Current and Future Mobility Needs Assessment for the Cities of Cottage Grove and Creswell

Emily Connor • Anne Brown

PPPM 410/510 Transportation Planning

UNIVERSITY OF OREGON   LTD   SCI Sustainable Cities Institute   SCYP Sustainable City Year Program

Current and Future Mobility Needs Assessment for the Cities of Cottage Grove and Creswell

Emily Connor

Report Author • Planning, Public Policy and Management

Anne Brown

Assistant Professor • Planning, Public Policy and Management

SCHOOL OF PLANNING, PUBLIC POLICY AND MANAGEMENT

Acknowledgments

Contents

About SCI

The Sustainable Cities Institute (SCI) is an applied think tank focusing on sustainability and cities through applied research, teaching, and community partnerships. We work across disciplines that match the complexity of cities to address sustainability challenges, from regional planning to building design and from enhancing engagement of diverse communities to understanding the impacts on municipal budgets from disruptive technologies and many issues in between.

SCI focuses on sustainability-based research and teaching opportunities through two primary efforts:

1. Our Sustainable City Year Program (SCYP), a massively scaled university-community partnership program that matches the resources of the University with one Oregon community each year to help advance that community's sustainability goals; and

2. Our Urbanism Next Center, which focuses on how autonomous vehicles, e-commerce, and the sharing economy will impact the form and function of cities.

In all cases, we share our expertise and experiences with scholars, policymakers, community leaders, and project partners. We further extend our impact via an annual Expert-in-Residence Program, SCI China visiting scholars program, study abroad course on redesigning cities for people on bicycle, and through our co-leadership of the Educational Partnerships for Innovation in Communities Network (EPIC-N), which is transferring SCYP to universities and communities across the globe. Our work connects student passion, faculty experience, and community needs to produce innovative, tangible solutions for the creation of a sustainable society.

About SCYP

The Sustainable City Year Program (SCYP) is a year-long partnership between SCI and a partner in Oregon, in which students and faculty in courses from across the university collaborate with a public entity on sustainability and livability projects. SCYP faculty and students work in collaboration with staff from the partner agency through a variety of studio projects and service-learning courses to provide students with real-world projects to investigate. Students bring energy, enthusiasm, and innovative approaches to difficult, persistent problems. SCYP's primary value derives from collaborations that result in on-the-ground impact and expanded conversations for a community ready to transition to a more sustainable and livable future.

About Lane Transit District

LTD provides more than 10 million trips per year on its buses and EmX Bus Rapid Transit line in Lane County, Oregon. Of Lane County's approximately 4,700 square miles, LTD's service area is about 480 square miles and includes the Eugene-Springfield metropolitan area, and the surrounding cities of Coburg, Cottage Grove, Creswell, Lowell, Junction City and Veneta as well as communities in the McKenzie River valley.

LTD is a special district of the state of Oregon and led by a seven-member board of directors appointed by Oregon's Governor. LTD also operates RideSource, a paratransit service for people with disabilities, and numerous transportation options programs to promote sustainable travel county wide, and Point2Point, an initiative that provides community members with the necessary information and resources to assist them in identifying opportunities to drive less by discovering transportation choices that meet their individual lifestyles. LTD continually explores opportunities to enhance regional mobility through its projects and partnerships with other agencies.

Course Participants

TREVOR ACKERMAN, Community and Regional Planning Graduate

GRANT ANDERSON, Environmental Studies Undergraduate

JULIA BLUMER, Pre-Planning Public Policy and Management Undergraduate

HANNAH BUCKINGHAM, Environmental Studies Undergraduate

TARAH CLYATT, Environmental Studies Undergraduate

STANLEY FIDEL COLOMA, Planning Public Policy and Management Undergraduate

EMILY CONNOR, Community and Regional Planning Graduate

LINDSAY COOK, Public Administration Graduate

DYLAN CUATT, Planning Public Policy and Management Undergraduate

BO CULVER, Environmental Studies Undergraduate

RYAN DAVIES, Planning Public Policy and Management Undergraduate

CHLOE DELANEY, Pre-Planning Public Policy and Management Undergraduate

SOPHIE DOMENGEAUX, Planning Public Policy and Management Undergraduate

MORGAN DRIGGS, Planning Public Policy and Management Undergraduate

JOHN FRIEND, Community and Regional Planning Graduate

GEMMA FUCIGNA, Architecture Undergraduate

MELISSA GONZALEZ GABRIEL, Planning Public Policy and Management Undergraduate

SAM GREENE, Business Administration Undergraduate

XINGCHEN GUO, Accounting Undergraduate

CLARE HALEY, Community and Regional Planning Graduate

GRACE HARDY, Planning Public Policy and Management Undergraduate

RACHEL HESS, Environmental Studies Undergraduate

EMERSON HOAGLAND, Community and Regional Planning Graduate

COOPER HOLLIE, Environmental Studies Undergraduate

7

AVERY JOHNSON, Pre-Planning Public Policy and Management Undergraduate
PEGASUS LI, Spatial Data Science and Technology Undergraduate
ZACH LINGO, Environmental Studies Undergraduate
DAN LIU, Environmental Studies Undergraduate
ZANE LUXA, Pre-Planning Public Policy and Management Undergraduate
KYLE MARTINI, Environmental Studies Undergraduate
MADELINE MCCARTER, Pre-Planning Public Policy and Management Undergraduate
HANNAH PETERSON, International Studies Undergraduate
ELIZABETH RADCLIFFE, Planning Public Policy and Management Undergraduate
CATHERINE ROHAN, Community and Regional Planning Graduate
JULIET SCHMIDT, Environmental Studies Undergraduate
ANNA SHANK-ROOT, Planning Public Policy and Management Undergraduate
JACK SITTER, Planning Public Policy and Management Undergraduate
ISABEL TAPOGNA, Planning Public Policy and Management Undergraduate
EASTON TAYLOR, Environmental Studies Undergraduate
RJ THEOFIELD, Community and Regional Planning Graduate
DYLAN TRUONG, Planning Public Policy and Management Undergraduate
EMILY VASTANO, Computer and Information Science Undergraduate
GARETH WARR, Community and Regional Planning Graduate
PIPER WESLEY, Planning Public Policy and Management Undergraduate
ALIZA WHALEN, Community and Regional Planning Graduate
AUSTIN WIENS, Planning Public Policy and Management Undergraduate
REAGAN YEO, Planning Public Policy and Management Undergraduate

Executive Summary

The purpose of this report is to provide recommendations to the cities of Cottage Grove and Creswell based on the current and future transportation needs as informed by professional insight and community input. The first half of the report analyzes results from interviews taken from professionals in the area as well as the results from an online survey given to residents of the communities.

Current and future identified needs focused on the following themes:

- The perceptions of Route 98 and how that perception varied between LTD, professional insight, community input, and data analysis.
- Physical connectedness of the transportation systems in Cottage Grove and Creswell and barriers that might hinder transportation such as bus stop infrastructure.
- Programmatic connectedness between transportation systems in Cottage Grove and Creswell and how accessible they are to the communities they serve.
- Various technology and financial availabilities of the communities and how they shape the transportation options that can be considered for Cottage Grove and Creswell.

The second half of the report discusses new transportation mode options that could be used to address the transportation needs in Creswell and Cottage Grove. Modes such as bike share, paratransit, ride hail partnerships, and mobility on demand (MOD) (including analysis on Cottage Grove's pilot MOD project) were considered. The various case studies on these modes can be found in the appendix.

Between identifying some of the various needs that these two small cities have, students made recommendations for the cities' current transportation networks as well as some suggestions for what to consider when looking at new modes and how the cities' needs. Students made several recommendations to help address the current and future needs of these two communities.

Introduction

Transportation Planning students examined the mobility needs of smaller communities in the region and recommended how such communities could plan for improved resident mobility in coming years. These communities may not be not large enough to be served by traditional fixed-route transit service. However, there may be opportunities, especially given new technologies, to provide better mobility to residents beyond private car ownership. These communities are in the process of developing a deeper understanding of what their communities need. Understanding these needs, as well as how planners view these needs, is important to start planning for future transportation in these communities.

The research question underlying this report is: how can the communities of Creswell and Cottage Grove best utilize available transit modes, including Lane Transit District's Route 98, to best serve those that live there? To answer this question, the class formed several student teams to analyze the current and future situation as well as options that these communities have going forward.

The purpose of this report is to establish recommendations to the cities of Cottage Grove and Creswell based on the current and future transportation needs as informed by professional insight and community input.

Background

This report focuses on the transportation needs and challenges of two communities served by LTD, Cottage Grove and Creswell. These communities have unique transportation needs and challenges associated with their small size, land development patterns, and existing travel patterns. Currently, LTD provides bus service via Route 98 to both communities. LTD's Route 98 is a fixed-route bus that connects the city of Eugene to the rural cities of Creswell and Cottage Grove. In total, the route is approximately 50 miles long and has 49 stops. It is comprised of four main segments: Eugene, Lane Community College (LCC), Creswell, and Cottage Grove.

The route begins at the heart of downtown Eugene in Eugene Station (Bay N) and travels south along Willamette Street. Just outside of Eugene city limits, the line services LCC. Next, it continues south on I-5 for about seven miles to the city of Creswell. In Creswell, the route loops through the downtown and past City Hall along Oregon Avenue. Then, the bus continues traveling south on I-5 to Cottage Grove, where the majority of the route's stops are located. There, it provides access to facilities such as Cottage Grove High School, Lane Community College at Cottage Grove, and the Walmart Park and Ride along 28 stops. The route concludes by returning to I-5 and heading north towards Eugene Station (Lane Transit District, 2020). Figure 1 displays Route 98 and its stops.

South Lane Wheels (SLW) is a transportation nonprofit that provides door-to-door service in Cottage Grove and Creswell. Rides are available to the general public during weekdays from 7:30am to 5:30pm for a fee. Fees range from $3 for a door-to-door trip of three miles or less to $30 for a roundtrip ride from Cottage Grove to the Eugene/Springfield area (South Lane Wheels, n.d.). SLW also provides free Medicaid and non-medical transportation options to qualifying community members. SLW services must be scheduled ahead of time by phone and they do not run fixed route services.

The past year, LTD, in combination with the city of Cottage Grove and SLW, operated a mobility on demand (MOD) pilot program called The Connector. The pilot ran from January to December of 2019 and marked a new focus on transportation in rural communities (Card, 2020). The Cottage Grove MOD pilot was cut eight months short due to COVID-19 and a similar pilot planned for Creswell has been indefinitely delayed.

As the name indicates, the program provided an on-demand transit option to the community. Through the LTD

Transit App or via phone, residents could schedule a pickup "by clicking just one button" (Rothman, 2019).

As a part of the pilot program, LTD cut most trips from Route 98's loop around Cottage Grove in February 2019, only making trips on the loop in the early morning or late evening hours when MOD was not running. After MOD was implemented, Route 98 experienced a decline in ridership, which appears to be attributed to MOD not always being a reliable way to catch the 98 connection on time. Due to this, riders may have switched to their automobile.

FIG. 1

Lane Transit District Bus Route 98 Context Map.

Source: Lane Council of Governments, Lane Transit District
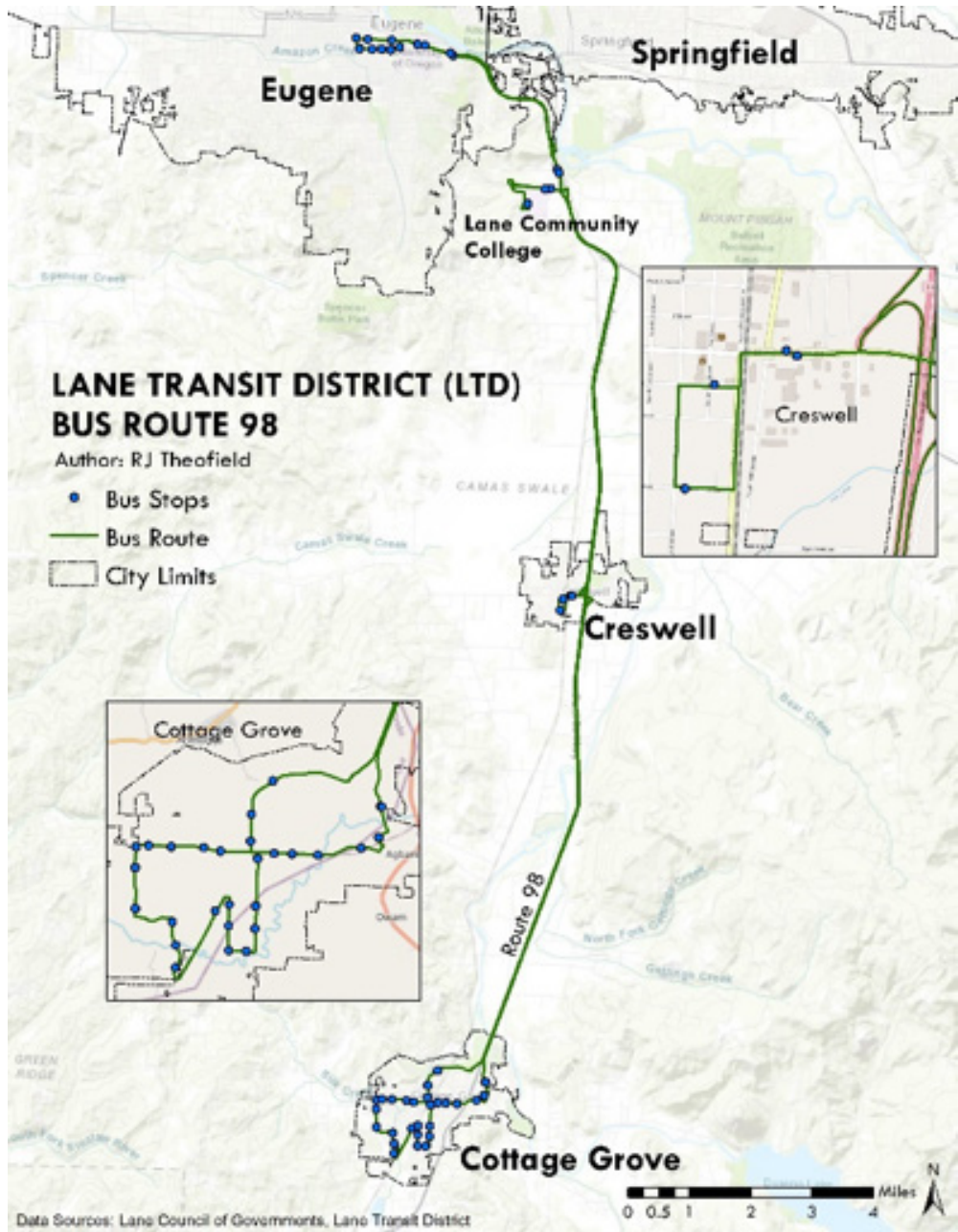
Perceptions of Current and Future Needs

Students researched current and future transportation need perceptions s with various different viewpoints in mind. This included, but was not limited to place, time, and perspective.

There were two main forms of perspective analyzed for this report: professionals and the general public. Professionals were contacted by student research teams for interviews and the general public was contacted via an online survey.

LTD conducted a community survey in spring 2020 to research how residents use LTD services and what changes they would like to see to transit services in the Creswell/ Cottage Grove area. LTD conducted the survey online and distributed it through social media advertising, flyers, email communications, city websites and newsletters, and newspaper advertisements. The survey resulted in a total of 203 responses from residents of Cottage Grove, Creswell, Eugene, Springfield, and nearby areas. Students aggregated responses by residents'

zip codes into two categories: Cottage Grove/Creswell and Eugene/Springfield. Zip codes that were adjacent to these cities were included in their respective categories. Responses that came from zip codes that were not inside of or adjacent to Creswell, Cottage Grove, Eugene, or Springfield were excluded from this analysis.

The following sections will share the perceptions of needs in these two cities, starting with the perspective that they come from, breaking down whether the needs are current or future, and where the need lies. The purpose of this report is to establish recommendations to the cities of Cottage Grove and Creswell based on the current and future transportation needs as informed by professional insight and community input.

Professional Insight

This section synthesizes information from interviews with eight transportation and planning professionals in Lane County, Oregon. Interviews were conducted on LTD's behalf to better understand the current transportation needs in Cottage Grove and Creswell.

Students reviewed interview responses for themes and inconsistencies among professionals. Based on interview findings, students developed recommendations for how Cottage Grove and Creswell could potentially address identified transportation needs and concerns.

METHODOLOGY

The student team collected data via interviews conducted via phone and Zoom, the results of the Mobility Needs Assessment Survey, and case study research. Students interviewed eight representatives from the city of Cottage Grove, city of Creswell, Lane County, LTD, SLW, and Lane Council of Governments (LCOG). Open-ended interview questions focused on topics like existing and desired transportation modes, ridership and coverage, and transportation mode opportunities and shortcomings. Although students asked interview participants a similar number of questions, the duration of each interview varied between 30 minutes and two hours. Interview guides can be found in Appendix A.

Interviewed transportation and planning professionals includes:
- Maddie Phillips, City Planner, City of Creswell
- Amanda Ferguson, City Planner, City of Cottage Grove
- Sasha Vartanian, Transportation Planning Supervisor, Lane County
- Kelly Clarke, Senior Transportation Planner, Lane Council of Governments
- Ruth Linoz, Executive Director, SLW
- Tom Schwetz, Director of Planning and Development, LTD
- Jeramy Card, Service Planner, LTD
- Jennifer Zankowski, Senior Development Planner, LTD

Students reviewed transcripts and audio recordings and analyzed professional opinions.

The Mobility Needs Assessment Survey was distributed from April 17 to May 3, 2020 and received 220 responses. The survey consisted of 12 closed-ended questions and ten open-ended questions, allowing respondents to add detail to their survey answers (survey questions can be found in Appendix B). Students cleaned and coded interview and survey data to discern themes and trends. The complete survey results can be found in Appendix C.

CURRENT NEEDS

The interviews reveal several themes of current transportation challenges and needs for Creswell and Cottage Grove. Themes include identifying the goals of transit in these communities, informational blind spots, and issues of connectedness within and between the different communities.

