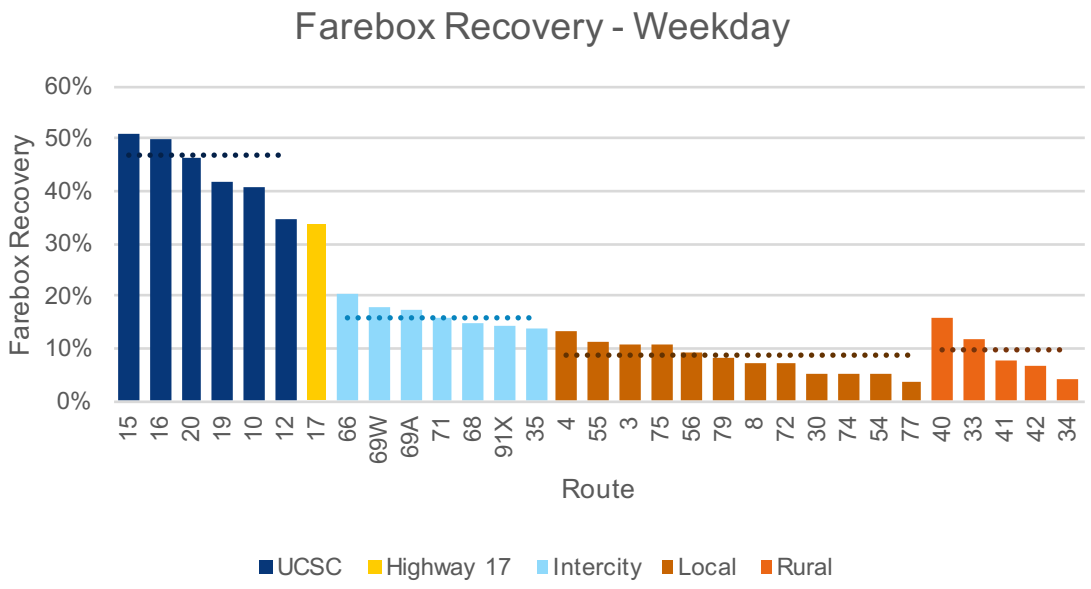


FIGURE 18: FAREBOX RECOVERY, WEEKDAY

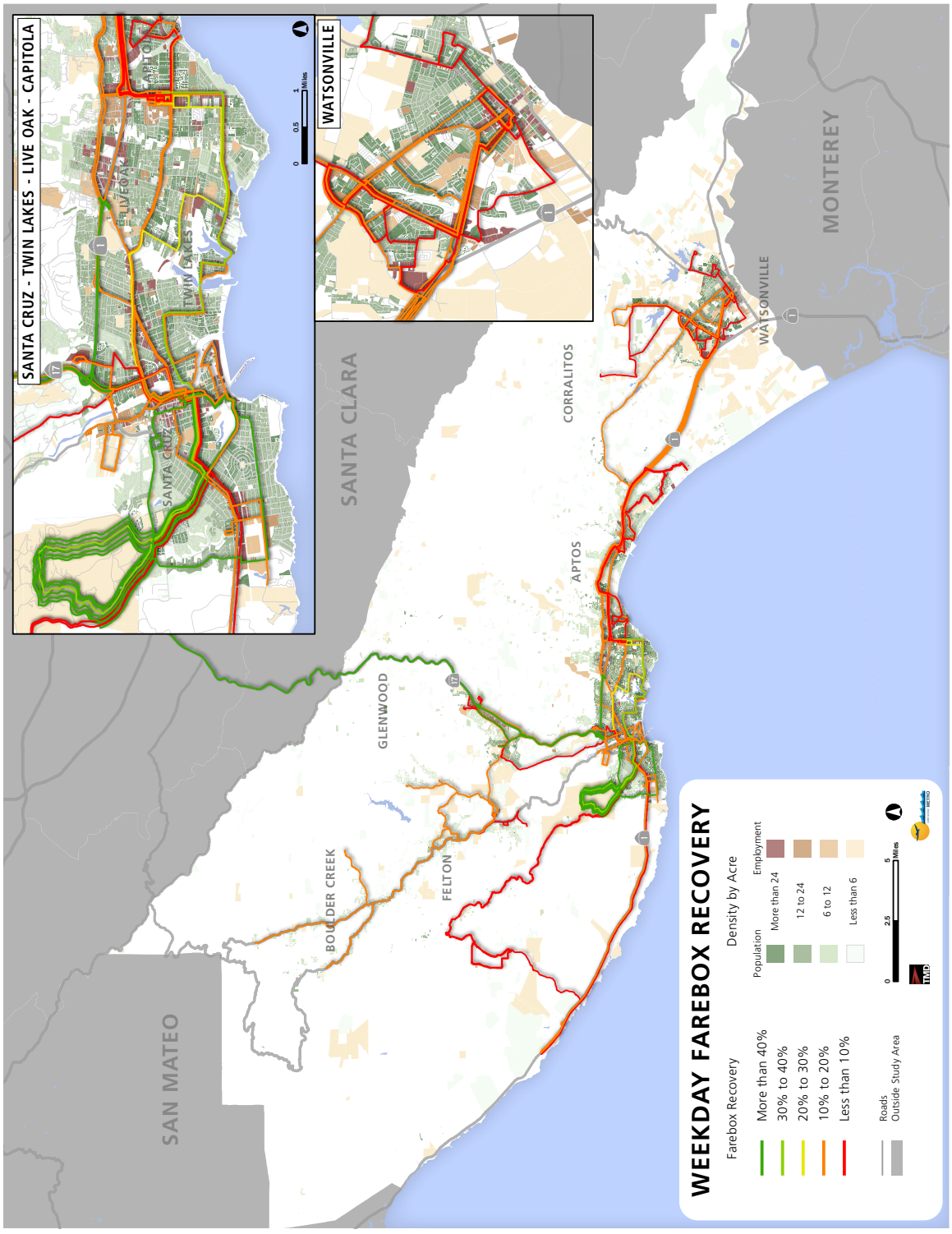


FIGURE 19: WEEKDAY FAREBOX RECOVERY MAP

Saturday

Saturday farebox recovery is similar to that of weekdays, averaging 22 percent system-wide. Farebox recovery for Route 17 exceeds 46 percent due to the higher express fares. UC Santa Cruz routes also have relatively high farebox recoveries, averaging 47 percent. All remaining routes had an average farebox recovery of less than 20 percent. Local and rural routes fell significantly short of 20 percent in particular, with only 6 percent of operating costs coming from passenger fares.