The Goals of Transit

Since transit riders each have individual needs and routes exist in different contexts, the goals of a transit system have a significant impact on how best to evaluate and operate the service. As discussed below, the jurisdictions and agencies overseeing Route 98 have varying views of which function Route 98 primarily provides. The goals guiding Route 98 depend on which rider category is seen as the primary user of the route.

Interviews identified two possible competing goals of Route 98: ridership and equitable service. If Route 98 is seen primarily as a commuter service, then questions of ridership will guide decision-making for the route. According to Jennifer Zankowski (LTD) the schedule times and design of the route are "primarily serving commuters coming into the Metro area." The route currently serves approximately 345 persons a day, which is relatively low compared to the other routes that LTD runs (LTD, n.d.). However, when the numbers of miles provided by the service are considered, Route 98 ranks among the highest of any route. This is because Route 98 spends a considerable amount of time on I-5 without stops, resulting in further and faster travel.

Some planners have a contrasting view of Route 98, seeing it primarily as lifeline service with secondary benefits to commuters. Instead of a commuting service, the thinking goes, many Cottage Grove and Creswell residents want a bus service that they can use to access destinations within and between their communities. Some city planners suggest that LTD could do a better job of directly meeting the priorities of these jurisdictions through outreach and planning.

To this point, Zankowski notes that Route 98 does not sufficiently serve the car-less population, the young and elderly, and those who do not work a "nine to five" job. Given that many planners view Route 98 as a lifeline in their communities as much as for commuters, it may be advisable for LTD to investigate how they could modify the route in order to achieve these dual goals. Possible modifications include schedule adjustment, a sub-route that loops between the communities of Creswell and Cottage Grove, and a last mile program that focuses on access to key destinations like shopping and social services. That being said, all LTD interviewees indicated no changes to Route 98 are likely in the foreseeable future.

Ultimately, whether the route continues to operate as a typical commuter service or shifts towards a lifeline service will have a large impact on route funding. Almost all planners and LTD personnel mentioned limited funds as a barrier to service improvement. In order to maximize the benefits of limited resources, LTD could consider if they will keep the route as it is, which is their current intention, or go through the process of a partial to full redesign. Additionally, different funding sources may be better suited for different service uses. For example,

relying on a fare heavy funding model could negatively impact lifeline users in a way that would be more acceptable for commuters. Continued conversations between professionals and community members can help clarify the role of Route 98 moving forward.

Blind Spots

Interview transcripts revealed several potential blind spots in professionals' knowledge of the communities they serve and transportation pattern. Knowledge of the share of households without cars, primary use of Route 98, and prevalence of smartphones appeared to be inconsistent or lacking. Filling in these potential blind spots could help paint a clearer picture of transportation in Cottage Grove and Creswell, and planners could then address current transportation challenges more effectively.

Households Without Cars

Interviewees were not aware of the share of households without cars. Knowing how many households lack a car could help cities prioritize infrastructure projects and provide LTD with data to assess. This data could help LTD tailor the type and level of service they provide.

However, knowing the share of households without cars does not provide a complete picture of transportation needs in Cottage Grove and Creswell. Multi-adult households may only have one car, making several members transit-dependent. Additionally, knowledge of households without cars does not mean that LTD should not also try to serve households with cars. However, the knowledge does highlight the population with the most limited transportation options.

Perceptions of Route 98

Responses that planners and LTD staff gave in response to student questions about perceptions of Route 98 varied. LTD staff describe the route as being used mostly by commuters coming into the Eugene-Springfield metro area, with some riders using it to access Lane Community College (LCC) and the University of Oregon. Most other planning professionals echo the use by commuters but also describe the route as a lifeline. Both city planners brought up the route being used to access the Walmart and shopping in Cottage Grove. The Cottage Grove planner, however, did not think the route is very useful for commuters and perceived the route as primarily serving students and shoppers.

While some variety in responses to perception of Route 98 is expected based on personal lenses, students found the mention of shopping in Cottage Grove interesting, especially because it was only identified by planners working in Cottage Grove and Creswell. Identification of this additional route benefit highlights how city planners can use their more intimate knowledge of their communities to inform transportation decisions. The differences in perceptions also indicate that surveying Route 98 riders to determine their purpose for riding could be beneficial. Understanding why people are on the bus could help LTD better align service with needs, whether that be through LTD or a partner organization.

Smartphone Ownership

Smartphone ownership is the last potential blind spot identified in the interviews regarding current needs. The interview question asked professionals if smartphone ownership would be a

barrier to adopting new technology-enabled transportation modes. While this question is future thinking, it also may have ramifications for present-day transportation. For example, the MOD pilot that took place in Cottage Grove included an app-based option for hailing rides in addition to a call-in option. Additionally, public transit is increasingly moving to e-tickets that can be purchased and stored on a smartphone.

One planner thought smartphone ownership is high but noted that cell phone coverage may be an issue in rural communities. Another planner did not specify how high they thought the level of smartphone ownership is, but stated that as long as there are alternatives, like call-in options, ownership would not be an issue. Two other planners saw smartphone ownership as a large barrier, especially related to informing non-smartphone-enabled users of bus route and schedule adjustments.

Collectively, planners identified smartphone ownership and use as a potential barrier. Additional understanding of smartphone ownership and use could be beneficial to future app-based pilot programs, particularly when it comes to staffing call desks. As smartphones and coverage become increasingly widespread this may become less of an issue, however access to smartphones is expected to remain difficult for low income individuals (Anderson, M and Kumar, M, 2019).

Connectedness
Connectivity is the second objective in the Central Lane Metropolitan Planning Organization Regional Transportation Plan, and it continues to be one of the larger issues affecting both cities. This manifests in different ways and scales

in Cottage Grove and Creswell, both at the programmatic and physical levels (Lane Council of Governments, 2017).

Programmatic Connectedness
Regional issues with programmatic connectedness stem from the multi-jurisdictional nature of transportation systems. Interaction with various stakeholder groups with different responsibilities and priorities can often lead to different understandings of the same systems, which can complicate the planning process.

Route 98's design also contributes to connectivity issues because of infrequent service and operating direction. The frequency of service along the route does not encourage spontaneous access. If someone chooses to take Route 98, they must plan hours ahead to ensure they take the correct bus at the required time. Planners brought up additional concerns related to the single-direction loop Route 98 takes through Cottage Grove and the extra time required to reach destinations because of the loop direction. The design of the route significantly limits transit connectedness and usefulness.

Physical Connectedness
Physical connectedness within the cities is an additional issue. In Cottage Grove, there are difficulties with east-west connections as the City is intersected by various physical barriers including two state highways, a rail line, and a river. These barriers create "pinch points," limiting the number of car, bike, and pedestrian crossing points, resulting in forced mode mixing. In an interview, Cottage Grove planner Amanda Ferguson highlighted that there are almost no pedestrian connections across Highway 99. The highway was built in the auto-centric

1950s, and while there are sidewalks on either side of the highway, there are no links across it.

Numerous other professionals also brought up the importance of sidewalks in transportation. Interviews highlight the importance of sidewalks for moving within and outside of communities, as all transit riders begin and end as pedestrians. Interviewees cited the cost of sidewalks, specifically ADA compliant sidewalks, as a barrier to further implementation. In addition to sidewalks, planners from each community mentioned interest in safe bike route options that connect their community to LCC or LTD's bus rapid transit system. Currently, sharing road space with personal vehicles is the only option for cyclists, which is not always comfortable or safe for many cyclists.

Both Creswell and Cottage Grove are largely auto-centric communities where essential services are spread out. Accessing services is not difficult for those with vehicles, but the distances may be difficult to overcome with current transit options and other modes of transportation such as walking and biking, making connectedness a serious challenge. The MOD pilot project was designed to address connectivity for those unwilling or unable to drive themselves. Initial results were extremely positive according to the Cottage Grove planner.

FUTURE NEEDS

Looking forward to future options, the interview participants were also asked to identify themes of not only what is needed at the present moment, but what will be needed going forward. This takes into account various new mobility options and the professional insight around that.

Interview and survey findings suggest that a multi-modal program will best address residents' needs. As shown in Figure 2, Cottage Grove and Creswell residents are most interested in ride-hail (55%) and on-demand flexible-route vans (42%), followed by bike and carshare (22% each), and scooter share (15%). The following section synthesizes and compares themes from interviews and survey responses.
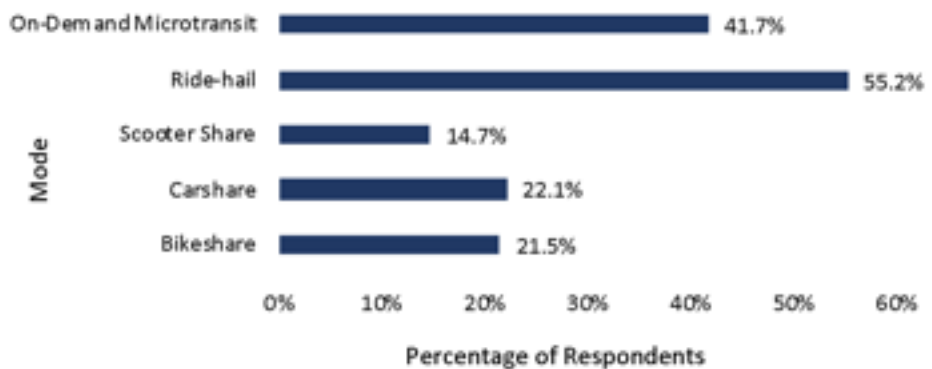
FIG. 2

Interest in Transit Mode, Cottage Grove and Creswell, 2020.

Source: Mobility Needs Assessment Survey, Cottage Grove and Creswell, OR. 2020


17

Technology-Enabled Transportation

While most Mobility Needs Assessment Survey respondents own smartphones (87%) and are not concerned about running out of cellular data (76%), professionals had diverse impressions of smartphone ownership and internet access. Some professionals perceive high smartphone ownership within their cities and others are under the impression that many people do not own smartphones. Since the Mobility Needs Assessment Survey was conducted online, these findings may not reflect the perspectives of people without internet access.

Despite these limitations, interviewees indicated technology-enabled transportation is not prohibitively exclusionary. That is, interviewees believe that many people are able to use technology-enabled transportation through either a smartphone or an alternative method, such as calling the dispatcher for SLW.

LTD Route 98 and Public Transit

Professionals expressed that the Route 98 bus, intended for commuters, serves commuter needs. Due to the current loop-based route and frequency, interviewees recognized that the Route 98 bus does not adequately support non-commuter travel.

Survey respondents do not conclusively reflect LTD's perception of Route 98 bus ridership, as 85% reported not using the bus in a typical week. While 36% of community members stated they would ride the Route 98 bus if it ran more frequently and 16% stated they would ride the bus if it stopped in more/different places (see Figure 3), professionals indicated that there are no current plans to alter the route. Professionals cited concerns that changing the route could negatively impact current riders by diverting resources and expressed the limitations of lifeline service.
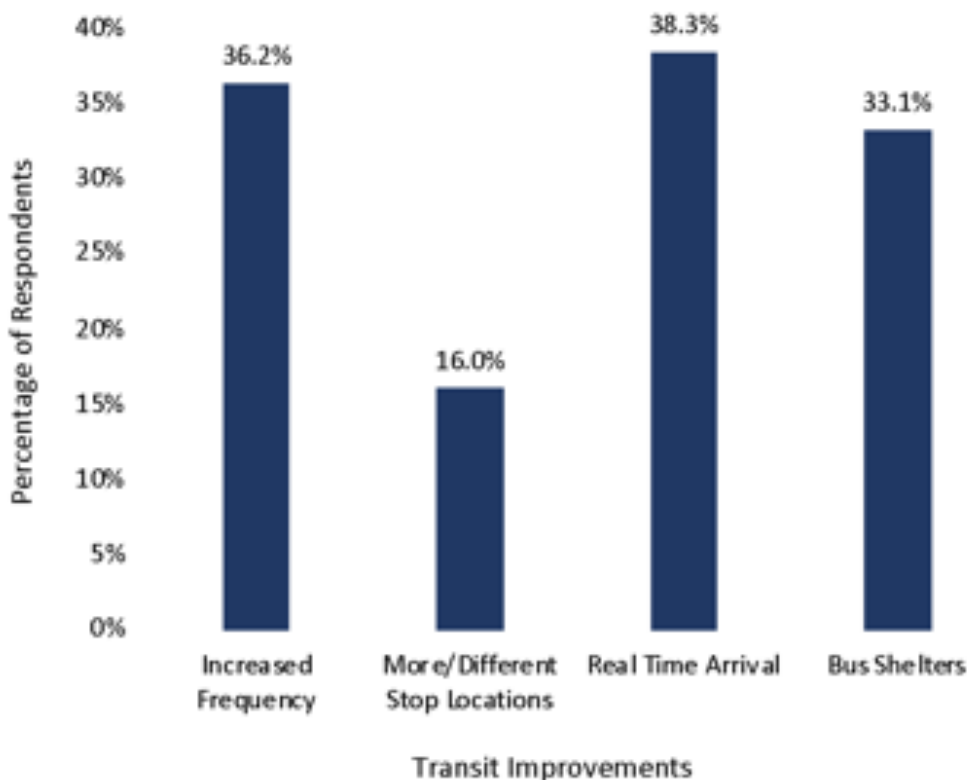
FIG. 3

Opportunities for Improved Transit

Source: Mobility Needs Assessment Survey, Cottage Grove and Creswell, OR. 2020

One transportation professional offered that Cottage Grove may benefit from its own small transit agency providing service within and between Cottage Grove and Creswell. Generally, community members expressed interest in enhanced transit stop amenities: 38% of respondents want real-time transit arrival information and 33% of respondents want bus shelters.

Active Transportation and New Mobility

Professionals identified bike and scooter share as great options for people without mobility limitations. Survey respondents indicated some interest as well (22% interested in bikeshare, 15% interested in scooter share). However, the Oregon helmet law (requiring those under 16 to wear a helmet) as well as age restrictions (PeaceHealth rides users must be at least 18) exclude family-wide use of the service (Oregon's Bicycle Helmet Law, 2020). Professionals echoed lukewarm interest in scooter share, citing accessibility concerns for all ages and abilities as well as safety hazards due to people riding on sidewalks.

As shown in Figure 4, 52% of respondents would like to see more/better bike lanes, and 65% would like to see more/better sidewalks. While professionals were enthusiastic about the benefits of biking and walking, they indicated that bike and pedestrian infrastructure expansion is difficult due to differing jurisdictional priorities.

FIG. 4

Active Transportation Interests

Source: Mobility Needs Assessment Survey, Cottage Grove and Creswell, OR. 2020
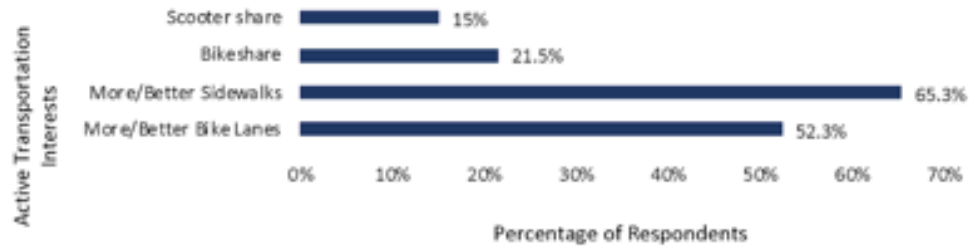
Over half of respondents (55%) indicated interest in ride-hail. Professionals are also interested in this transportation mode, particularly through public-private partnerships with transportation network companies (TNCs). While some interviewees identified the potential for ride-hail to reduce DUIs, others are concerned about the reliability and cost of a private service, especially without a partnership.

Similarly, 42% of respondents indicated interest in on-demand flexible-route microtransit. Professionals largely support this mode, citing the MOD pilot as having successfully helped older adults reach essential and recreational destinations. Professionals also acknowledged that this mode has capacity, access, and efficiency limitations. Specifically, professionals questioned whether this service would be able to meet demand (how many people can it carry?), provide the requested access (where does it go?), and do so efficiently (how long does it take?), all at the same time.

Challenges to Implementing Future Transportation Options

Transportation professionals and survey respondents identified different challenges within these opportunities. Professionals cited differing jurisdictional priorities,

funding, staff shortages, rural context, and low density development as primary challenges to adopting new mobility services and/or transportation technologies.

Interviewees indicated that building bike and pedestrian infrastructure may be hindered by differing priorities between cities, the county, and the Oregon Department of Transportation (ODOT), all of which have jurisdiction on roads in Cottage Grove and Creswell. Typically, sidewalks and/or bike lanes are added when road construction occurs for another reason.

Interviewees also highlighted funding and staff capacity as limitations. While cities may pursue grant awards, fund-matching requirements can be cost-prohibitive. As small cities, it is also difficult to add more work to already busy staff.

The rural context and low density development of Cottage Grove and Creswell can inhibit safe and efficient non-vehicle travel. Currently,

many of the roads in these cities lack infrastructure for bicyclists and pedestrians, which may perpetuate single-occupant vehicle use. Survey respondents echoed this concern, with over half interested in more/better sidewalks (65%) and bike lanes (52%) in their community.

Survey responses indicated challenges regarding attitudes and use of public transit as well as access to technology. As shown in Figure 5, nearly 18% of respondents stated they would never ride the Route 98 bus and 16% stated they typically do not leave town. Additionally, 19% of respondents are somewhat or very concerned about cellular data while 5% do not use the internet on their phones or do not have a phone. This means that future technology-enabled transportation options should be equipped with options that do not require a smartphone or cellular data, such as the ability to call a dispatcher.
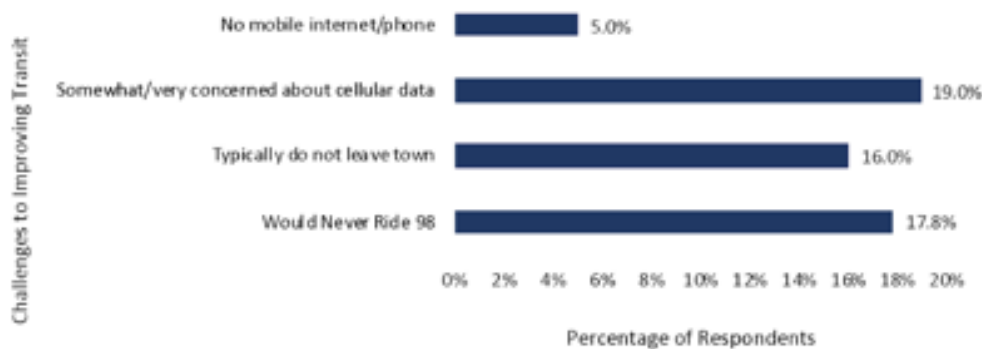
FIG. 5

Challenges to Improving Transit

Source: Mobility Needs Assessment Survey, Cottage Grove and Creswell, OR. 2020

PUBLIC PERCEPTION OF NEEDS

To assess more of the public perception of mobility needs in Cottage Grove and Creswell, students analyzed ridership trends, survey results, and the first/last mile areas around bus stops. Student researchers also used in-person observation to assess first/last mile access along Route 98. Observation of Creswell and LCC stations were performed on Friday, May 1st, 2020, between 2:00pm and 3:30pm. Cottage Grove observations were performed on May 7th, 2020 between 3:00pm and 4:00pm. To analyze ridership along Route 98, students analyzed boardings at 49 inbound and outbound stops. Route stops were organized into four segments for analysis: Eugene, Lane Community College, Creswell, and Cottage Grove. Data used include ridership data from LTD that was collected from October 2016 to December 2019. Students measured ridership using total boardings, providing insights into bus usage without being skewed by long distances traveled between destinations. Students conducted data analysis using Microsoft Excel and ArcGIS ArcMap. The following sections provide further detail on how students conducted the analysis.

Ridership Trends and Patterns

Route 98 provides critical connections between the Eugene-Springfield metropolitan area, Lane Community College, and the cities of Creswell and Cottage Grove. Service to these less dense and less populous areas means that the expectation for transit ridership is inherently much lower than inside the metro area. Moreover, the development patterns alongside this route create long stretches of unserved areas as the bus must travel on I-5 between major destinations. This pattern is exhibited by Figure 6. It shows that boardings are not evenly distributed throughout the area. As a result of these characteristics, the goal of Route 98 is coverage, not ridership (Lane Transit District, 2018). These areas cannot, nor should they, generate ridership figures comparable to LTD's premier route, the Emerald Express (EmX). While ridership is not the main goal, it is an important measure that helps LTD and the public assess whether the route and its stops best serve these communities.
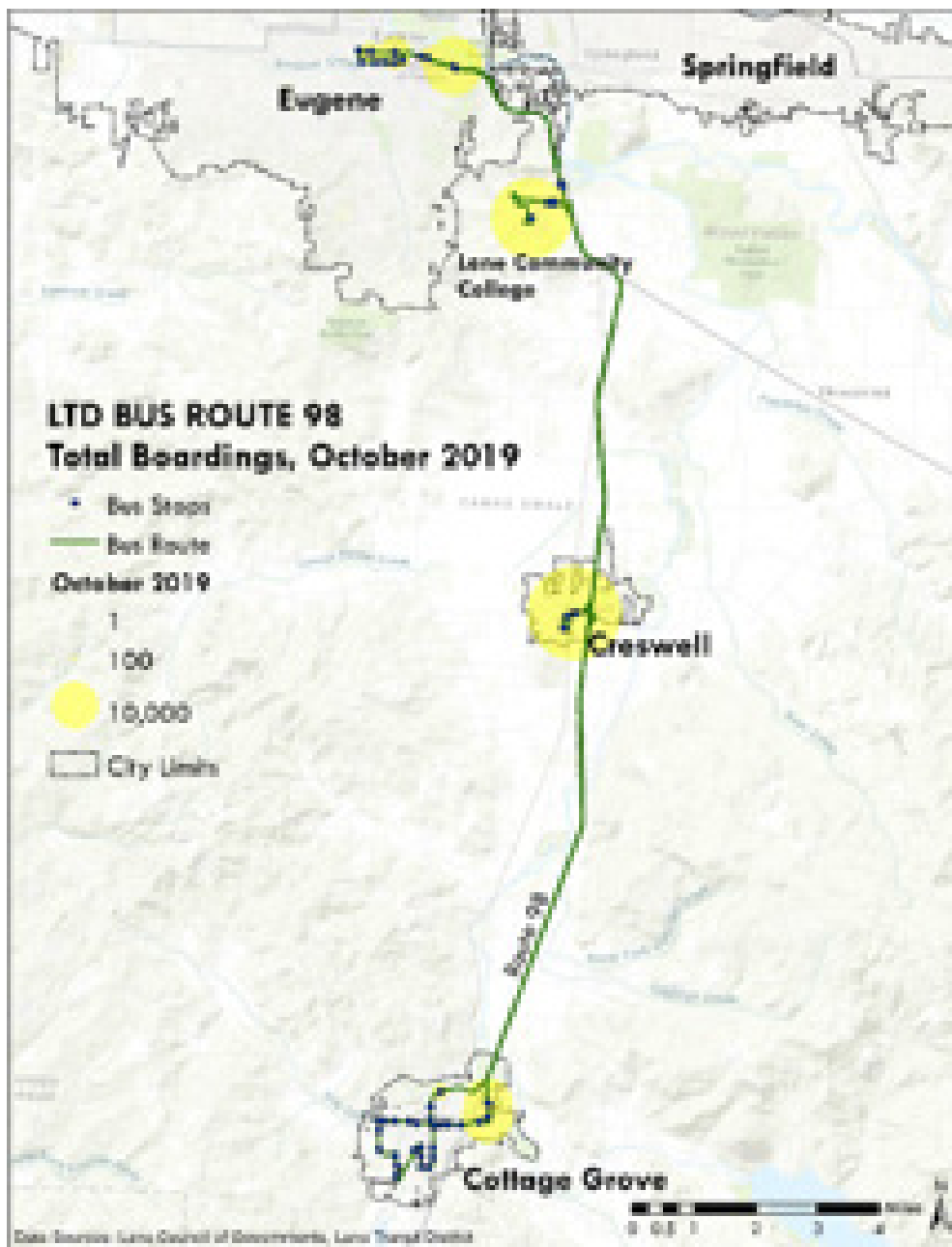
Overall, our analysis found that ridership along this route may be sparse, uneven, and declining, and the decline is sharper in the outlying cities. The following key findings support this:

Ridership declined on all route segments from 2017 to 2019. Overall, the average annual growth rate of total boardings on Route 98 declined nine percent during this three-year period. In fact, the ridership of every segment of the route decreased. Cottage Grove experienced the greatest decline, shedding just shy of 12 percent of its total annual boardings on average. On the other end, Eugene lost only seven percent of its total annual boardings on average.

Stops in the Eugene and Cottage Grove segments were the most popular from 2017 to 2019. Inbound and outbound stops located in the segments of Eugene (29%) and Cottage Grove (25%) together accounted for

about 54 percent of total boarding along the route from 2017 to 2019. Creswell (12%) and LCC (4%) outbound stops were the third and fourth most popular stops in terms of boardings.

Several stops account for most of the total boardings within each segment. The stop with the highest total boardings represented over 50 percent of total boardings within each segment in October 2019 (see Table 1). LCC Station, Bay E had the highest share of its segment's total boardings during that month, with 96 percent of boardings.

Segment	Stop Name	Total Boardings	Percent of Segment Total
Creswell	N/S of E. Oregon Ave.	40,436	75%
Lane Community College	LCC Station, Bay E	29,396	96%
Eugene	N/S/ Franklin Blvd. W of Walnut	15,887	56%
Cottage Grove	W/S Row River N of Village Green DW	10,889	78%

Survey Findings

LTD's mobility needs survey asked questions about travel patterns, mode choice, and transportation services and amenities. LTD distributed the survey online without random sampling and the results of the survey cannot be assumed to be representative. However, results can still be used to gain a general understanding of residents' travel behaviors and attitudes towards transit.

Table 2 compares survey respondent characteristics to Lane County demographic information in the categories of sex, age, income, and access to a car. Survey respondents are overwhelmingly female. Creswell/Cottage Grove respondents are older than the county as a whole, while Eugene/Springfield respondents are younger. Creswell/Cottage Grove survey respondents' household incomes are on par with the county, although Eugene/Springfield respondents are more likely to have annual household incomes less than $25,000. Both Creswell/Cottage Grove respondents and Eugene/Springfield respondents had slightly more access to a car than Lane County residents.

	Creswell/Cottage Grove Survey Respondents	Eugene/Springfield Survey Respondents	Lane County
Female	77%	92%	51%
Over the Age of 50	44%	17%	38%
Annual Household Income Less than $25,000	23%	48%	24%
No Access to a Car	6%	5%	8%

TABLE 2

Select demographic characteristics, 2020 and 2018

Source: LTD Mobility Needs Assessment Survey, 2020; American Community Survey 5-Year Estimates, 2018

Survey Trends and Patterns

Residents of Creswell/Cottage Grove have travel needs both within and outside of their communities and would be willing to use LTD services if more amenities were provided. The following trends support this finding:

Creswell/Cottage Grove residents frequently travel outside of their communities. Figure 7 shows how often respondents visit other communities for work, school, shopping, or services. 93 percent of Creswell/Cottage Grove respondents said they travel outside of their communities on a typical week. In contrast, 67 percent of Eugene/Springfield respondents travel outside of their communities on a typical week.
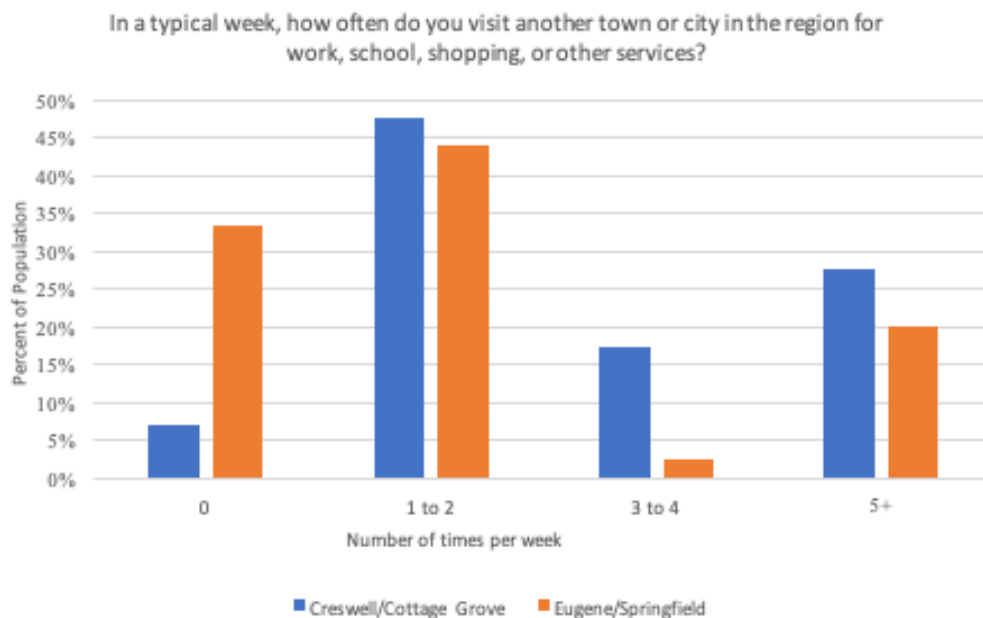
FIG. 7

Frequency of Travel Outside of the Community, Creswell/Cottage Grove and Eugene/Springfield, Spring 2020

Source: LTD Mobility Needs Assessment Survey, 2020

Creswell/Cottage Grove residents are willing to ride the Route 98 bus, and improved frequency may result in higher ridership. Figure 8 shows what circumstances would lead respondents to ride the Route 98 bus more frequently. Only 16 percent of respondents from Creswell/Cottage Grove said they would never ride the Route 98 bus. For Creswell/Cottage Grove respondents, the top choice was "if the bus ran more frequently" (45%). Only 22 percent of Eugene/Springfield residents marked this option, perhaps because of the improved transit frequency available in Eugene/Springfield.

Under what circumstances would you ride the LTD Route 98 bus or ride it more frequently?
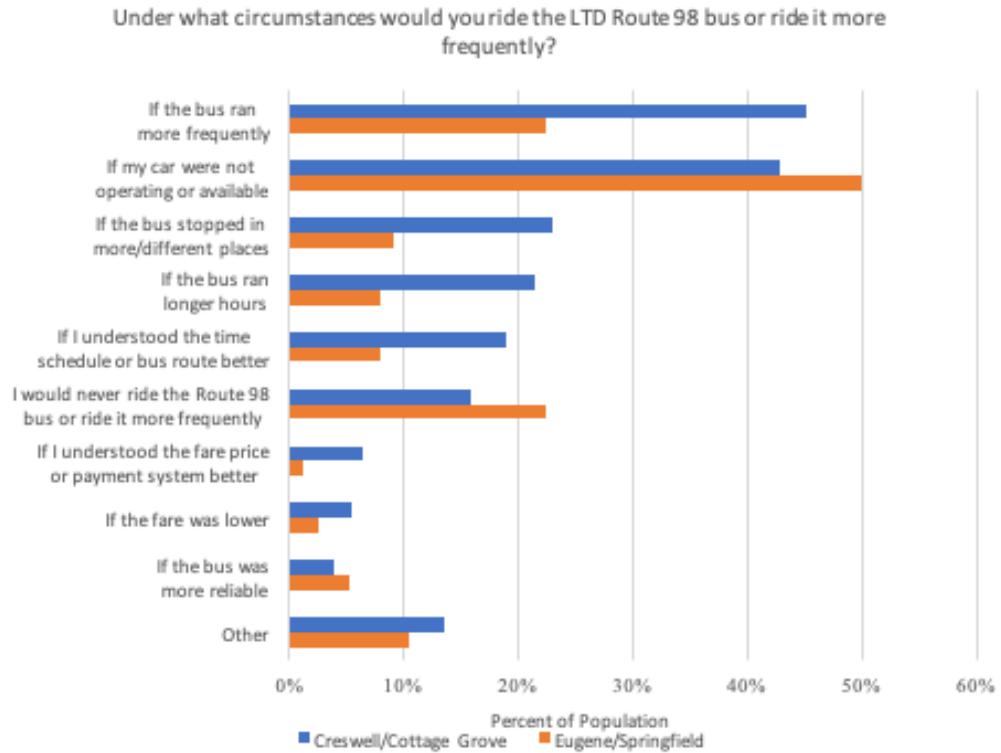
Improved bicycle and pedestrian infrastructure are needed in Creswell/Cottage Grove. Figure 9 depicts which transportation amenities respondents would like to see in their community. The top response was more/better sidewalks for both Creswell/Cottage Grove (63%) and Eugene/Springfield (70%). More/better bike lanes was also a popular choice, with 55 percent of Creswell/Cottage Grove and 49 percent of Eugene/Springfield respondents. Although not as highly ranked as bicycle and pedestrian infrastructure, nearly one third of respondents wanted to see more bus shelters in their community. While the survey did not ask respondents if these infrastructure improvements would allow them to use LTD services more frequently, sidewalks and bike lanes could improve access to bus stops and could increase ridership. Research shows that the presence of multi-use paths and bike lanes does increase ridership at the stop level in some instances (Dill et al, 2013).

What other transportation infrastructure or amenities would you like to see in your community?
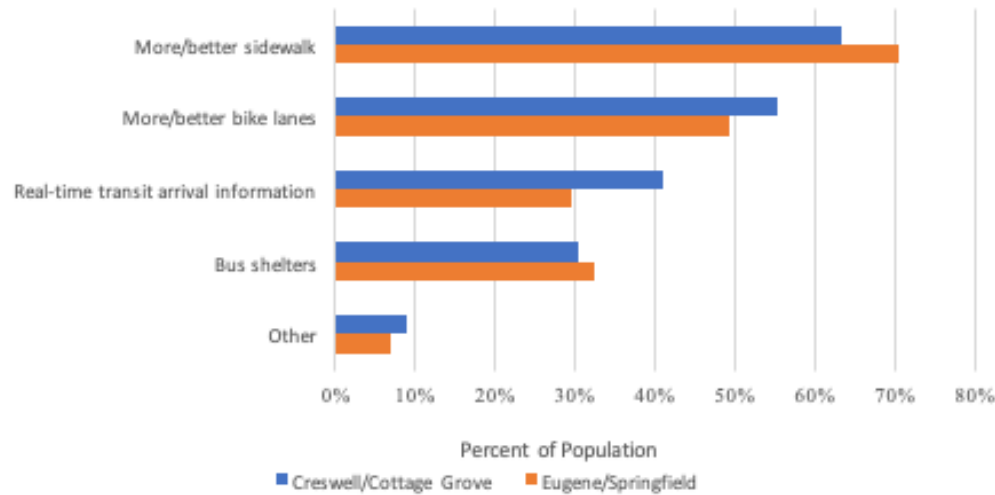
Because over 60 percent of Creswell/ Cottage Grove residents regularly walk for transportation, sidewalks are a critical component of improving accessibility. Figure 10 shows which modes of transportation respondents used in the 30 days prior to taking the survey. In both Creswell/Cottage Grove and Eugene/Springfield, residents primarily used cars for transportation. However, over half of respondents also walked.