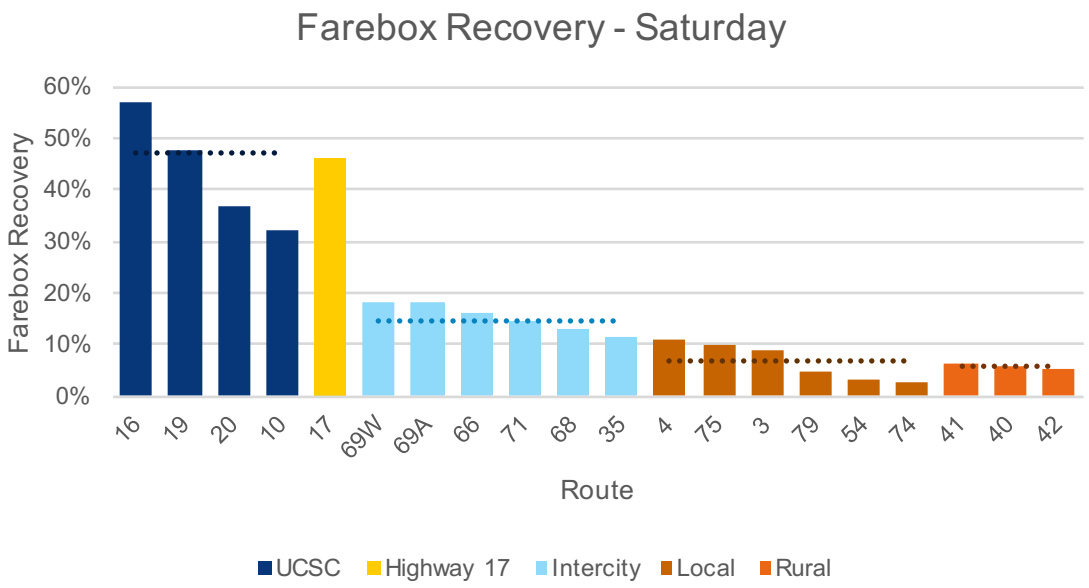


FIGURE 20: FAREBOX RECOVERY, SATURDAY

Sunday

Sunday farebox recovery percentages were similar to that of Satudays at 19 percent system-wide. With less activity at UC Santa Cruz, farebox recovery declined to 40 percent on average. Route 17 farebox recovery remained consistent with the elevated farebox recovery of over 46 percent on Saturdays. Local and rural routes were consistent with Saturdays as well, with a low farebox recovery of 6 percent.

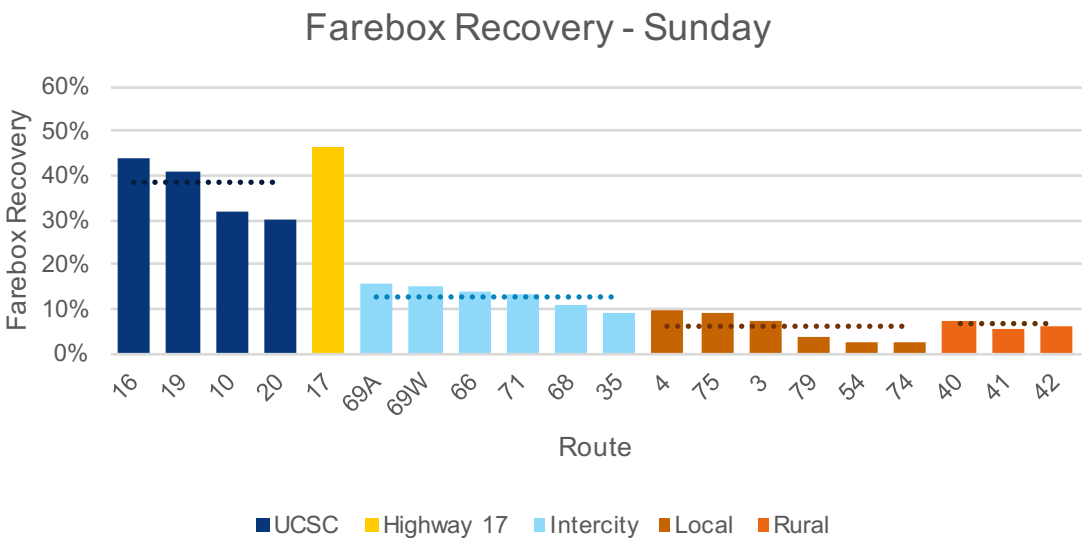


FIGURE 21: FAREBOX RECOVERY, SUNDAY

Subsidy Per Passenger

Subsidy per passenger boarding measures how much it costs to operate a route on a "per boarding" basis. Three factors influence the subsidy per passenger metric: the number of passengers using the route, the cost to operate the route, and the fare paid by each passenger. It is calculated using passenger revenue minus operating cost divided by the total number of passenger boardings. Essentially, this metric identifies how many public dollars (i.e. federal, state, and local funding sources) are required to operate the service – the higher the subsidy per passenger, the more funding is needed for the route. Financial performance is not always proportional to the service performance – a route could have few boardings but also a low subsidy per boarding if the route has low operating costs resulting from the efficient use of few vehicles or a higher average passenger fare.

Metro currently has an operating cost of $177.59 per revenue hour for local service and $181.91 per revenue hour for the Highway 17 Express. As a result, the service needs to be either productive and serve a lot of people or have high fares to recoup the costs of operating service. Highway 17 service, which repors to the Joint Powers Authority, has a higher operating cost due to the higher fuel costs from express service operating in hilly terrain. Systemwide, the current average fare for METRO services is $1.39, while the Highway 17 service collects on average $5.52 per passenger. Santa Cruz METRO currently has an agreement in place with UC Santa Cruz for students to use the service through a quarterly fee. This agreement allows METRO to collect $1.39 for each student boarding, and is changed each year based on the annual consumer price index. These fees are included as revenues in the subsidy calculations presented in the following sections.

Weekday

Weekday subsidies are shown in the chart below. UC Santa Cruz routes have fairly low subsidies of $1.47 per passenger due to their high productivities. Intercity routes also perform fairly well, averaging a subsidy of $7.43 per passenger. Local routes had significantly higher subsidies, averaging $14.74 per passenger. Local routes in Santa Cruz and Capitola tended to perform better, while Watsonville routes had high subsidies, with Route 77 having a subsidy of $36.64 per passenger. The lack of transfers in Santa Cruz METRO hurt local circulation type routes such as Route 77, as individuals may opt to walk to longer distance services or use MST buses which offer free transfers to METRO service.