In the past 30 days, what types of transportation have you used?
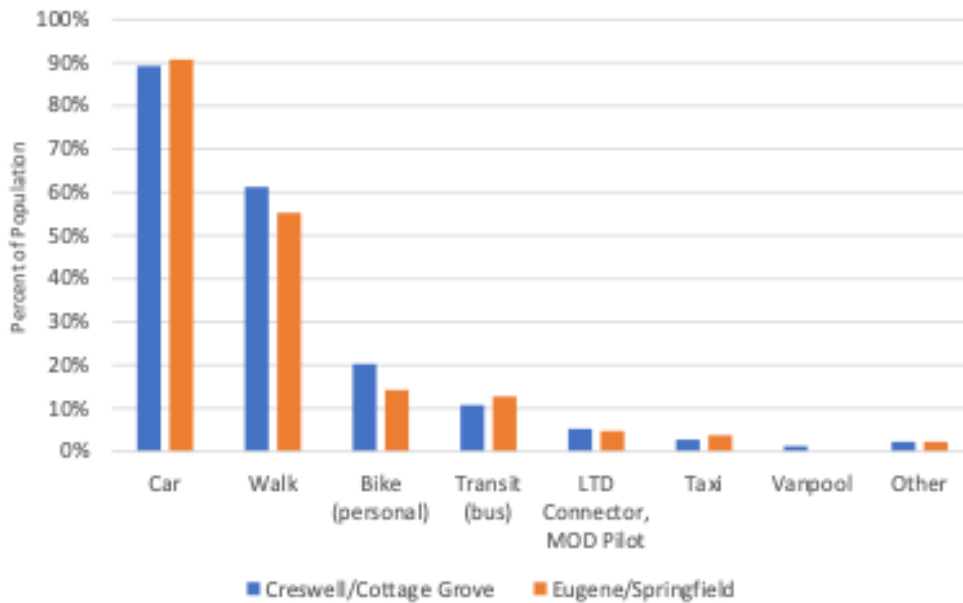
Interest in MOD is high for Creswell/ Cottage Grove residents, but use is low. Figure 11 shows which types of transportation services respondents would like to see in their communities. 52 percent of Creswell/Cottage Grove respondents said they were interested in an on demand, flexible route van,

but transportation mode responses seen in Figure 11 shows that only five percent reported using the service. This could be due to a number of factors, including residents' lack of knowledge of the new service, the possibility of missing a connection with the Route 98 bus, or other factors.

If available, would you be interested in any of the following transportation services in your community?

FIG. 11

Transportation Services, Creswell/ Cottage Grove and Eugene/Springfield, Spring 2020

Source: LTD Mobility Needs Assessment Survey, 2020
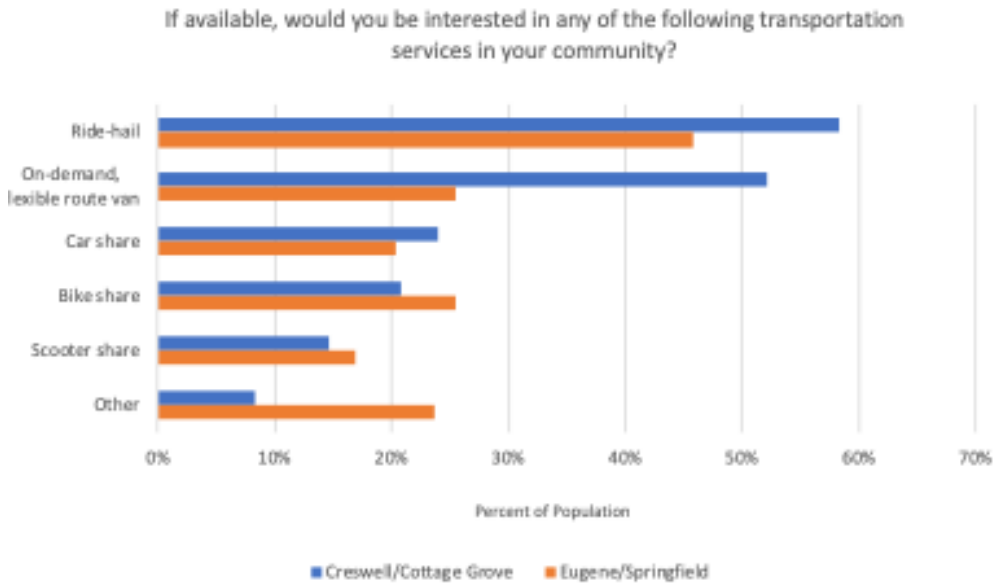
First/Last Mile

Survey results indicate that the accessibility of bus stops and nearby destinations is an important determinant as to whether Creswell/ Cottage Grove respondents would ride the Route 98 bus. The following section outlines key first/last-mile characteristics along Route 98.

Accessibility

Facilities that provide better amenities increase accessibility, whether they are pedestrians, bicyclists, or drivers. Ridership is sensitive to wait times, and when there are fewer amenities, transit users perceive longer wait times (Yoh). The longer the wait, the more important amenities are for passenger satisfaction. Observation of the stops themselves and the areas around them revealed that most of the stops do not provide many amenities. There were a few exceptions, but many have minimal provisions for riders.

27

Covered seating/standing area is available at only half of the stops. Creswell's stop is covered, as are two of Cottage Grove's (Walmart see Figure 12 and at the apartments on Main Street). The Creswell stop has a nearby covered structure. The other route stops have two exposed metal seats flanking a bus

stop sign, with little in the way of tree cover or alternative shelter. The LCC transit station is the exception to these generalizations. There is an abundance of covered seating and standing areas. Partial glass walls shield some of the seats from crosswinds and rain that would come under the roof.

Route 98's stops lack other safety and comfort amenities. Lighting at these stops is sparse and inconsistent; few of the stops have trash cans; only the Cottage Grove Walmart has a restroom; and few stops have proximal businesses/services to improve the waiting experience. LCC is again the exception to this, where lighting is ample, there are multiple trash and recycling bins along the station, and the college union allows riders to access services (see Figure 13).

Park and ride facilities are available for those in Cottage Grove and Creswell. Creswell's stop is adjacent to the parking lot, providing ease of access for drivers (see Figure 14). Cottage Grove has a large park and ride in the form of the Walmart lot. This is the only official park and ride among the six stops in Cottage Grove. If drivers wish to park and ride at any of the others, they will be doing so in residential neighborhoods, where long-term parking is not guaranteed.

Adequate bicycle and/or pedestrian infrastructure is not universally present. Even if there were bike lockers at every stop, the routes near them do not always encourage that mode of first/last mile access. Sidewalks exist around most of the stops but are not in equally good shape and lack similar tree cover/lighting to make them pleasant at all times of day. It is not possible to assess and generalize every possible route to and from the stops, but only two stops have a bike lane running past the stop (see Figure 15).

Only one bike locker exists along this route, located at the Cottage Grove Walmart stop (see Figure 12).

Disabled riders face low accessibility. Minimal curb cuts and safe crosswalks make most of the route potentially challenging for mobility-impaired users (in addition to the general lack of amenities). The Lane Community College stop provides numerous safe points of entry/exit from the curbs, as well as shelter from the elements, for disabled riders (see Figure 13). Multiple bays for buses allow them to pull over and out of the way during boarding.

New Transportation Modes

To meet the needs of Cottage Grove and Creswell going forward, student research teams were tasked with researching new mobility options that can help address the current and future needs of Cottage Grove and Creswell. The study options include:

- Mobility on Demand (MOD)
- Paratransit
- Ride-hail Partnerships
- Bike-Share

Appendices C-F highlight case studies observed for each of these potential modes, with Appendix G detailing the MOD Pilot in Cottage Grove.

Mobility on Demand

With the emergence of ride hailing services like Uber and Lyft, transportation planners have looked toward implementing their model of service through public provision or private-public partnership. MOD programs like the LTD Connector use software created by Transloc, which allows users to request rides through an app with a set pick-up and drop-off location. Users can also call in a ride or use the LTD website to access these services. Overall, most services provided include many of the same features, but how they are provided varies. In this report, students researched different methods of MOD provision and identified what has worked more successfully when putting MOD in place in smaller communities.

Many factors go into implementing a MOD service. Some of the most notable are service hours, how to request a ride, accessibility of shuttles, cost of fare, multimodal support, and service area. Each of these can alter the utility of such a program. Additionally, the size of the community and its location near other urban areas that have established fixed route transit is crucial in how it should be designed, as the purpose of each trip (commuting within MOD service area, or commuting to a fixed route to leave the service area) impacts what range of coverage should be provided.

Operating MOD at off-peak hours also impacts ridership based on the purpose of each rider's trip, meaning Wheels2U serves people likely not heading to work, but for things like recreation, shopping, etc. How transit authorities set service hours is important in determining who will be able to use the service, for what reasons, as well as how the existing fixed routes will be impacted.

An equitable MOD program should focus on the needs of the community. In Cottage Grove, with no Uber or Lyft, wheelchair users have limited options for transportation without their own private vehicle. The LTD Connector, having wheelchair access, serves a much-needed purpose in providing paratransit for the City. Other MOD programs like the Regional Transportation Commission of Nevada have focused on this, making paratransit the main focus of MOD.

Other cities, like Denver (RTD Denver) and Norwalk (Shared Mobility Use Center) have discounted fares for people with disabilities, which makes service more accessible to people who may rely on it as their sole mode of transportation.

MOD IN COTTAGE GROVE

Student research teams analyzed data from a 13-month study involving a new MOD service in Cottage Grove. There were 20,771 trips made with the MOD service, which provided data for students to study. Students used GIS to display and analyze data through a series of maps. Based on the maps that were created from the MOD data, students analyzed service patterns across five measures:

- Spatial Patterns Across Times of the Day
- Completed/Cancelled MOD Trips
- Wheelchair Requests
- Wait Times
- Frequent/Infrequent Riders

The student teams used spatial patterns to analyze each aspect of the MOD program and fully identify what recommendations could be made in order to improve the program.

After studying the patterns from the MOD service, students issued four recommendations that could add new benefits and increase efficiency. These include:

- Integrate the Connector with Route 98
- Create Varied Pricing for Frequent vs. Single-Use Riders
- Improve Availability of Service Information to Riders
- Increase ADA Accessibility

Combining the Connector and Route 98 may help provide reliable transportation to the residents of Cottage Grove that live too far away to use Route 98. Students recommend creating a varied pricing system for those that frequently use the program, creating an incentive to keep frequent riders using the program. Students also recommend improving the availability and keep canceled trips to a minimum. Students' final recommendation is to increase ADA accessibility by giving those with disabilities priority use over the vans with ADA accessibility.

Further analysis and information of Cottage Grove's MOD pilot project, please see Appendix G.

Paratransit

To further explore available new mobility options, student research teams examined how paratransit has partnered with ride-hailing services to create pilot programs that provide a faster, on-demand paratransit service for those with disabilities (examples provided in Appendix E). Cities with paratransit may hesitate to partner with companies that use smartphones and apps for on-demand travel.

Many of the older population and people with disabilities use smartphones and are able to navigate them. Overall, riders seem satisfied with paratransit programs. Some of the complications that students found are no-call service and higher costs. Boston subsidizes paratransit rides and through their pilot program. The subsidy is applied to ride-hailing for those who are registered to use paratransit.

There have also been complaints about having to walk to a 'virtual bus stop,' as some riders with disabilities are unable to do so. In addition, some city paratransit programs have been reluctant to partner with Uber and Lyft. Both companies have previously faced lawsuits for discriminatory service against those with disabilities. On-demand ride hailing has also negatively impacted the taxi industry, which many riders with disabilities use to get around (Westervelt, 2019). This has left a gap for paratransit options that likely needs to be filled.

Considering the population of Lane County and the types of trips elderly people tend to make, students conclude that a program like Boston's could be worth piloting. The program does not have to be large, but big enough to serve the community that already falls under the Americans with Disabilities Act (ADA). Students recommend looking into other on-demand services that LTD could partner with in addition to or to replace Uber and Lyft, as ride hailing agencies are not required to be ADA compliant. In addition, rides could be subsidized for ADA members already using paratransit. These services also allow schedule flexibility and spontaneity to be enjoyed by those with travel-limiting disabilities.

RIDE HAIL PARTNERSHIPS

To look at the potential of ride hail partnerships for Cottage Grove and Creswell, student teams researched current available partnerships throughout the United States. Students conducted case studies of three different partnerships: LA Metro and VIA, Liberty Mobility Now, and TD Late Shift. Details on these case studies can be found in Appendix F.

After reviewing partnerships with TNCs in other cities, students found a flat rate system that involves carpooling with a first and last mile focus is essential for smaller communities in Lane County. Using a flat fare that is affordable to all residents in their community based on the average income could be an effective tool in these smaller communities. This fare needs to be low to help encourage members to use this system for first

and last mile travel and expand their use of transit. Using price to encourage ridership can be an effective tool and one that students encourage. For example, a 10% discount on all rides for the first week of use could be implemented. Small promotions, such as discounts during community-based events, could help encourage users to access the partnership and potentially bring in new users.

A carpool-based system could also be of value to smaller communities such as Cottage Grove and Creswell. This system could connect riders to a car that is going in the same direction they need. This could allow for more people in one vehicle and reduce the number of single riders.

Bike Share

Communities the size of Creswell and Cottage Grove provide a unique opportunity to implement micromobility options for their citizens. A challenge for micromobility in large cities is the inconvenience of having to travel across larger distances in areas built for cars. Cottage Grove encompasses of 3.8 square miles and Creswell encompasses of 1.7 square miles. Travel distance is lower and hopefully traffic danger is lower. Micromobility in these communities could look similar to the PeaceHealth Rides bike system that is currently used in Eugene's southeast University District. PeaceHealth Rides includes bikes and docking stations both on campus and high traffic spots surrounding campus.

Cottage Grove has a population of 10,169 people (World Population Review, 2018). Forty-nine percent of the population is male, and about 30% of the population has earned some college credits. On average, individuals earn $28,652 annually, and 21.19% of the population lives in poverty. A challenge for Cottage Grove is the physical layout of the city, which includes a river, railroad, and the I-5 freeway. Four areas of the community are shaped around these three barriers.

The first area is the neighborhoods west of the river. This region includes an elementary school, a high school, and a Lane Community College campus. One issue with micromobility in this area is the lack of connection across the river, with the main bridge being on Main Street. Without a car, traveling can be disconnected, especially by bike. The second area is east of the river and west of the train tracks. This is the most dense part of the city and contains the downtown area, a shopping center in

the north, and housing. The third area is east of the train tracks and west of I-5. It contains a large section of Main Street with multiple parks, schools, and another shopping area. This area is the largest and also has very few crossings over the tracks. The final section is west of I-5 and includes the hospital, an airport, and Walmart. These sections are divided with little infrastructure that makes car use likely because of the lack of direct routes. Bike stations would be used primarily to move within these sections as well as through Main Street, which has the most direct routes.

Cottage Grove is also challenged by equity, with a lower-than-average income. Reasonably priced bike share could help individual's decide to add it to their travel expenses. While the goal is to decrease car use, infrastructure changes would be helpful for bikes.

Creswell has a smaller population of 5,735 people (World Population Review, 2018). Forty-three percent of the population is male and about 38% of the population has completed some college credits. The average annual income is $35,891 and 7.51% of the population lives in poverty. Creswell faces fewer physical and economic challenges compared to Cottage Grove. Creswell is unique in that in contains three different neighborhoods with distinct income levels There are three main corridors that make up these areas of the community with barriers that make bike travel difficult. The three neighborhoods are split up evenly, with the first being west of the railroad tracks. The next neighborhood is between the railroad and I-5, which includes downtown and the trailer park. The last area is located west of I-5 and connects through Oregon avenue; it includes a park, neighborhood, and shopping center. Significant obstacles for Creswell include the north-south

railroad tracks and I-5. These split the eastside shopping center and neighborhood from the rest of the City. The eastside neighborhood and shopping center can only be accessed by Oregon Avenue. With infrastructure improvements, Oregon Avenue could handle more bicycle traffic. Creswell also has a higher average income and a more bikeable community overall.

EQUITY

Bike share and e-scooters can create an opportunity for more people to travel via alternative transportation modes. Bicycle use already suffers from equity issues such as lack of infrastructure, access to quality bikes, repair facilities, and safety classes. Although these amenities aim to lower the environmental impact of cars and allow people to access to more travel opportunities, equity remains a concern within these programs. Placement of facilities, access to the internet, and debit/credit card access remain problematic for these amenities.

Placement of Facilities

Bike share and e-scooter programs are generallyl considered last mile connections for people to better access their community. Unfortunately, the location that these programs choose to place their facilities may ignore underserved communities. Corporations may make major decisions without knowing and understanding the community they enter. According to a 2017 study done by the city of Portland, high income communities use these programs three times more than low income communities. This study also found that placement of facilities impacts how much a community uses these programs (Goffman, 2018).

Philadelphia's bike share program reaches out to underserved

communities to create a program that benefits these communities. They gather information through surveys and meetings to determine the best location for new facilities. Indego also uses a bike-ambassador program that surveys people from trusted organizations that are located in these communities. This aims to increase comfort among underserved communities in using these programs to travel around their community (Bicycletransit, 2019).

Cost

Bikeshare and e-scooter programs are designed to be less expensive ways to travel around communities and access more opportunities. Many in the U.S. use cars for short distance travel that could potentially be accomplished through more sustainable modes of transportation.

Many bike share and e-scooter programs do not have low-income programs and have high costs when property is damaged. Only 32% of bike share programs have a low-income plan (Goffman, 2018). In Washington DC, the cost of replacing a damaged bike is $1200 (Goffman, 2018). This deters people from using the service because of the financial risk. Indego provides numerous options for their

low-income citizens. They provide a $5 monthly pass for low-income residents that allows unlimited rides (RideIndego, 2020).

Access to Debit or Credit Card

Although these programs are meant to provide an affordable travel mode, other issues can persist, such as cost and credit/debit card requirements. Indego provides a cash payment option that allows people without any credit or debit cards to access bike share. Although many critics predicted that many people would not pay for their rides, Philadelphia has not seen issues with theft or unpaid rides.

Internet Access

These programs require that an individual has an internet connection and a smartphone. Philadelphia educates residents on how to use computers through the Digital Initiatives of the city of Philadelphia. By partnering with the Keyspot Network, Philadelphia provides over 50 public access computers centers. Digital Skills and Bicycle Thrills partnered with the City to develop a class that educates people on bicycle safety and digital knowledge.

Recommendations

Student research teams recommend the following changes to current transit and new mobility options in Cottage Grove and Creswell.

CURRENT TRANSIT

Increase frequency of Route 98. Survey results indicate that increasing the frequency of the bus is the most favorable option, with around 45% in favor of increased frequency. This is especially important for the many residents of Creswell and Cottage Grove who work, study, and shop outside the community. The ridership and survey data indicate that Route 98's greatest function is as an intercity connector and commuter service. Increased frequency could be accomplished by expanding the fleet and/or shortening the route to reduce time spent traveling within cities. Potential downsides include expenses associated with increased route frequency and reduced coverage through route shortening. An optimal balance between route shortening and coverage loss is desirable.