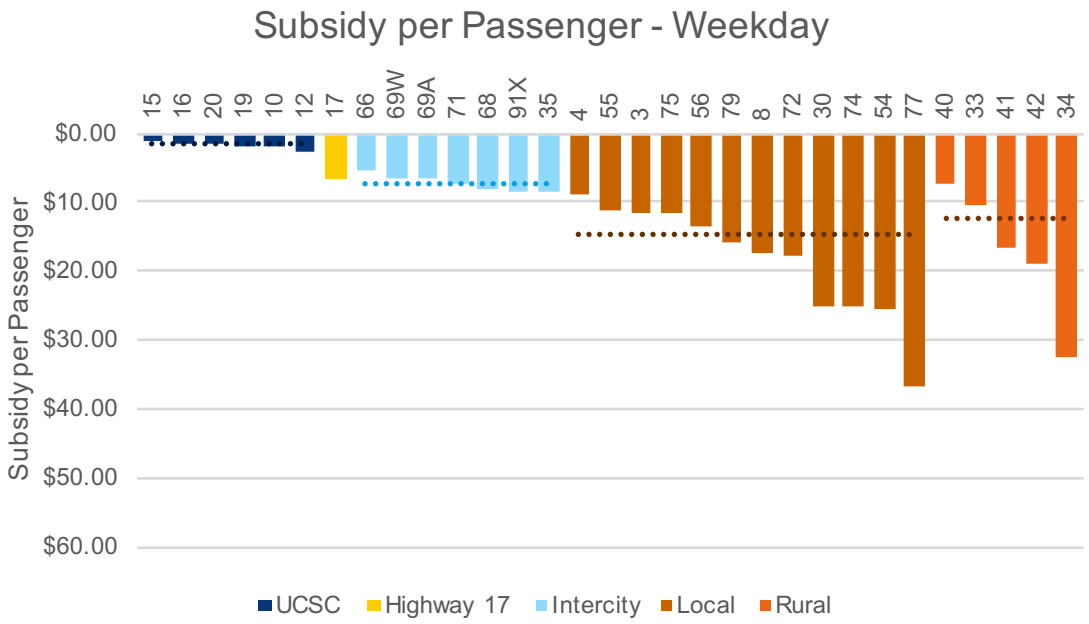


FIGURE 22: SUBSIDY PER PASSENGER, WEEKDAY

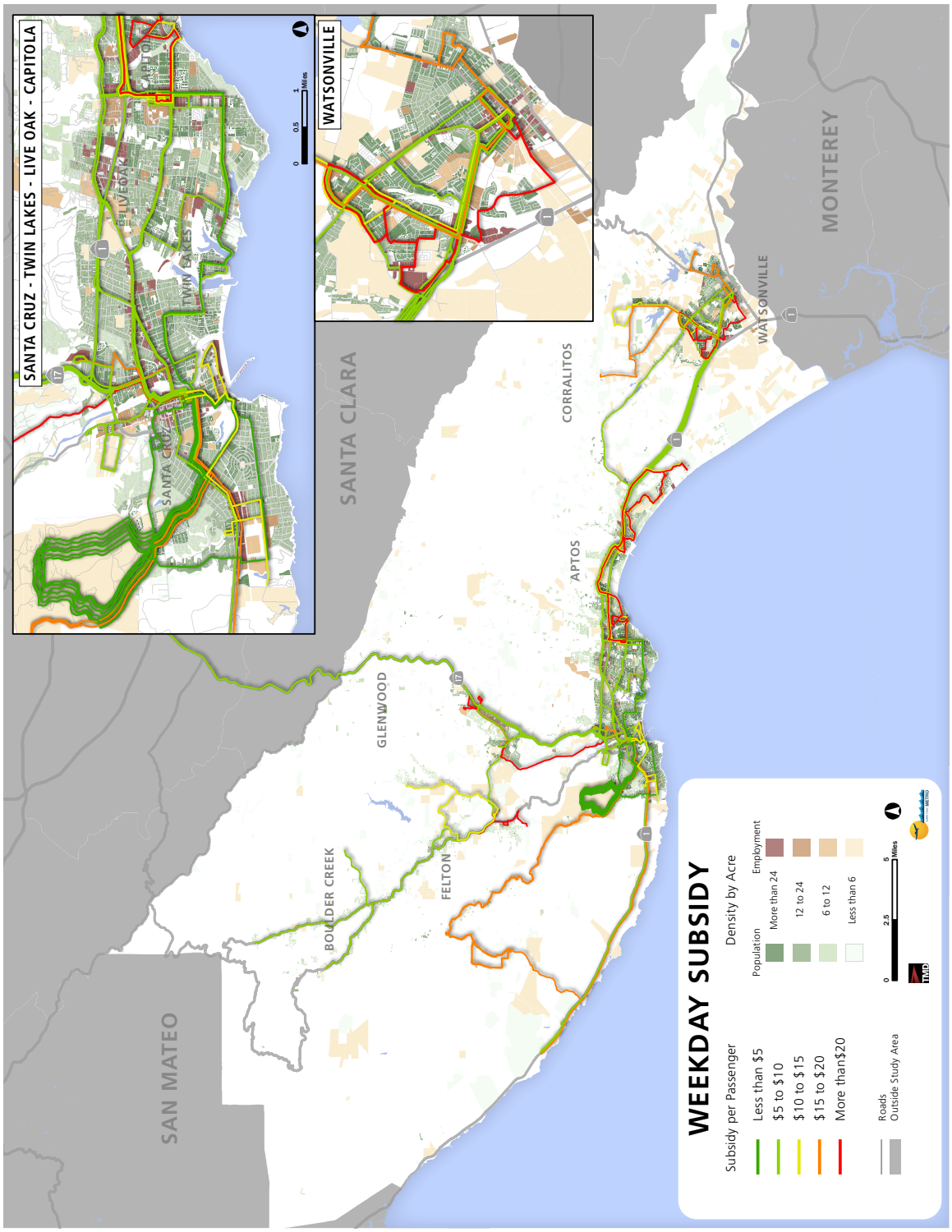


FIGURE 23: WEEKDAY SUBSIDY MAP

Saturday

Average subsidies per passenger are significantly higher on weekends compared to weekdays. While UCSC routes still maintain a low subsidy per passenger of $1.57, local routes average nearly $20.00 subsidies per passenger, and all rural routes have subsidies exceeding $20.00 per passenger. Routes 74 and 54 had the largest subsidy per passenger on Saturdays of $46.64 and $39.22, respectively. All rural routes had average subsidies of over $20.00 per passenger.