Target investments in improved amenities based on stop usage. Improvements to bus stops could increase their accessibility. These improvements could include installing bus shelters; enclosing existing shelters; and adding lighting, bike lockers, trash cans at all main stops along the route. Roughly 30% of survey respondents in Cottage Grove and Creswell expressed the desire for more bus shelters along the route. These improvements could add to the design, safety, and comfort level at the stops, in turn improving riders' experience. Minimal investment in amenity improvement has been shown to have a positive relationship with improved

ridership and customer satisfaction (Hu, 2016).

Some of the more popular stops along Route 98 have sparse amenities, such as the Row River Road west-south stop in Cottage Grove. Given the stop's high boarding numbers and proximity to the hospital, additional amenities at the stop could improve accessibility and comfort for many riders. Specific stops recommended for amenity improvement include north-south E. Oregon Avenue in Creswell and Row River Road west-south in Cottage Grove.

Expand Bus Service Within and Between Cottage Grove and Creswell. Survey results indicate that 36% of respondents said they would ride the Route 98 bus if it ran more frequently and 16% of respondents stated they would ride the Route 98 bus if it stopped in more and/or different locations. LTD has no plans to alter Route 98 and LTD staff expressed concern that changes could negatively impact current riders. Instead of increasing Route 98 frequency, students recommend that an additional fixed-route bus route provide service within and between Cottage Grove and Creswell. This service could facilitate access to the Route 98 bus, which could continue to prioritize commuter service, and enhance the quality of life of residents who rely on public transportation.

Survey respondents also expressed interest in amenities such as bus shelters (38%) and real-time transit arrival information (33%). Research

suggests that providing transit amenities such as seating, lighting, and route information make extended wait times more tolerable. These amenities could also provide riders with an improved sense of safety and reliability, especially in areas without existing Route 98 bus service.

Implement land use development that promotes accessibility to transit in Cottage Grove and Creswell. Research suggests that promoting denser development around transit stops; creating complete streets in subdivisions and retail areas that allow for bike and pedestrian access; and other improvements increase circulation within communities. Interviews point out that once a traveler enters a private vehicle, they are very unlikely to exit in order to make a transit trip. Because of this, it is desirable that urban form supports other modes of transportation such as walking and biking, allowing quick and easy access to transit services.

Increase coordination and establish more partnerships across organizations to improve transportation options for Cottage Grove and Creswell residents. Numerous interviews mention the difficulty of coordinating physical infrastructure improvements because of varied jurisdiction, whether that be Oregon Department of Transportation (ODOT), Lane County, or the cities themselves. Reinforcing working relationships among these agencies well before any improvements are made can support the planning process when it takes place. Additionally, smaller agencies may find it useful to work together to develop plans before contacting ODOT. Interviewees expressed worry about being overlooked as a small community. Including other organizations like

LTD that are not typically involved in physical infrastructure improvements could also be useful, as they can contribute insights unique to their positions that may otherwise have been overlooked.

Regional planners identified both Creswell and Cottage Grove as proactive in responding to transportation needs, good at identifying resources, and being open to collaboration. Both cities should continue to build on those strengths. One option is to create a community organization centered around transportation, Better Eugene Springfield Transportation (BEST) could serve as a model. The organization could include citizens as well as city and country planners, LTD representatives, and SLW representatives. The organization could span Cottage Grove and Creswell and serve dual purposes of education about current transit options and exploration of new transportation opportunities.

Partnerships that leverage the unique skill sets and citizen bases of different organizations have already worked well for Cottage Grove. The MOD pilot, conducted by LTD, SLW, and Cottage Grove, was well liked by the community. More experimental pilots of this type could be conducted, including determining each city's optimal transportation "mix," as identification of a blanket solution is unlikely. The success of the MOD pilot also highlights the speed at which small cities can assimilate and experiment with new transportation options, encouraging further pilot projects.

NEW TRANSPORTATION OPTIONS
Prioritize bike and pedestrian infrastructure improvements, especially around the popular stops. The urban structure can change to

complement changes made to stops. Such updates could include bike lanes, sidewalks, ADA accessibility, and improved lighting. Survey results show people wanted more/better sidewalks and bike lanes as improvements to their community. Paired with specific stop improvements (e.g., bike lockers), better infrastructure for active transportation could increase accessibility for those who rely on walking and biking to complete first and last mile trips.

Provide internet hot spots. For the 15.6% of individuals that have access to a mobile device but may not have access to data plans, on board Wi-Fi as well as Wi-Fi hotspots at high frequency destinations such as LTD bus stops and large shopping outlets could bridge the gap for under-connected individuals hoping to utilize connector services. The Pinellas Suncoast Transit Authority has already taken the initiative to connect transit users with Wi-Fi by connecting both their busses and transit terminals with public access internet (PSTA, 2020). Although the pilot program has successfully reached over 80% of Cottage Grove respondents consistently, improvement may remain in reaching marginalized individuals.

Allow for alternative methods of payment for new mobility options. Checking account requirements present a barrier for equitable access to services. Survey responses found that 100% of those who did not have a checking account were low-income. Cottage Grove could consider policies that take into account the barriers technology can create among low-income communities. To address this issue, a debit card program could eliminate cash options. Allowing riders to pay at a specified customer service center prior to their trips would allow them to begin transitioning away from

cash options. In Washington D.C., Capital Bikeshare along with District Government Employees Federal Credit Union and United Bank created a bank system for bike share users. These organizations provided users without checking accounts a bank account and debit card. To relieve the barrier that membership costs can create, unbanked users were given a $25 gift card towards their annual membership (FHWA).

Fund Future Transportation Initiatives with Transient Room Tax Revenue. Increasing public transportation options requires funding. Long-term, students recommend increasing Lane County's Transient Room Tax (TRT) to generate funding for expanding public transportation. The TRT currently benefits tourism initiatives, the Lane County Historic Museum and other museums, special projects and administration, and tourism marketing for areas outside Eugene and Springfield (Lane County, 2020).

Increasing Lane County's Transient Room Tax and allocating funding to transportation initiatives is ideal because residents will not bear the burden of the tax. If allocated to transportation projects, this additional revenue will heighten access to public transportation and improve the lives of Lane County residents.

Identify creative revenue sources. Funding of transportation improvements can be difficult in smaller communities where there may be less development. This could mean less money towards capital improvement projects. Cottage Grove and Creswell could consider ideas on how to direct development to areas that need infrastructure improvements and how to improve infrastructure in coordination with

these developments. These changes could include adjustments made to city codes, system development charges, and subdivision ordinances. No matter where funding is derived, it could promote increased transportation access and connectivity across all modes.

MOD

Keep piloting the mobility-on-demand service until more data is generated, especially once the pandemic has subsided. The recentness of the MOD pilot makes it potentially hard to assess. Respondents reported a high degree of interest in the MOD service, but few people used it. Low utilization may be due to several factors, including lack of reliability, advertisement, or general awareness of the service. It is possible that it did not operate long enough to be sure of its potential.

Expanding upon and improving MOD service could fill a mobility need that Route 98 cannot accomplish without significant tradeoffs, especially for those outside of the route's walkshed or who may not have easy accessibility to their local stop. If the recommendations to focus on commute service leave intracity mobility needs unmet, it is possible MOD could bridge that gap. Alternatively, the data might show that rather than on-demand, deviated route service, fixed-route service could more efficiently move people around Cottage Grove (pending that the loop/route was small enough to be reliable but large enough to provide a good walkshed to any stop).

Integrate the Connector with Route 98. From the data collected, specifically the spatial patterns across times of day, the student teams noticed that many Connector riders were using the system to transport them to and from LTD stops at different times of the day. For example, from 7am-10am students noticed that destinations clustered around LTD stops and from 4pm-7pm students noticed that origins clustered around LTD stops. As noted in the findings section, this pattern may indicate that the Connector system could be used to complement LTD's Route 98 rather than replace it.

For the Connector to be as effective as it can be, staff could consider combining the Connector and Route 98 in order to transport the residents of Cottage Grove that live too far away to use Route 98.

Create Varied Pricing for Frequent vs. Single-Use Riders. For single-use riders, our recommendation is that the current fee of $1 be raised to $3, bringing in more money for the MOD service to make any necessary upgrades. Students believe that raising the current fee by $2 is not enough to deter use but potentially influence more people to become daily riders and use the service frequently. The increased cost for the infrequent riders could cover the reduced costs for the frequent riders and create more revenue that could be reinvested back into the program.

Based on the results from the Cottage Grove MOD study, students concluded that many people who use the service are frequent riders. Students recommend this system provide some type of benefit for frequent users. People who make less than $35,800 and/or use the service at least once per day (or 30 rides per month) should pay the current $1 per trip. This helps give low-income riders access to the service and provides an incentive for people to use the service more frequently.

Improve the Availability of Service Information to Riders. The last data period had a total of 439 canceled

trips from December 2019 to February 2020. This is in line with what should be happening as more people understand and use the MOD system correctly. While the data shows a general trend of cancellation declining, cancellations may have been prevented from the start of the program.

An information system could be created and implemented for the MOD system similar to a bus stop. Well-planned bus stops provide information to passengers such as time or arrival, fare costs, and routes and locations of lines and stops. If a bus stop lacks any of this information, studies indicate this will lead to a decreased satisfaction and overall use of any transportation service (Ink, 2016). Students recommend the creation of a two-part plan that will inform riders. The first recommendation is the creation of a smartphone application and website that will provide all the information listed above plus real time available seating and estimated times of arrival. This information will empower potential riders with the information they need to decide to use the MOD service. The second recommendation is to create an information pamphlet to be posted inside the MOD vehicles and on the website that clearly and simply outlines cost, capacity, and features of the MOD system. These two recommendations can provide riders with up-to-date and correct information so they can use the MOD system effectively and efficiently.

Round Trip Scheduling. Given that 6.5% of respondents to the survey do not own a cell phone and 15.6% of respondents are concerned with access to monthly data (Mobility Needs Assessment Survey, 2020), it would be helpful for individuals to be able to book return trips and departures in a single interaction including calls, online scheduling, or a smartphone

application. If riders can only access a phone or computer while they are at work or at home, they may be unable to get back to their original location using the Connecter service. This means they will most likely find an alternative travel mode. Additionally, being able to book round trips through non-technological means could provide transportation access to the technologically disadvantaged and connect individuals who lack access to phones and the internet.

Increase ADA Accessibility. Student analysis of 13 months of the Connector ridership data reveals potentially concerning trends in ridership that required wheelchair requests. Rides containing wheelchair requests made up only 2.38% of rides. This could be due to the fact that 60% of riders requesting wheelchair service did not return for additional trips, suggesting that there may be obstacles preventing these riders from fully benefiting from this service (LTD, 2020). Students' first recommendation would require LTD and Cottage Grove staff to obtain survey data from riders who requested wheelchair access and determine what measures could be taken to improve their experience using the Connector. This could allow program officials to make alterations to the service in response to expressed needs from affected riders that could increase ridership among this population.

The second recommendation is to consider creating a dedicated wheelchair accessible vans for the Connector. This recommendation is in response to the elevated rate of cancellations among rides that required wheelchair accommodations (16.16%, compared to only 7.39% cancellation rate across all rides) (LTD, 2020). This, in addition to the high share of single use riders who require wheelchair

accommodation, implies that the current system may be inaccessible to disabled riders. Increasing dedicated accessible vehicles could improve service accessibility to presently underserved riders. These vans could be used to transport all riders, but the system could match riders who request wheelchair access with dedicated vans and prioritize their pick-ups. Dedicated vans could also help reduce elevated wait times that riders who require wheelchair accessible transport experience on the service while improving their riding experience.

Prioritize Those Who Require Transportation to Medical/Mental Health Appointments. Accessibility to medical care could increase by providing an option to specify that the ride is for a doctor's appointment, therapy session, or other medical appointments. Those rides could be prioritized, as they are time sensitive. Keeping the ride descriptions short and private could allow people to rely on this service to get them to their essential appointments on time.

Give job preference to those unemployed by the COVID-19 pandemic. Hiring local residents who were let go from their jobs because of COVID-19 pandemic could help decrease unemployment and boost the community's economy. Filling the positions of drivers and call center operators among others with those unemployed by COVID-19 could provide a morale boost, along with a paycheck, to those hurt by this pandemic. Hiring these individuals could also give this program and the people who use it a stronger sense of community and interconnectedness, as everyone can relate and sympathize with the struggles caused by the pandemic.

Paratransit
Consider investing in a pilot on-demand service in partnership with rideshare companies to expand paratransit services. There is interest in opportunities that could emerge for people with disabilities through paratransit programs. Providing ride hailing or on-demand services can give greater equity to the transportation community and allow people with disabilities to make as many trips in a day and commute to things like social events and work. A pilot program may be worth considering because it is low commitment and can be adapted as LTD learns what works best for Lane County. It also has the potential to successfully expand accessibility and transportation to those who have high need.

Considering the population of Lane County and the typical trips that elderly people might make, students conclude that a program similar to that in Boston's would be worth piloting. Students recommend looking into other on-demand services that Lane Transit District (LTD) could partner with in addition to or in replacement of Uber and Lyft, as they are ride hailing agencies that are not required to be ADA compliant. In addition, rides could be subsidized for ADA members already using paratransit. These services also allow schedule flexibility and spontaneity to be enjoyed by those with travel-limiting disabilities.

Ride Hail Partnerships
Encourage collaboration between the transit system and the ride-share company for a carpool-based system. Sharing valuable data about who riders are and where they travel could help expand the program as it grows. A carpooling ride-share system could connect passengers to a vehicle that is

already going in the desired direction (as opposed to a completely on-demand single occupancy ride).

Consider utilizing promotions, such as 10% off all rides for the first week of use. Promotions can help encourage people try the system, and may lead better success of the system.

Consider a flat rate payment based on the average annual income. Ensuring that the system is affordable for the community it serves is necessary for its success. A flat rate fare based on local income data could help encourage residents to use the system.

Bike Share

Implement bike share, not e-scooters, into Cottage Grove and Creswell's transportation plans. Students believe that it would be desirable to bring bike share to these towns first. If the program is successful, scooters could be added later. While student research shows that e-scooter users are more diverse and might better fit the demographics of Cottage Grove and Creswell residents, it could be better for a town just starting to experiment with micromobility to begin with bike share. Reasoning behind this is that Cottage Grove and Creswell likely lack major bike infrastructure, like dedicated bike lanes. Without these, e-scooter users often move onto the sidewalk and create hazards for pedestrians. Having only docked bike share may eliminate the threat of dock-less bikes or e-scooters being left on the street or sidewalks. Students believe that a town just entering the world of micromobility will find it less overwhelming to only have bike share.

However, before implementing bike share, it is important to consider some of the potential downsides to this option. Bike share would require infrastructure investments in both Cottage Grove and Creswell. According to the survey, 52% of respondents would like to see more/better bike lanes in their community and 65% would like to see more/better sidewalks in their community. Cottage Grove and Creswell currently lack safe infrastructure for walking and biking, which should be addressed either before or in conjunction with pursuing bike share. Research indicates that safety concerns prevent people from biking, so implementing bike lanes before or alongside bikeshare is helpful to community adoption.

Bike share would also require a public-private partnership that includes a fleet maintenance program. Identifying and creating a strong partnership is key; while the PeaceHealth Rides bikeshare program has been successful, the private partner recently notified the city that it is exiting the bike share business. The city of Eugene will now operate the service until a permanent operator is selected. Fleet maintenance is also a challenge.

Only 15% of survey respondents indicated they would be interested in scooter share services in their community and some professionals cited concerns about safe use and vandalism. Due to complicated logistics and valid safety concerns, bike share could be a better solution than scooters once bike lanes are expanded. Scooter share may be more feasible once a Eugene-Springfield program is well established.

Conclusion

How can the transportation system best serves the communities of Creswell and Cottage Grove? By taking into account the perceptions of current and future needs in this community alongside research of new transportation mode options, students found there are several options to consider. Cottage Grove, Creswell, and LTD can decide to focus more on current transportation mode update and infrastructure or various other new mobility opportunities. This document shares the opinions of residents and professionals, and aims to inform necessary stakeholders, with the hope of helping them make decisions that reflect community interests.

References

Anderson, M., and Kumar, M. (2019). Digital divide persists even as lower-income Americans make gains in tech adoption, Pew Research Center

Bicycletransit. (2019). "Indego Community Ambassadors: Impacting One Community at a Time." Indego, June 6, 2019. https://www.rideindego.com/blog/indego-community-ambassadors-impacting-one-community-at-a-time/.

Blodgett, Moria, Khani, Alireza; Negoescu, Diana; Benjaafar, Saif (2017). Public/Private Partnerships in Transit: Case Studies and Analysis. Minnesota Council on Transportation Access

Blumenauer, E. (2002). Transit-oriented development. Issues in Science and Technology, 19(2), 12-14.

Card, Jeremy. (2020). The LTD Connector: Evaluating the Effectiveness of Mobility-on-Demand in Cottage Grove, Oregon

Cohen, J. (2019). Seattle's 'microtransit' experiment drives people to light rail. Is it working? Crosscut. https://crosscut.com/2019/08/seattles-microtransit-experiment-drives-people-light-rail-it-working

County of Los Angeles. (2012). Appendix B. Ridership and Air Quality Benefits. Bicycle Master Plan: Final Plan – March 2012. https://dpw.lacounty.gov/pdd/bike/docs/bmp/Appendix%20B.pdf

Dill, J., Schlossberg, M., Ma, L., & Meyer, C. (2013, January). Predicting transit ridership at the stop level: The role of service and urban form. In 92nd annual meeting of the Transportation Research Board, Washington, DC.

Eusebio, Dustin. "Designing and Navigating Spaces for People with Vision Impairment." https://www.bigrentz.com, September 19, 2019. https://www.bigrentz.com/blog/ultimate-guide-designing-navigating-spaces-people-vision-impairment.

Fan, Yingling, et al. "Waiting Time Perceptions at Transit Stops and Stations: Effects of Basic Amenities, Gender, and Security." Transportation Research Part A: Policy and Practice, vol. 88, 2016, pp. 251–264.