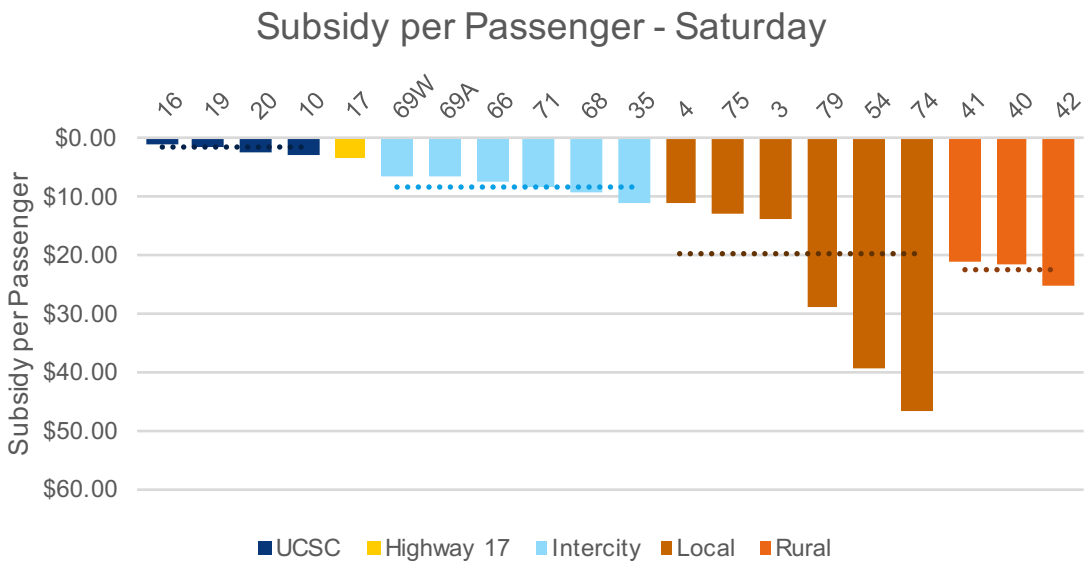


FIGURE 24: SUBSIDY PER PASSENGER, SATURDAY

Sunday

Sunday subsidies per passenger are similar to that of Saturday. UCSC Routes and the Highway 17 Express have subsidies of $2.21 and $3.27, respectively. Intercity routes had a Sunday subsidy of $9.60, while local routes had average subsidies of $21.96 per passenger. As with Saturdays, the long, circuitious routes combined with low ridership resulted in high subsidies for Routes 79, 54, and 74, with route 74 subsidies exceeding $57.00 per passenger.