Federal Deposit Insurance Corporation. (2017). FDIC National Survey of Unbanked and Underbanked Households Executive Summary. https://www.fdic.gov/householdsurvey/2017/2017execsumm.pdf

Federal Highway Administration. "Accessible Sidewalks and Street Crossings." US Department of Transportation, n.d., 32.

Federal Transit Administration. (n.d.). Mobility on Demand (MOD) Sandbox Program. U.S. Department of Transportation. https://www.transit.dot.gov/research-innovation/mobility-demand-mod-sandbox-program

Federal Transit Authority. (2018). Transit Agency Profile: Lane Transit District. Retrieved from FTA: https://cms7.fta.dot.gov/sites/fta.dot.gov/files/transit_agency_profile_doc/2018/00010-00007.pdf

Hu, N. L. (November, 2016). "Impacts of land use and amenities on public transport use, urban planning and design." Land Use Policy, Volume 57.

Goffman, Ethan. (2018) "Bikeshare Has an Equity Problem, and Philadelphia Is Tackling It." Mobility Lab, July 18, 2018. https://mobilitylab.org/2018/07/18/bikeshare-has-an-equity-problem-and-philadelphia-is-tackling-it/.

GoGo Grandparent. (n.d.). https://gogograndparent.com/.

Hu, N. L. (November, 2016). "Impacts of land use and amenities on public transport use, urban planning and design." Land Use Policy, Volume 57.

Ink, Social. (2016). "Small Transit Shelter." National Association of City Transportation Officials, 17 May 2016

ISEPTA Philly. "SEPTA and Uber Announce Transit Partnership." SEPTA, 0AD. https://www.iseptaphilly.com/blog/Uber.

LA Metro. (2019). "LA Metro Launches Partnership with Via to Provide On-Demand Service to Three Busy Transit Stations." LA Metro Home, 28 Jan. 2019, www.metro.net/news/simple_pr/la-metro-launches-partnership-provide-demand-servi/.

Lane Council of Governments. (2017, May). Central Lane Metropolitan Planning Organization 2040 Regional Transportation Plan Chapters 1 to 4

Lane County. (2020). Lane Code Chapter 3. https://www.lanecounty.org/UserFiles/Servers/Server_3585797/File/Government/County%20Departments/County%20Counsel/Lane%20Code/LC04.pdf

Lane Transit District. (2018). Transit Tomorrow: Existing Conditions and Choices Report. Eugene: Lane Transit District.

Lane Transit District. (2020). 98 - Cottage Grove - Route Description. Retrieved from LTD: https://www.ltd.org/98-cottage-grove-route-description/

Larsen, J. (2013). Bike-Sharing Programs Hit the Streets in Over 500 Cities Worldwide. Earth Policy Institute. http://www.earth-policy.org/plan_b_updates/2013/update112

Liberty Mobility Now, INC. "Liberty Connects Rural Communities and Healthcare Providers with Patients." F6S, 0AD. https://www.f6s.com/libertymobilitynow.

Los Angeles County Metropolitan Transportation Authority. (n.d.). Metro Bike Share Business Plan FY19-20. Los Angeles County Metropolitan Transportation Authority; Bicycle Transit Systems; Fehr & Peers. http://libraryarchives.metro.net/DB_Attachments/2019-0780_Attachment_A_Metro_Bike_Share_Business_Plan.pdf

LTD. (n.d.). LTD Connector 98 Cottage Grove. Retrieved from https://drive.google.com/file/d/1TBQNLhPMemKCAXSdjhjd3zdlPTcuED-e/view

LTD. (n.d.). Transit Ridership Data: Route 98. Retrieved from https://www.lcog.org/903/Transit-Ridership-Data

LTD (2020). "Rides MOD Jan 2019-Feb 2020"

Massachusetts Bay Transportation Authority. (n.d.). On-Demand Paratransit Pilot Program. https://www.mbta.com/accessibility/the-ride/on-demand-pilot.

Mass Transit. (2020). "L.A. Metro Board Approves Extension, Expansion of Rideshare Pilot Partnership with Via," 2020. http://www.masstransitmag.com/alt-mobility/shared-mobility/car-sharing/press-release/21122780/los-angeles-county-metropolitan-transportation-authority-metro-la-metro-board-approves-extension-expansion-of-rideshare-pilot-partnership-with-via.

Martinko, Katherine.(2014). "4 Ways That Walking to School Can Benefit Kids." TreeHugger, October 8, 2014. https://www.treehugger.com/culture/4-reasons-why-walking-school-benefits-kids.html.

Metro. (n.d.). About. https://bikeshare.metro.net/about/

Metro. (n.d.). Measure R. https://www.metro.net/projects/measurer/

Oregon's Bicycle Helmet Law". (2020). Helmets.Org. https://helmets.org/ore_law.htm

PeaceHealth Rides – FAQ. (n.d.) https://www.peacehealthrides.com/

Pew Research Center. (2015, April). The Smartphone Difference. http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/

Pew Research Center. (2019, June) Mobile Fact Sheet. Pew Research Center Internet & Technology. https://www.pewresearch.org/internet/fact-sheet/mobile/

Pinellas Suncoast Transit Authority (PSTA). (2020). Connecting to Wi-Fi. PSTA. https://www.psta.net/on-board-amenities/connecting-to-wifi/

Regional Transportation Commission of Southern Nevada. (2019, October 28). On-Demand Pilot Program. https://www.rtcsnv.com/ways-to-travel/paratransit-accessibility/on-demand-pilot-program/.

Saksa, Jim. (2016). "SEPTA Announces Discount Program with Uber for Rides to, from 11 Regional Rail Stations." WHYY. WHYY, May 25, 2016. https://whyy.org/articles/septa-announces-discount-program-with-uber-for-rides-to-from-11-regional-rail-stations/.

TrilliumOHP. (2018). RideSource: A resource for rides to your appointment. (2018, July 19). Retrieved from https://www.trilliumohp.com/content/dam/centene/trillium/medicaid/pdfs/MCA_AD10-Transportation-Tri-foldV11-web.pdf

RideIndego. "Passes." Indego, (May 22, 2020). https://www.rideindego.com/passes/.

Ride With Via. Via overhauls paratransit with new on-demand service in Michigan. (2019, August 05). Retrieved May 14, 2020, from https://ridewithvia.com/2019/08/via-overhauls-paratransit-with-new-on-demand-service-in-michigan/

Rothman, S. (2019). Mobility On Demand makes ridesharing easy for customers in Cottage Grove. KVAL.

South Lane Wheels. (n.d.). Information, http://southlanetransit.com/south-lane-wheels-information.html.

U.S. Census Bureau (2018). Income in the Past 12 Months (In 2018 Inflation-Adjusted Dollars) Retrieved from: https://data.census.gov/cedsci/table?q=average%20income%20&hide Preview=false&tid=ACSST1Y2018.S1901&t=Income%20%28Households,%20Families,%20Individuals%29&vintage=2018

U.S. Department of Transportation. (2017, August). Travel Behavior Shared Mobility and Transportation Equity. https://www.fhwa.dot.gov/policy/otps/shared_use_mobility_equity_final.pdf

Wakayama, B. (2018, October 3). LTD offers RideSource programs for people with disabilities. Retrieved from https://www.kezi.com/content/news/LTD-reminds-passengers-about-RideSource-programs--495105491.html

Watkins, Kari Edison, et al.Where Is My Bus? Impact of Mobile Real-Time Information on the Perceived and Actual Wait Time of Transit Riders. 18 July 2011, https://www.sciencedirect.com/science/article/pii/S0965856411001030?casa_token=jJn pVqRikRYAAAAA%3A6K7Ig-qLXBa5j_3gI0korLbu_eHwk5zaiuKN1BAV3am MiM6liEVfAP9PEIcQYc2uzjM9IyPsQw.

Westervelt, E. (2019, August 21). Ride-Hailing Revolution Leaves Some People With Disabilities Behind. Retrieved May, 2020, from https://www.npr.org/2019/08/21/753034337/ride-hailing-revolution-leaves-some-people-with-disabilities-behind

World Population Review, Cottage Grove, Oregon. 2018.

World Population Review, Creswell, Oregon. 2018.

Yoh, Allison, et al. "Hate to Wait: Effects of Wait Time on Public Transit Travelers' Perceptions." Transportation Research Record, vol. 2216, no. 1, Jan. 2011, pp. 116–124, doi:10.3141/2216-13.

Yoh, I. S. (n.d.). Hate to Wait: Effects of Wait Time on public Transit Travelers' Perceptions.

Zoie, Matthew. "Metro Is Experimenting with Public Rideshare-Without the Help of Uber or Lyft." Los Angeles Magazine, 5 Sept. 2019, www.lamag.com/citythinkblog/metro-rideshare-via-los-angeles/.

Appendix A

Interview Question Guide, Planners

1. Can you identify and discuss transportation that works well in your community? (i.e., what are some good examples that could be emulated in the future?)
2. What are the primary transportation planning issues facing your community?
3. What are the greatest unmet transportation needs facing your community? Do/how do you see this changing in the coming 10-20 years?
4. Are there populations in your community that you believe are underserved by current transportation options? How do you believe these populations could be better served?
5. Do you have a sense of the share of households without a car in your community? Do you know how they primarily travel?
6. How do you perceive the LTD Route 98 service? What do you understand to be its role in your community, how people in your community use it, and what your community may view as its shortcomings?
7. What do you see as the primary benefits/limitations to each of the following modes in terms of their ability to serve your community?
    a. Transit
    b. Biking
    c. Bike share
    d. Car share (station-based and/or point-to-point)
    e. Scooter share
    f. Walking
    g. Ride-hail (Uber/Lyft)
    h. On-demand, flexible route microtransit
8. If new technology-enabled transportation modes (such as scooter share or ride-hailing) were introduced in your community, please discuss if/how you see the following as barriers for residents in accessing or using these modes:
    a. Smartphone ownership
    b. Data plan limitations
    c. Banking/credit card access
    d. Physical infrastructure
    e. Safety issues
    f. Other?
9. (Cottage Grove) What are your perceptions about the successes or challenges of the microtransit pilot? What lessons do you think we can learn from the pilot in planning for or introducing new services or modes in the future?
10. Is there anything else you would like to add or we should know about travel and transportation in your community that we have not already covered?

Interview Question Guide, Lane Transit District

1. What are the primary transportation planning issues you see in Cottage Grove?
2. What are the primary transportation planning issues you see in Creswell?
3. What are the greatest unmet transportation needs facing Creswell/Cottage Grove? Do/how do you see this changing in the coming 10-20 years?
4. Are there populations in Creswell/Cottage Grove that you believe are underserved by current transportation options? How do you believe these populations could be better served?
5. What are your perceptions about the LTD Route 98 bus?
   a. Who uses it / trip purpose
   b. What are the strengths and/or benefits you see of this route?
   c. What do you see as the route's current limitations?
   d. How costly is the service to run compared to other LTD services?
   e. What is the 98's ridership, both overall and compared to other LTD routes? Has ridership changed meaningfully over the past 5-10 years?
   f. Does LTD have any plans to alter the 98's service in the near future in any way that you're aware of? If so how?
   g. Do you perceive there to be first-last mile access issues with the 98?
   h. From your perspective, how feasible are the following options on the 98?
   i. Adding real-time arrival information
   j. Adding service hours / frequency (and how much do you think would be feasible? How would you make the decision to alter service on the route?)
6. What do you see as the primary barriers to transit in communities like Creswell and Cottage Grove?
7. What do you see as the primary opportunities for LTD in communities like Creswell and Cottage Grove? This may be things like adding transit service, partnering with private mobility providers to connect to transit stations, or any other service you think could benefit travelers in these communities?
8. Transit agencies across the country have partnered with a variety of new modes (bike share, ride-hail, on-demand vans) to provide first-last mile access to transit stations. Would LTD consider partnering with private mobility providers in places like Creswell and Cottage Grove to either improve access to transit or replace transit? What are potential advantages/disadvantages that you see to this type of partnership? What types of barriers do you perceive?

1. What services does SLW provide and how do you see each filling transportation needs in the community?
2. Can you please provide additional detail about your riders? Do rider characteristics vary across the three services you currently offer (door to door, metro service, LTD connector)?
3. What share of your rides and riders require a wheelchair or mobility device?
4. What are the primary transportation planning issues facing your riders?
5. What are the greatest unmet transportation needs facing your community? Do/how do you see this changing in the coming 10-20 years?
6. Are there populations in your community that you believe are underserved by current transportation options? How do you believe these populations could be better served?
7. If travelers did not use South Lane Wheels, do you have a sense of how (or if) they would travel instead?
8. Do riders ever use South Lane Wheels to connect to the LTD Route 98 service? What do you understand to be its role in your community, how people in your community use it, and what your community may view as its shortcomings?
9. Some cities have partnered with Uber and Lyft to provide paratransit--including wheelchair accessible and senior services. What are your perceptions or thoughts about Uber and Lyft providing these services in this community?
10. What did you hope to learn from the MOD pilot in Cottage Grove?
    a. Can you describe your experiences with the MOD pilot in Cottage Grove?
    b. How successful do you think the program was?
    c. Do you think it does/does not address transportation needs that were not previously being met?
11. Many new transportation modes and innovations require access to technology. If new transportation technologies or modes were introduced, please discuss if/how you see the following as barriers for South Lane Wheels users:
    a. Smartphone ownership
    b. Data plan limitations
    c. Banking/credit card access
    d. Physical infrastructure
    e. Safety issues
    f. Other?
12. Is there anything else you would like to add or we should know about South Lane Wheels that we have not already covered?

Appendix B

<u>Mobility Needs Assessment Survey</u>

1. Since January 1, 2020, what types of transportation have you used? (Check all that apply)

▫ Car   ▫ Transit (bus)

▫ Bike (personal)   ▫ Walk

▫ Taxi   ▫ LTD Connector, Mobility on

▫ Vanpool   Demand (MOD) pilot

▫ Other_____

2. In a typical week, how often do you visit another town or city in the region for work, school, shopping, or other services? ▫ 0   ▫ 1-2   ▫ 3-4   ▫ 5+

3. In a typical week, how many days do you ride the LTD Route 98 bus? ▫ 0   ▫ 1-2   ▫ 3-4   ▫ 5+

4. Under what circumstances would you ride the LTD Route 98 bus or ride it more frequently? (Check all that apply)

▫   If the bus ran more frequently

▫   If the bus was more reliable

▫   If the bus stopped in more/different places

▫   If the bus ran longer hours

▫   If I understood the time schedule or bus route better

▫   If I understood the fare price or payment system better

▫   If the fare was lower

▫   If my car were not operating or available

▫   I would never ride the Route 98 bus or ride it more

      frequently

☐   Other _____

5. If available, would you be interested in any of the following transportation services in your community? (Check all that apply)

☐ Ride-hail (Uber/Lyft)   ☐ Scooter share

☐ Bike share   ☐ On-demand, flexible route van

☐ Car share   ☐ Other_____

6. What other transportation infrastructure or amenities would you like to see in your community? (Check all that apply)

☐ More/better sidewalks ☐ More/better bike lanes

☐ Bus shelters   ☐ Real-time transit arrival info

☐ Other_____

7. What do you think is the greatest transportation need in your community?

_____

8. Are there destinations locally or regionally you would like to travel to without a car? Please be as specific as possible.

_____

9. How many cars does your household own?

☐ 0   ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5+

10. How many people live in your household (including yourself) ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5+

11. Do you own (check only one)

☐ Smartphone   ☐ Cell phone   ☐ I own neither

12. How concerned are you about running out of monthly data on your phone?

☐ Very concerned   ☐ Somewhat concerned

☐ Not very concerned   ☐ I never need to save data

☐ N/A - I do not use the internet on my phone/have a phone

13. How do you typically access the internet? (Check all that apply)

☐ Home internet   ☐ Work internet

☐ Library   ☐ Mobile internet/cell phone data plan

☐ Other_____   ☐ No access to the internet

14. Do you have a checking account?   ☐ Yes   ☐ No

15. What is your age?

☐ <18   ☐ 18-24   ☐ 25-34   ☐ 35-49   ☐ 50-64   ☐ 65+

16. Do you have a temporary or permanent physical condition or disability that makes it difficult to travel outside the home? (Check all that apply)

☐ Need wheelchair access   ☐ Do not see
well/blind   ☐ Hearing impaired/deaf
                       ☐ Need service animal   ☐ Prefer not to
answer   ☐ Does not apply

17. Are you (Check all that apply):

☐ Employed Full Time   ☐ Employed Part Time

☐ Student   ☐ Homemaker

☐ Unemployed   ☐ Retired

☐ Unable to work due to a disability

18. What was your annual household income last year?

☐ Less than $14,999   ☐ $15,000 to $24,999

☐ $25,000 to $34,999   ☐ $35,000 to $49,999

☐ $50,000 to $74,999   ☐ $75,000 to $99,999

☐ $100,000 or more   ☐ Prefer not to say

19. What gender do you identify as?

☐ Female   ☐ Male   ☐ Non-Binary/Other

20. What is your race/ethnicity? (Check all that apply)

☐ American Indian or Alaskan   ☐ Asian

☐ Black or African American   ☐ Hispanic or Latino

☐ Native Hawaiian or Pac. Islander   ☐ White / Caucasian

☐ Mixed race/Other _____

21. What is your home zip code?

_____

22. Please provide your email address to be entered to win a $50 gift card.

_____

Appendix C

Survey Synthesis

Source for all charts/tables: Mobility Needs Assessment Survey, Cottage Grove and Creswell, OR. 2020

Table C-1: General: Times Per Week Visiting Another Town

Times per week	Percent
1 to 2	46%
3 to 4	13%
5 or more	26%
Never	16%

Table C-2: Technology: Mobile Phone Ownership

Mobile Phone Ownership	Percent
Smartphone	87%
Cell Phone	11%
Neither	2%

Table C-3: Technology: Concern about Running Out of Cellular Data

Concern about running out of cellular data	Percent
Not at all	30%
Not very	46%
Somewhat or very	19%
Do not use internet	5%

Table C-4: LTD Route 98: Times Per Week Riding the Route 98 Bus

Times per week riding Route 98	Percent
0	85%
1 to 2	5%
3 to 4	3%
5 or more	3%

Table C-5: LTD Route 98: Changes Under Which Respondents Would Ride the Route 98

Changes under which respondents would ride the Route 98 bus	Percent
Never	17.8%
If no car	44.1%
If more frequent	36.2%
If stopped in more/ different places	16.0%

Table C-6: Existing Conditions: Community Interests for Infrastructure

Community interests for infrastructure	Percent
Bike lanes	52.30%
Sidewalks	65.00%

Appendix D

The following is a list of case studies referenced for various Mobility on Demand (MOD) projects around the country.

Plymouth Metrolink (Dial-a-Ride)
The City of Plymouth, seventh largest city in the State of Minnesota, emphasizes the use of a smartphone app, called the TransLoc app. The purpose of it is to better connect with their transit riders to their destination and it is aided with a private company called TransLoc Inc. Before the use of the TransLoc app, Dial-a-Ride was a typical curb-to-curb shuttle service, administered by the Plymouth Metrolink. It is a deluxe mini-bus that takes a transit rider anywhere around Plymouth. Metrolink riders had to plan a Dial-a-Ride days or weeks in advance. With the addition of the TransLoc app, Dial-a-Ride became an on-demand program by the fact that a Metrolink rider can book a Dial-a-Ride as needed. No more weeks in advance planning or scheduling, but only with an average of twenty-minute wait. "The app lets you stay informed of your ride's status as you wait." Rides are available between 0600 to 2030. Dial-a-Ride isn't just active within Plymouth, but also in neighboring areas; Ridgeland, Golden Valley Center, Wayzata. "Dial-A-Ride fares are $3 each way." The process is as stated: "use the TransLoc app to quickly request and pay for a ride. Passengers who would like to request rides by phone may do so by calling."

Denver's Flexride
The Flexride is Denver's MOD service. They operate 20 different zones, mostly suburban, throughout the Denver metropolitan area. Each zone has its own independent service where users can go anywhere within that zone. This is one of the cities attempts in solving the last mile problem in their suburbs. Due to Denver dividing its single family zoned housing into 20 separate sections that their program is worth investigating for Cottage Grove's more rural implications. The Flexride is designed to connect these outer regions of Denver to their transit system. Flexride, like the Connector, is first come first serve. What makes this service unique compared to other MOD services is that it can be planned over 30 days. The system is designed for users to have the option of planning several weeks ahead without worrying about being late. If you have an appointment at a specific time you simply select your destination and the time you need to arrive at. Being able to plan by drop of time is particularly useful for Cottage Grove's situation. LTD's bus 98, which connects Cottage Grove with Eugene/Springfield, is not a frequent service. Having a guaranteed drop of time would create a reliable less stressful option for Cottage Groves commuting population.

Seattle, Washington-Via to Transit: A Case Study

Seattle's King County Metro Transit initiated the "Via to Transit" program, increasing the public's accessibility and providing one-way point-to-point access to the rail system. Some of the program's fleet of 18 vans are wheelchairs accessible (Cohen, 2019). As an Uber-like point-to-point transportation program, Via to Transit has become well-known in the city of Seattle. From the following data, we can get a specific overview of the success of this program.

"$2.7 million from Seattle's transportation benefits district levy, a $350,000 Federal Transit Administration grant and $100,000" that both King County Metro and Sound Transit provided individually financed the year-long pilot program (Cohen, 2019). The grant from the Federal Transit Administration is part of the Mobility on Demand Sandbox Demonstration Program that partners with public transit providers to explore MOD concepts and solutions in their region (Federal Transit Administration, n.d.). After four months, King County Metro assembled enough data to make a preliminary determination that the MOD program is working. While it is too early to proclaim the program a success, it has surpassed the daily ridership objectives and more than 70,000 total rides. King County Metro's objective was "to average 525 rides per day. Instead, Via averages 770 rides a day, with 1,000 rides on the busiest days" (Cohen, 2019).

The provision of government grants and funds insinuate support from governments for this program, as it is an important channel to create convenient and accessible transit for the public. It also creates connections between people and between people and transportation.

Seattle is utilizing the data it has collected to measure the benefits of the Via to Transit program and weigh if it should continue. The following key performance indicators measure the success of the Via to Transit program.

Project Goals	Key Performance Indicators	Key Performance Targets	Data Field Relied Upon
Improve mobility by increasing ridership for the Agency through Pilot service	Number of trips on Pilot service per week. A trip is defined by a passenger ride with unique origin and destination	1,000 trips/week* *This ridership KPI is a joint target for Contractor and Agency, as Agency is taking lead on marketing	Aggregate number of trips taken on weekly basis for the month
Provide a reliable, high quality FLM customer experience	Average actual amount of wait time	10 minutes or less	Averaged actual amount of wait time for all trips per month
	Average ride feedback/ rating	Average ride rating of 4.5	Average ride rating awarded by passenger of all trips per month (qualitative rating feedback will also be provided)
	Percent demand met	80%	Total completed trips divided by total valid requests

Increase vehicle utilization of FLM vehicles by aggregating multiple riders into single vehicles whenever possible	Average trips per driver per hour. A trip is defined by a passenger ride with unique origin and destination	2.5 trips per driver per hour	Number of trips completed per driver per hour
Ensure access for disadvantaged populations through ensuring the availability of a Limited English Proficiency enabled call center and ensuring the affordability of the service	Percent demand met for users using call center, including LEP services	80%	For call center users: total completed trips divided by total valid requests
	Average wait times for trips dispatched through call center	10 minutes or less	Average actual wait times for all trips dispatched through call center
	Number of trips paid for using pre-paid debit cards	Target to be set in month three	Number of trips paid for using pre-paid debit cards
Ensure the availability and usability of an ADA-compliant Accessible Vehicle	Percent demand met for users who requested an ADA-compliant Accessible Vehicle	80%	For ADA riders: total completed trips divided by total valid requests

Los Angeles, California-Metro Bike Share: A Case Study

"Southern California will be rolling into bike sharing in a big way with programs opening in Los Angeles (4,000 cycles), Long Beach (2,500), and San Diego (1,800)" (Larsen, 2013). Metro Bike Share is funded by Los Angeles County's Measure R, a half-cent sales tax that supports transportation initiatives and programs (Metro, n.d.). The City of Los Angeles adopted the bikesharing program only recently, but it has already promoted city development and increased environmental quality. An increase in cycling will reduce toxic gases like carbon dioxide, carbon monoxide, and hydrocarbons. Increasing cycling through bikesharing programs helps to reduce greenhouse gas (GHG) emissions from polluted vehicle exhaust, improve air quality, and offers opportunities to decrease single-occupancy driver car trips (County of Los Angeles, 2012).

Los Angeles County Metropolitan Transportation Authority has a set of metrics for the area Metro Bike Share serves and a different set for the docking stations (Los Angeles County Metropolitan Transportation Authority, n.d.):

System Area Metrics	Description
Ridership	Average rides/bike/day
Operating Costs	Meet transit metrics: average operating cost/trip and farebox recovery
Member Demographics	Percentage of riders that are eligible for reduced fare and the percentage of riders from diverse populations
Support of Bicycling	Improvement that could encourage bikeshare

Docking Station Metrics	Description
Ridership	Average rides/bike/day
Distance to Closest Station	Optimal distance is a five-minute walk for cyclists
Maintenance Issues	Vandalism, water pooling, or other problems may deter users
Solar Issues	Issues that would affect the equipment's solar power
Number of Docks and Events Where the Station is Full or Empty	May signal supply issues if station volume does not meet demand
Visibility	Station visibility issues could be solved by relocation

Metro Bike Share's guiding principle is to "provide new and existing transit users with an accessible, reliable and efficient mobility option as an integrated part of Los Angeles County's world-class transportation system. The thorough planning process allows Metro Bike Share to strategically locate Bike Share stations near transit, therefore making Bike Share an accessible, reliable and efficient mobility option" (Los Angeles County Metropolitan Transportation Authority, n.d.). It promotes public transit indirectly and feasibly as a trend to offer an accessible approach to lead more and more people to abandon single-occupancy driving trips, and transfer to public transportation.

Appendix E

Paratransit Case Studies

Summary of Paratransit Programs Findings

Program	Price per Trip	Partners	Mode of Making Reservation	Same Day Service	Ride Cap
Boston On-Demand Pilot	As low as $2	Uber, Lyft, Curb	App or Phone Call	Yes	None
RTC On-Demand Pilot	$3	Lyft	App or Phone Call	Yes	Monthly
Rapid On-Demand	Free	Via	App	Yes	None
GoGo Grandparent	$0.27/min + vendor fee	None	Phone Call	Yes	None
LTD RideSource	$3.50 to $5.50	None	Phone Call	No	None

The table above provides an overview of the key features we found for each of the paratransit programs discussed below.

Boston MBTA On-Demand Paratransit Pilot Program
In September of 2016, Boston's Massachusetts Bay Transportation Authority (MBTA) launched an On-Demand Paratransit Pilot Program. For this program, MBTA partnered with rideshare companies Uber, Lyft, and Curb to provide transit service to paratransit customers. Anyone eligible for MBTA's paratransit service, RIDE, would now be able to use an app or call-in to get car or van transportation in as quickly as 5 minutes. The cost of the trip is subsidized by MBTA, making it as low as $2 per trip. This is even cheaper than the cost of RIDE, which is $3.35 to $5.60 per trip (Massachusetts Bay Transportation Authority, n.d.). The advantages of this program are its shorter wait times, the ability for customers to track their ride, the option to use an app or call-in (something that appeals to older populations), and the reduced cost. One negative of this service is that drivers are not required to provide complementary assistance which can be a challenge to some riders. However, the RIDE program is still in place if assistance getting to and from the vehicle is needed.

Service Comparison Between THE RIDE and On-Demand Paratransit Pilot Program in Boston

Service	THE RIDE	Pilot Program
Price	$3.35 or $5.60 for premium triups	As low as $2.00
Booking Timeframe	At least 1 day in advance	On demand, instant request to dispatch
Day-of Wait Time	30-minute window	As low as 5 minutes in core service areas
Trip Reservations	by phone	Via smartphone app (Uber, Lyft, Curb) or phone call (Lyft and Curb only)

The table above compares prices, times and booking systems of Boston's RIDE paratransit service and the new paratransit service in partnership with Uber, Lyft and Curb. The pilot on-demand service typically has lower costs, lower wait times and flexibility in how the rider can book their trip.

RTC On-Demand Pilot Program

Similar to Boston's program, Southern Nevada's Regional Transportation Commission (RTC) launched an On-Demand Pilot Program in February 2018. Partnering only with Lyft, this program also provides transit service for paratransit customers. Some key differences from Boston's program are that each trip is $3, the same price as RTC's Paratransit service, prices increase during peak hours, each customer has a monthly ride cap based on previous paratransit travel activity, and the trip is only subsidized up to 10 miles (Regional Transportation Commission of Southern Nevada, 2019). The program shares with Boston's pilot the same key advantages of shorter wait times and the option to schedule through an app or by call. However, it may not be the most financially friendly program if a rider is traveling during peak hours or over the 10 mile subsidy limit.

Rapid On Demand

Via, a provider of on-demand mobility, launched a partnership with The Rapid, the public transportation provider in Michigan. They created "Rapid On Demand", a pilot program that aims to eliminate the pre-scheduling of rides a few days in advance, and instead have their vehicles accessible when their riders need them. Those that are eligible for ADA services already are also eligible to use the program. In contrast to some of the other pilot programs, these trips are booked only through a smartphone and then direct the rider to a nearby virtual bus stop within walking distance (Ride With Via, 2019). This can be problematic for some users if they are not comfortable using smart phone technology or if they are incapable of walking somewhere even relatively close. Paratransit's aim is to eliminate the difficulty that some people face to get from one place or mode of transportation to another.

GoGo Grandparent

GoGo Grandparent is not a pilot progam partnering with a transit agency but rather a service in the Southern California region assisting in the extension of ridehail services to people who are not comfortable working with or are without a smartphone. Using voice recognition, the program transfers the individual's request to the chosen service provider. The caller can make requests for large trunks for wheelchairs and enough room to accommodate for disabilities. Rides and communication between drivers and riders are set up through the program by an agent of the program. A computer is able to monitor the location during the ride and track what times people were picked up and dropped off. This also gives callers the ability to list family members or friends as contacts to be alerted when they are picked up and after they have made it to their destination. The alerts help ensure a feeling of safety for riders when using the service. The caller can also save frequent locations to their number profile and speed dial a pick up. A requirement of the service is that the rider has to be able to transfer themselves into the car without assistance, although the driver can assist in loading foldable wheelchairs and walkers. The caller puts a card on file at the beginning and can store that card when creating more rides later. GoGo Grandparent charges a small convenience fee of $0.27/minute from the start of the ride in addition to the vendor's fare, which can end up being a bit more expensive depending on where the rider is going (GoGo Grandparent, n.d.). For some, not having to have a smartphone or walk to a transit stop is worth the convenience fee.

RideSource operated by LTD

RideSource is LTD's shared-ride service program for those with disabilities or disabling health conditions (Wakayama, 2018). Under the federal Americans with Disabilities Act of 1990 (ADA), all transit providers are required to provide equal access to public transportation for those with disabilities. With this requirement, LTD must take specific measures to ensure that regular bus service is easily accessible. This service serves those who would have otherwise been neglected by traditional transit services. Prior authorization is needed to utilize Ridesource, but once approved, users are able to schedule their trips 24-hours in advance. Cost to ride with Ridesource is structured in two ways; 10-ride services are offered at $35 for in service areas, and $55 for out of service areas. This service is covered by Oregon Health Plan and Trillium Health Plan if the trip is to and from medical, dental and mental health appointments (Trillium OHP, 2018).

Since 1990, Ridesource has transported people from their origins to their destinations with much success. However, as technology advances, new ways of operating have proven to provide better services while cutting operating costs—all of which are vital aspects of improvement for LTD's paratransit services.

Appendix F

Ride-Hail Partnership Case Studies

LA METRO AND VIA

In January of 2019, LA Metro launched a one-year pilot partnership with Via, a moderately-sized ridesharing company based in New York. LA Metro formed this partnership in an effort to address the first-mile/last-mile problem within the city and provide shared rides to and from popular transit stops. The decision to partner with Via over larger companies like Uber and Lyft which were considered was made for several reasons, including Via's fair compensation to drivers (Via pays drivers hourly regardless of the amount of rides they give) and willingness to share relevant data regarding riders and their destinations, which the city values in order to properly evaluate its residents' need, as well as the success of the program (Zoie, 2019).

LA Metro's main goal for the program was to increase residents' accessibility to the city, especially through increased accessibility to transit. This was achieved in part by ensuring that rides could be ordered both on an app and by calling a number (so that residents without smartphones could participate in the program) and payment could be made with credit, debit, or pre-paid cards (so that unbanked residents could participate). Additionally, LA Metro subsidized the costs of the rides (with the assistance of a grant from the Federal Transit Administration) so that residents enrolled in its low income program ride for free, residents with TAP accounts (the transit's electronic ticketing system) ride for $1.75, and residents without a TAP account ride for $3.75 (LA Metro, 2019).

After the year-long pilot, the project was deemed successful and extended for an additional six months. During the first year, the project "exceeded its key goals in terms of rides per week, rides per driver hour, wait times and customer satisfaction." It provided over 70,000 rides, including over 1,000 of which were made over the call-in service and 800 rides requiring "special assistance or wheelchair accessibility," demonstrating the success of its goals to provide options for riders without smartphones and with special needs. Additionally, the first year cost more than $500,000 less than estimated, and those savings allowed LA Metro and Via to expand the service by extending service hours (Mass Transit, 2020).

Many aspects of the partnership between LA Metro and Via were found to be successful, especially regarding its goals for equal access to the residents within the city. Efforts to ensure that low-income riders could use the service free, unbanked riders could pay with means other than credit and debit cards, and riders without smartphones were able to order rides with other means were all successful (even exceeding the goals the city had set). Via's willingness to share its ride data with LA Metro was essential to the success of the program and the ability to reevaluate and expand the program in its extension. Considering the success of each of the measures listed above, Lane County should include these steps in whatever rideshare program it moves forward with.

LIBERTY MOBILITY NOW

Unlike some other TNC - public transit agency partnerships, Liberty Mobility Now was implemented as a General Transit service. This is where underutilized transit routes are replaced with access to TNC services. In larger cities with well-established transit lines, TNCs cannot be so readily implemented to replace underutilized routes, making TNCs optimal for paratransit use, first-mile and last-mile transportation, and some other specific uses. In smaller towns, where Liberty Mobility Now prefers to operate, the company has found that replacing underused routes with their ride hailing service frees up the city to maximize the ridership on frequently - used routes while still providing financially viable coverage to those who desire or need it outside the extent of transit infrastructure (Blodgett, 2017).

Liberty Mobility Now does not act as a private company that competes with local transit agencies, but instead "acts as a broker or a platform, directing potential customers toward existing services when available" (Blodgett, 2017). Central to the Liberty Mobility Now program is its "community circle" concept wherein it facilitates community leader gatherings to understand community dynamics and the needs of different groups. These leaders might represent farmers, commuters who live outside the area but work within, the elderly community, etc. This is how Liberty "focuse[s] more on community building than standard transit companies" to avoid "the usual top down and bureaucracy-driven approach" (Blodgett, 2017). Liberty Mobility Now, by combining the role of transportation planners and their TNC-style ride hailing, has been able to maximize efficiency and provide customers with the most comprehensive service when they need it.

Liberty Mobility Now has worked well in rural Nebraskan communities with little to no public transit infrastructure. However, it cannot be applied so readily to rural communities governed under LTD. This is primarily because Liberty Mobility Now facilitates most of the transit activity and creates the transit infrastructure. LTD already has the infrastructure and outreach and will only be able to partner with companies who solely specialize in ride hailing. Liberty Mobility Now uses its ride hailing service as an essential component to its larger business model that requires extensive control over the transit network (Liberty Mobility Now, INC., n.d.). In Cottage Grove and Creswell, Uber or Lyft might provide ride hailing services while LTD would facilitate the broader transit operations. Nevertheless, Liberty's modeling offers insight into how LTD must be able to facilitate community engagement to broadly meet the needs of the community. Liberty has found the most success when transportation plans emerged organically and clearly from the specialized geographic and demographic needs of a town., "Liberty has found that, focusing on community building, is easier (and also more effective) in rural areas than in urban areas"(Blodgett, 2017). Liberty has thus tailored promotions to enhance community.