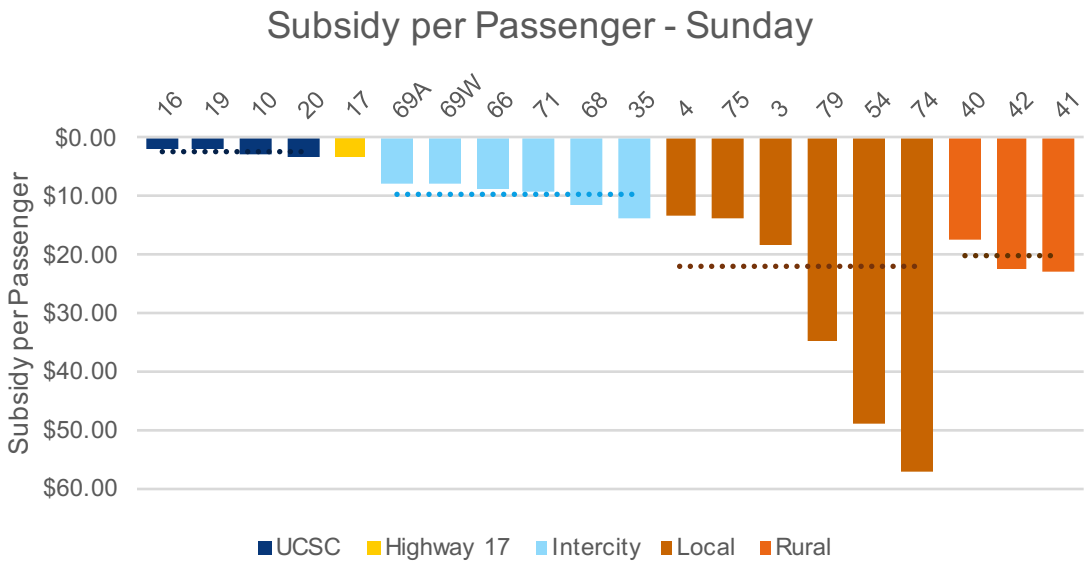


FIGURE 25: SUBSITY PER PASSENGER, SUNDAY

Route	Weekday				Saturday				Sunday			
	RIDERSHIP	PRODUCTIVITY	SUBSIDY	FAREBOX RECOVERY	RIDERSHIP	PRODUCTIVITY	SUBSIDY	FAREBOX RECOVERY	RIDERSHIP	PRODUCTIVITY	SUBSIDY	FAREBOX RECOVERY
3	158	13.7	$11.55	10.7%	54	11.7	$13.77	9.2%	40	9.1	$18.15	7.1%
4/4W	183	17.1	$9.01	13.4%	36	14.3	$11.02	11.2%	30	12.3	$13.04	9.6%
8	5	9.5	$17.33	7.4%								
10	1,077	52.2	$2.01	40.8%	410	41.2	$2.92	32.2%	390	40.7	$2.98	31.8%
12	63	44.3	$2.62	34.7%								
15	2,437	65.1	$1.34	51.0%								
16	3,261	63.6	$1.40	49.8%	2,103	72.7	$1.05	56.9%	1,559	56.0	$1.78	43.8%
17	1,155	15.0	$6.58	45.6%	739	20.7	$3.27	62.8%	695	20.7	$3.27	62.8%
19	1,366	53.5	$1.93	41.8%	1,184	61.0	$1.52	47.7%	981	52.5	$1.99	41.1%
20/20D	1,553	59.1	$1.61	46.3%	762	47.4	$2.36	37.1%	600	38.7	$3.20	30.3%
30	29	6.7	$25.11	5.2%								
33	18	14.9	$10.52	11.7%								
34	5	5.3	$32.43	4.1%								
35	1,357	17.9	$8.54	14.0%	895	14.5	$10.84	11.4%	705	13.8	$13.56	9.3%
40	78	20.2	$7.41	15.8%	17	7.8	$21.46	6.1%	20	9.5	$17.27	7.4%
41	63	9.8	$16.77	7.7%	12	7.9	$21.16	6.2%	11	7.3	$22.91	5.7%
42	12	8.8	$18.85	6.9%	10	6.7	$25.09	5.2%	11	7.5	$22.18	5.9%
54	7	6.6	$25.37	5.2%	16	4.4	$39.23	3.4%	13	3.5	$48.68	2.8%
55	141	14.1	$11.18	11.1%								
56	23	12.0	$13.40	9.4%								
66	527	26.0	$5.45	20.3%	415	20.6	$7.21	16.2%	340	19.8	$8.72	13.8%
68	371	18.7	$8.13	14.6%	278	16.6	$9.32	13.0%	223	16.9	$11.48	10.8%
69A	786	22.4	$6.55	17.5%	639	23.0	$6.32	18.0%	529	19.4	$7.58	15.5%

TABLE 2: SUMMARY OF PRODUCTIVITY MEASURES

69W	993	22.6	$6.48	17.7%	749	23.1	$6.31	18.1%	606	20.7	$7.77	15.2%
71	2,377	20.0	$7.50	15.6%	1,672	18.4	$8.25	14.4%	1,476	17.6	$9.12	13.2%
72	156	9.2	$17.93	7.2%								
74	93	6.7	$25.13	5.2%	49	3.7	$46.64	2.9%	39	3.0	$57.18	2.4%
75	242	13.6	$11.66	10.7%	234	12.5	$12.81	9.8%	223	11.9	$13.51	9.3%
77	40	4.7	$36.64	3.7%								
79	92	10.3	$15.82	8.1%	56	5.9	$28.67	4.6%	46	4.9	$34.90	3.8%
91X	846	18.2	$8.37	14.2%								

TABLE 2: SUMMARY OF PRODUCTIVITY MEASURES CONTINUED

Service Evaluation Key Findings

The Market Assessment showed that Santa Cruz METRO operates in a diverse environment, with services dedicated to UC Santa Cruz, county-wide mobility services, and lifeline services. The objective of the service evaluation document is to identify strengths of the transit system and strategies for achieving additional productivity and financial effectiveness.

- METRO routes operate in primarily a hub-and-spoke fashion, with primary hubs at Santa Cruz Pacific Station and the Watsonville Transit Center connecting to secondary points of interest such as UC Santa Cruz, Scotts Valley, Cabrillo College, Capitola Mall, and Freedom Center. However, METRO's fare policy does not facilitate transfers within the system easily, and often requires individuals to purchase day passes to complete a one-way journey. Day passes are set at the price of 3 one-way trips, and are advantageous for customers who need to transfer or complete multiple trips throughout the course of the day. However, an item of note is that day passes cannot be purchased at ticket vending machines and must be purchased onboard the vehicle, which may disincenivize some customers to use the service.
- Several routes operate in close proximity to each other and often are duplicative (See map in Route and Service Characteristics section). This may result in confusion for potential passengers as individuals may not choose to use transit because they cannot navigate the system efficiently or understand which route to take. Services should be streamlined such that the combined level of service on routes provided to each area meets the existing demand.
- Ridership has consistent demand throughout the day (see Ridership by Time of Day), which is likely a result of the university-focused services.

- Routes that perform the best have a clear origin and destination or serve multiple destinations along the route, such as intercity routes between Watsonville and Santa Cruz or routes that serve UC Santa Cruz. Due to the lack of transfers in the system, short circulator-type routes that require connections to longer distance services to complete journeys do not perform as well as longer distance routes. This fare barrier results in a route-oriented service design compared to network-oriented agencies that provide no fare barrier between routes.
- Several routes operate limited numbers of trips into rural destinations. These have high subsidies and may warrant being replaced by a vanpool or other alternative means of transportation.

Increased Efficiency and Alternative Service Opportunities

The following section presents a summary of each route and expands in greater detail areas that may be studied for changes in developing service alternatives.

- **Route 3** serves Natural Bridges via Delaware Avenue, Mission Street, and Bay Street. This route was restructured to serve parts of former Route 7 as part of the service cuts in 2010, resulting in an inefficient alignment that detours to the Boardwalk except during the summer. With an average productivity of 13 passengers per hour and a subsidy of slightly over $10 per passenger, this service may be adjusted to better serve the needs of the community and reduce duplication with Route 20. Boardings and alightings are spread evenly along the route and throughout the day, but ridership drops off dramatically on weekends with the service every 2 hours.
- **Routes 4 and 8** run in the city of Santa Cruz, connecting downtown Santa Cruz to Emeline and Harvey West. Route 4 is the most productive local route at 17 passengers per revenue hour, while Route 8 runs one trip during the morning carrying five passengers on average. Boardings and alightings on Route 8 occur only in Downtown Santa Cruz and in the Emeline Complex. In comparison Route 4 has boardings along the entire route including along Ocean and Grant heading towards the Emeline Complex. The circuitous nature of Route 4 may result in lower productivity than what can be achieved through a more streamlined alignment. Based on the stop-level ridership, the Emeline Complex and Harvey West areas are about equal in terms of ridership, and no boardings or alightings were reported at METRO offices. Restructuring these services may better serve the needs of the community.

- **Routes 10, 15, 16, 19, and 20** connect Pacific Station to UC Santa Cruz. All routes have high productivities, and collectively carry nearly half of all weekday ridership. Many students use METRO to access the UC Santa Cruz campus. Large numbers of boardings and alightings occur on the university campus and at Pacific Station, with lower but consistent levels of boardings and alightings along the corridors going to campus. These routes all run within close proximity to each other, and may be consolidated to improve ease of understanding and create a consistent schedule, reducing confusion. Additionally, recent developments at Natural Bridges to serve as a UC Santa Cruz satellite teaching location and at Pacific Collegiate School may warrant looking at restructuring service on Route 20.
- **Route 12** connects Capitola Mall to UC Santa Cruz on one morning trip, paralleling Route 68 and Route 16. While this trip carries an average of 44 passengers, confusion could be reduced by consolidating this trip into Route 68 and have this route interline on additional trips to the campus. The ridecheck showed 14 boardings between Capitola Mall and downtown Santa Cruz, which indicates the trip could easily be absorbed by Route 68.
- **Route 17** connects Santa Cruz to San Jose and the San Francisco Bay Area. While scheduling is done in coordination with trains departing and arriving from Diridon Station, it may make sense to standardize the departure times such that this service can be branded in coordination with Route 35 to provide frequent service to Scotts Valley.
- **Route 30** provides peak only trips to serve the middle and high schools in Scotts Valley. The low productivity is a function of the limited service span and the rural geography. Service recommendations will look at reducing service on this route to service the area only during the schoolyear, integrating this with Route 35, or realigning that service to serve this corridor.
- **Routes 33 and 34** are school only trips operating in the San Lorenzo Valley. Route 33 and 34 both have low ridership counts, carrying 18 and 5 passengers respectively over two trips each. Currently these routes are operated with a smaller bus, but they may be candidates for conversion to a vanpool-type service as the routes operate in hilly terrain and do not carry significant passenger loads.
- **Route 35** primarily operates from Santa Cruz to Scotts Valley and the San Lorenzo Valley. This route is fairly frequent at every 30 minutes during the day between Boulder Creek and Santa Cruz, with three branches operating north of Boulder Creek operating a couple trips per day each. Productivities were good on this route, but ridership north of Boulder Creek was marginal. No boardings or alightings were recorded at Big Basin State Park, and ridership on weekends to the Country Club was much lower compared to weekday ridership. The limited services on each branch could likely be consolidated to save resources.

- **Routes 40, 41, and 42** operate a limited number of trips between Pacific Station and the rural communities of Bonny Doon and Davenport. Collectively these routes carry an average of 153 weekday boardings. Route 40 to Davenport had an even distribution of boardings and alightings along its route, while Route 41 had half of its daily ridership using the service between Pacific Station and UCSC, with the other half originating or ending in Bonny Doon. Route 42, with service at 8:30pm on weekdays at 6:00pm on weekends, serves as a final trip to these communities, combining service characteristics of Route 40 and 41. In the stop-level ridecheck, no Route 42 passengers were recorded boarding or alighting on the Empire Grade Road segment. There may be opportunities for this service to be streamlined in the future or to be replaced by a vanpool type service.
- **Routes 54, 55, and 56** operate between Capitola Mall and the communities of Aptos, Rio del Mar, and La Selva. Route 55 operates hourly on weekdays to Rio del Mar and is the most productive of the three routes. Eighty percent of the boardings or alightings occurred between Capitola Mall and Cabrillo College, which accounts for only 40 percent of the route. Routes 54 operates one trip during weekdays and Route 56 operates two trips during weekdays. Only a couple riders were reported to have boarded or alighted east of Seacliff and State Park Drive. These segments may be considered in the service alternatives for discontinuation or replacement by other modes of transport.
- **Route 66** runs between Pacific Station and Capitola Mall via 7th and Brommer Streets. This route has the highest weekday producitivity, highest farebox recovery, and lowest subsidy per passenger of all the intercity services. This route serves a critical role by connecting two major transfer points in the service area. This route will be analyzed to see if further improvements in productivity can be made by directly connecting to Cabrillo College.
- **Route 68** runs between Pacific Station and Capitola Mall via East Cliff Drive and Portola Drive. Based on the partial ridecheck of this route, relatively few passengers get on and off between East Cliff Village and Pacific Station. The vast majority of riders ride directly between the Capitola Mall area and downtown Santa Cruz. This service is a candidate for consolidation with other routes that connect these two destinations.
- **Route 69A and 69W** operate as a semi-express service between Santa Cruz and Watsonville. Both services run along Soquel and Capitola through Santa Cruz, Live Oak, and Capitola. Route 69A has local segments in Watsonville along Airport and Freedom Boulevards, while Route 69W runs along Soquel Drive in Soquel to serve Cabrillo College. With both of these routes serving the Santa Cruz to Watsonville corridor in addition to Route 71 and 91X, there may be opportunities for efficiency improvements to increase productivity.
- **Route 71** operates as a local service between Santa Cruz and Watsonville via Freedom Boulevard. Based on a partial ridecheck of this route very few passengers board in the Corralitos area west of Airport Boulevard. If service were to be realigned to Highway 1 in this section, very few passengers would be be affected and most riders would likely benefit from shorter trip times.

- **Route 72 and 75** both operate locally within Watsonville from the Watsonville Transit Center and primarily along Green Valley Road. Route 75 has a slightly higher productivity and lower subsidy per passenger than Route 72. Ridership is spread relatively evenly across both routes, with higher activity at the Watsonville Transit Center and the Airport Boulevard/Green Valley Road stops. These routes are candidates for route consolidation due to the low productivities and overlapping alignments.
- **Route 74** is a poor performing route that operates locally within the City of Watsonville. The route overlaps with other Santa Cruz METRO services, with the only unique segment on West Beach Street west of the transit center as well as on Ohlone Parkway. Roughly 18 boardings would be impacted by removing this segment. Most other segments are duplicated by routes 69A and 71. Ridership is evenly spread along the route with the largest activity occurring at the Watsonville Transit Center. Additional trips on 74S which serve Pajaro Valley High School performed better, averaging with 16 boardings and 18 alightings at the high school.
- **Route 77** is a short local circulator servicing the Pajaro Valley and Crestview. This route is duplicated entirely by MST routes or by METRO routes, and carries only 40 passengers on weekdays. Boardings are evenly distributed, with one-third of the boardings occurring in the Pajaro Valley, one-third of the boardings occurring in the Crestview area, and the remaining boardings occurring at the Watsonville Transit Center. With poor performance on weekdays, it may be a candidate for consolidation or realignment.
- **Route 79** to East Lake has high subsidies throughout the week, with Saturday and Sunday subsidies at $25 and $35 per passenger respectively. Averaging approximately 5 passengers per revenue hour on weekends, this route is vastly underutilized. One third of the boardings on Route 79 take place at the Watsonville Transit Center based on the ridecheck. The remaining boardings are sparse and spread throughout the alignment.
- **Route 91X** operates as an express service between Santa Cruz and Watsonville via Main St. and Highway 1. On-time performance on this route is an issue with congestion on Highway 1 during the morning and afternoon rush hour impacting running times. Current studies include bus-on-shoulder lanes on Highway 1 to help resolve the on-time performance issues as well as attract additional riders.

Next Steps

The Service Evaluation identified how services within the Santa Cruz METRO network perform at the tier and route level. Future work for this project will focus on melding the service and market findings to develop service alternatives that best meet the needs of the community while recognizing the fiscal realities METRO faces in the upcoming years.