Although their ride hailing service is a critical service to the city and the varying groups within, Liberty thematically intertwines its business model to promote communal values, and thus the company itself. LTD can learn from and replicate valuable community organizing methods that Liberty Mobility Now has implemented, acting as a program to facilitate a TNC partnership. This will decrease transit fragmentation that might result when a TNC like Uber or Lyft increase operations in rural communities and compete with public transportation. By extracting key elements from Liberty Mobility Now's methodologies, LTD can learn to be more than just a transit agency to rural communities, facilitate healthy collaboration with TNC's,

and provide a streamlined service so people can have easy access to public transportation. Also, Liberty Mobility Now primarily operated in small towns where little to no transit infrastructure existed at all. This partially explains why Liberty mainly used their services for general service replacing underused routes, but LTD could benefit by implementing last-mile, first-mile, paratransit, etc. in addition to general service replacements.

TD LATE SHIFT

TD Late Shift is a partnership with ride-hailing companies and transit bus systems comes from Pinellas Suncoast Transit Authority (PSTA) in Pinellas County, Florida. This partnership involves providing low-income residents of Pinellas County transportation to or from work when bus services are not available. This program is titled TD Late Shift and is catered towards workers who work late at night and have no other means of transportation within Pinellas County. TD Late Shift was first started in August 2016 and has been running for three years now. This program currently partners with three private network companies that include Uber, United Taxi, and Care Ride. PSTA also stated that they are not limited to these three ride options and welcome any other ride-hailing services that want to partner with them if they abide by a contract provided by PSTA.

Residents who want to participate in TD Late Shift first, must be signed up for the TD program, which is where information about the participants income and residency is listed. From this information, TD verifies that the resident signing up is within the guidelines to qualify for the program. Once accepted, participating residents are given 25 free trips per month but must pay a flat rate of $9 per month for TD Late Shift and $11 per month for a TD bus pass. So, in all a total fee of $20 is charged every month for participating residents in the TD Late Shift program. Although it may seem that $20 a month is a significant amount of money (especially for low-income workers) according to Uber, "the average cost of a trip within Pinellas County at night is between $11 and $16, meaning that the monthly value of the 25 free trips could be more than $300." To compensate for these subsidized fares and to keep this program afloat, funding for this program mainly comes from the Florida Commission for the Transportation Disadvantaged and a smaller contribution from Pinellas Suncoast Transit Authority.

Since the implementation of TD Late Shift in 2016, this program has been quite successful and has seen success beyond providing subsidized late-night trips for residents in Pinellas County. This program seeks to fulfill a goal of stimulating a local economy by giving more opportunities for residents that see transportation as a barrier for holding a job. The American Public Transportation Association recognizes this goal and identifies the problem for needing this goal as, "the lack of affordable transportation options is a burden for limited-income residents who have a nighttime job and a barrier to employment for those seeking one." TD Late Shift has provided many equitable aspects including job opportunities for low-income residents, easier ride access for disabled workers, and a safer more reliable means of transportation. The success of TD Late Shift is validated by PSTA by measuring the number of participants in the program, and according to APTA, "up to 400 people use the program per month, with an average of around 14 monthly trips per person in September 2018." Since all participants within this

program must have limited income and no other personal means of transportation the popularity of this program is especially high in lower income communities.

Implementing this program within the Cottage Grove and Creswell areas could work well with filling in the gaps when local transit is not available. These more rural communities lack transit that carries late into the night and still has residents that work nighttime or early morning hours. However, since ride-hailing companies have not reached the Cottage Grove and Creswell areas the implementation of a late-night ride program such as this could be timely and costly. With having to meet the proper requirements for obtaining ride-hailing services and to create a program to verify residents' income and transportation needs the cost and time of doing this could outweigh the benefits. Another issue that could arise is the popularity or utilization of this late-night ride program considering the difference in population of Cottage Grove and Creswell compared to Pinellas County. Pinellas County has a much bigger population and therefore more funding, so a program such as this that takes a fair amount of funding might only make financial sense where the population is large, and income is lower.

SEPTA AND UBER

The Southeastern Pennsylvania Transportation Authority (SEPTA) paired with Uber to launch a program that gives discounted rides to and from eleven of SEPTA's regional rail systems. They implemented a 40% discount if a rider takes an Uber to or from one of the eleven rail systems (ISEPTAPhilly, n.d.). This encouraged residents to use Uber to go to and from the rail stations, which helped to increase the awareness and use of the service in the community. According to WHYY, a public media organization in the Philadelphia region, "Getting consumers hooked on a cheap product then jacking up the price can sound nefarious—but if it allows commuters to drive less, or even give up their cars entirely, it's tough to fault Uber for making a buck after the promo ends" (Saksa, 2016). A discount of any kind will help increase the amount of people using a rideshare app because it will make their ride a little more affordable. If this discount helps get people hooked and decrease the amount of people driving in their cars then it is wise to implement a discount code with each ride share app.

Although Uber will be making money with this pilot program, it will hopefully help to increase rail ridership in the future. By providing a way for commuters to finish that first and last mile, it is making it more convenient for them and increasing the amount of people utilizing Uber as well as the city's rail system.

The goal of this project was to alleviate parking within the city, reduce the amount of cars coming in and out of the city, and help with completing the first and last mile. With these goals in mind SEPTA chose to work with Uber to alleviate the problems. This promotion also had only a 14 week trial period; after Labor Day the trial was set to end and it would be up to riders to pay the full Uber price. With a 40% discount and a maximum discount of $10, the Uber price was lowered significantly and made taking an Uber to complete the first and last mile each day relatively reasonable for a commuter. This pilot program allowed for reasonably priced Ubers to help resolve first and last mile parking, and worked to increase rail ridership.

If a discount rate was used in smaller cities throughout Lane County, this could help to initially attract users. Providing a slight incentive such as a reduced rate will help attract users of all ages and get them hooked on the partnership. This would eventually be paired with a low flat rate fee to make sure users are accessing the partnership after the discount is taken away.

An article from a public media organization in Philadelphia was consulted, which explained the program and also gave an inside look at what Uber achieved from the implementation of the discounted pilot program. There is limited information on the success of the pilot program, but it did increase the number of people traveling to and from the selected rail stations. A discount on Ubers might increase the amount of riders at first, but if the discount is eventually taken away, the service may not be as feasible for riders to rely on everyday (Saksa, 2016). This discounted rate is useful to attract customers initially but once the discount is taken away, the partnership would have to depend on another method to keep users accessing the partnership.

Appendix G

<u>Cottage Grove MOD Analysis</u>

In order to provide recommendations to LTD and Cottage Grove staff about the efficiency and success of the Connector program, we analyzed the data that was collected during the first 13 months of the program using Geographic Information Systems (GIS). We created maps addressing six primary research questions:

- What are the spatial patterns of trip making (both origins & destinations) of the Cottage Grove MOD?
- What are the spatial patterns by different times of the day?
- What are the patterns of completed/canceled MOD trip requests?
- What are the patterns of wheelchair requests?
- How do wait times vary across space?
- What are the spatial patterns of trip-making by frequent vs. infrequent riders?

We examined data for 20,771 trips over the course of 13 months, which included coordinate points for both origins and destinations of Connector trips (LTD, 2020). First, we plotted the origins using XY coordinate data in order to visualize the points. We completed the same actions for the destinations. We also added several base map layers to contextualize the data including the Cottage Grove urban growth boundary, roads and railroads, landmarks (including schools and hospitals), rivers and lakes, parks, bus routes and stops, and facilities (including cultural activities, local municipal buildings, and recreation sites).

We then analyzed the data further, attempting to isolate various patterns that might exist in the data in order to create policy recommendations. We divided trips into four three-hour time blocks to analyze the trends of the origins and destinations by time of day. The time blocks were 7-10 am, 10 am-1 pm, 1-4 pm, and 4-7 pm. We selected these time blocks in order to better analyze those who might be commuting during traditional "rush hour" periods, and those who were using the service during the day. We then visually observed spatial trends of the origins and destinations during these time blocks.

Methods for cancellation were split up into different categories. Based on the data provided by Cottage Grove under the terminal column there were cancellation and completed rides. In the terminal column some but not all cancellations provided reasons for cancelling the ride. The data that were used was based on the reason if it was given for the cancellation.

To analyze data specific to rides that contained a wheelchair request, we created a layer in ArcMap by selecting features where the "wheelchair" field was "TRUE." From there, we displayed both the origins and destinations of corresponding rides and visually observed spatial patterns.

In order to display patterns relating to the difference of wait times over space, we elected to use the "graduated colors" feature in ArcMap to color code the wait time. The data used for this map may need to be revisited because 2053 data points under the "wait_time" field had a wait time of "0," and 2142 entries recorded a wait time of less than 5 seconds (LTD, 2020). Without further explanation from the source,

or documentation that these rides correspond to walk-on pick-up, these entries potentially skew the wait time calculations reported in this paper significantly, as the mean across the field was "673" seconds, or 11.22 minutes (LTD, 2020).

To document the travel patterns of frequent vs. infrequent users of the system, we first created a new column in the Excel data file, and used the COUNTIF feature to determine how many times each rider used the system. We then saved the file as a CSV and joined it to our existing shapefiles based on the same data in ArcMap. Frequent and infrequent riders were divided up into groups based on how often they rode. Looking through the data provided we split them into groups based on how often they rode.

The patterns of frequent versus infrequent riders are split up into 5 groups. The first group is made up of riders who used the MOD service 1 to 50 times for a total of 510 individual riders (LTD, 2020). The second group is made up of riders who rode an average of 51 to 100 times for a total of 333 riders (LTD, 2020). The third group is composed of riders who rode an average of 101 to 190 with a total of 253 riders (LTD, 2020). The fourth group is made up of frequent riders who rode 204 to 405 times with a total of 297 riders (LTD, 2020). The last group is made up of the most frequent riders who rode 688 to 877 times for a total of 142 riders (LTD, 2020).

Throughout the project, we used both Microsoft Excel and Arcmap summary, calculation and formula functions to calculate statistics based on the data provided.

SPATIAL PATTERNS OF TRIP MAKING:

The Spatial patterns of trip making for the MOD service is numbered and varied. The MOD system was used over 20,000 times and a large amount of data was collected. Some important notes of this data was that a large number of stops involved were located very close to an LTD stop or service and it can be assumed that the MOD was used to get to or from another LTD service, 70% of MOD pickup/ drop off are within 0.25 Miles of an LTD Stop (LTD, 2020). Facilities such as parks, assisted living centers, and other facilities that provide useful services to the community were within 0.25 miles of 82% of all drop-off and pickups (LTD, 2020). Looking at the data only 28% of MOD pickup/drop off are within 0.25 Miles of the Park and Ride and would suggest that the park and ride is being used in tandem with the MOD system by some riders (LTD, 2020). Some data that was important to note is that 12% of MOD pickup/drop off are within 0.25 Miles of a Landmark which would indicate that this service is successful in bringing people to their desired destinations (LTD, 2020).

SPATIAL PATTERNS ACROSS TIMES OF DAY:

From the data that was collected, trips that occurred throughout different times of the day were relatively equal. 22.2% of all trips were made between 7am-10am, 27.1% of all trips were made between 10am-1pm, 28.3% of all trips were made between 1pm-4pm, and 22.4% of all trips were made between 4pm-7pm (LTD, 2020). Figure G3-G8 show the spatial patterns of the trip data which demonstrate a visual correlation between the locations of the origins and destinations and what time the trip was taken.

From 7am-10am (Figure G5), we saw origins that were more spread around the City of Cottage Grove and destinations that are more clustered towards the city

center and LTD stops. This implies that the Connector may be used to connect transit riders who live beyond walking distance of a transit stop to the route 98 bus line.

The patterns from 10am-1pm and 1pm-4pm were very similar to each other (Figure G6 and G7). Origins from the 10am-1pm and 1pm-4pm time slots tended to be clustered near LTD stops. Additionally, we saw a large amount of clustering for destinations in the city center. This is not surprising because city centers tend to have the most activity. Given that 10am-4pm are common store hours, this pattern was expected. Collectively, 55.4% of Connector trips occurred in this 6 hour window, which may indicate that the primary demographic using the Connector does not work a typical 9-5 schedule (LTD, 2020).

Origins and destinations between 4 and 7 pm (Appendix 8) contrasted with the spatial data for the 7-10 am block (Appendix 5), with origins clustering around LTD stops, downtown businesses, and the park and ride, while destinations are spread throughout the neighborhoods of Cottage Grove. This spatial pattern implies that the Connector may be used by some commuters as a tool to connect them either downtown employment opportunities or to other local transit options. Given these results, the Connector may be a complement to LTD's Route 98 rather than a substitute.

PATTERNS OF COMPLETED/CANCELLED MOD TRIPS:

Of the 20,771 MOD rides that were requested, only 1,534 rides were canceled (LTD, 2020). These canceled rides made up 7.00% of the total rides requested (LTD, 2020). Additionally, 260 rides were canceled voluntarily and 43 rides were canceled due to an MOD error (LTD, 2020). MOD errors include inputting the address or phone numbers incorrectly, making it nearly impossible to connect with the rider. The majority of voluntary cancelations appear to cluster near LTD stops. Additionally, cancelations caused by MOD errors appear to be more scattered around Cottage Grove. This could imply that voluntary cancelations were caused by riders preferring to take Route 98 at that certain time. Additionally, we mapped cancelations based on time of the year. There were a total of 556 canceled trips from March 2019 to June 2019, 529 canceled trips from July 2019 to November 2019, and 439 canceled trips from December 2019 to February 2020 (LTD, 2020). The purpose of dividing each of these trips by groups of months is to show the trend of how many people used and cancelled the service over time. The trips canceled throughout the year appears to be located in similar areas throughout Cottage Grove and there is not a clear pattern that is shown. However, canceled trips began to decline throughout the year which may show that MOD employees and riders are becoming more familiar with the system.

For the course of the MOD study there have been 1,534 cancelations of MOD requests. There is a portion of these cancelations that are due to a user outright canceling the service due to them canceling a trip, getting a ride from another service, or just changing their mind. However, a large portion of the cancelation are due to reasons of misunderstanding the service that the MOD provides. For example, many passengers canceled because:

- They had no fare and were not prepared to pay.
- Had too many groceries and not understanding the amount of space that they could use.
- They wanted to bring another person along with them without calling ahead.

Most of these cancellations were due to "walk-ons". What this means is that while the person called ahead and asked for a ride, they at some point decided to walk on to the MOD service instead of having it come to pick them up. These are just some of the reasons why there were so many cancellations of the MOD service. From the first time frame there were a total of 556 canceled trips from March 2019 to June 2019 this represents the most amount of canceled trips. This data is not surprising because it is the start of the service and people are learning how to use it. The second period of time saw a total of 529 canceled trips from July 2019 to November 2019. Again this is consistent as people are getting more familiar with the service there are less cancellations, that being said there are still a large number of cancellations.

PATTERNS OF WHEELCHAIR REQUESTS:
From the data we collected we found that wheelchair requests only made up 2.38% of total rides, 28.9% of total wheelchair requests corresponded to just one location, and 59.39% of total wheelchair requests corresponded to one customer number (LTD, 2020). Additionally, the average wait time for wheelchair requests is 13.7 minutes, compared to 11.2 minutes across all trips(LTD, 2020).

The origins and destinations for wheelchair requests did not show strong clustering around certain locations in Cottage Grove (Appendix 13). However, unlike the other data we collected, we did not observe any clustering around LTD stops. This could indicate that people who utilize the wheelchair requests use the Connector system as their primary mode of public transportation. Public transportation, such as a bus or light rail system, is not always ADA friendly. Therefore, we would expect to see people with disabilities who cannot afford a car, to use the Connector as their main form of public transportation.

A concerning trend in the data surrounding wheelchair requests that we analyzed showed that out of 70 unique riders who made wheelchair requests, 42 of them (60%) used the service only one time (LTD, 2020). Additionally, only 12.86% percent of those 70 riders used the system more than 5 times (LTD, 2020). This indicated that while the service worked well for a few riders, the sampling of wheelchair riders could be over representative considering that nearly 60% of the data represented the trips of just one rider, while 60% of the wheelchair users who used the service did not come back for a second time (LTD, 2020).

PATTERNS OF WAIT TIMES:

The average wait time for the MOD service is 11.22 minutes (LTD, 2020). The ideal wait time for public transit is around 15 minutes or less between buses on a specific route (Fan, 2016). The MOD service taking less than 15 minutes is important for those who use the service frequently because they can easily incorporate wait time into their daily schedule. Reliable wait times associated with using public transit greatly influences more use of the services offered. While we did not observe any notable spatial variation for wait times (Appendix 14), there are interesting relationships between the time of day, demand for the service, and wait times.

There was a slight variation in wait times depending on the time of day. The normal service hours are from 7am to 7pm. Table 1 shows the average wait time and the percentage of rides occurring within each time block that we analyzed. The patterns visible in this table suggest that some relationship exists between demand for the service, which correlates to time of day, and the mean wait times experienced by riders.

Table 1

Time Block	% of Rides Occurring	Average Wait Time
7 - 10 am	22.2%	9.5 minutes
10 am - 1pm	27.1%	13.0 minutes
1 - 4pm	28.3%	12.2 minutes
4 - 7 pm	22.4%	9.5 minutes

PATTERNS OF FREQUENT AND INFREQUENT RIDERS:

From the 5 groups there were 1,535 total people that used this service at least once (LTD, 2020). Overall, the distribution of the frequency of riders is evenly spread across Cottage Grove. Those that used the service between 1-190 times were seen to be the most evenly distributed across the city. As the ridership use went above 200 trips per individual the distribution of MOD use began to gather northeast of Main Street in Cottage Grove. This is because the northeastern part of Cottage Grove is closest to the I5 freeway which leads straight to Eugene.
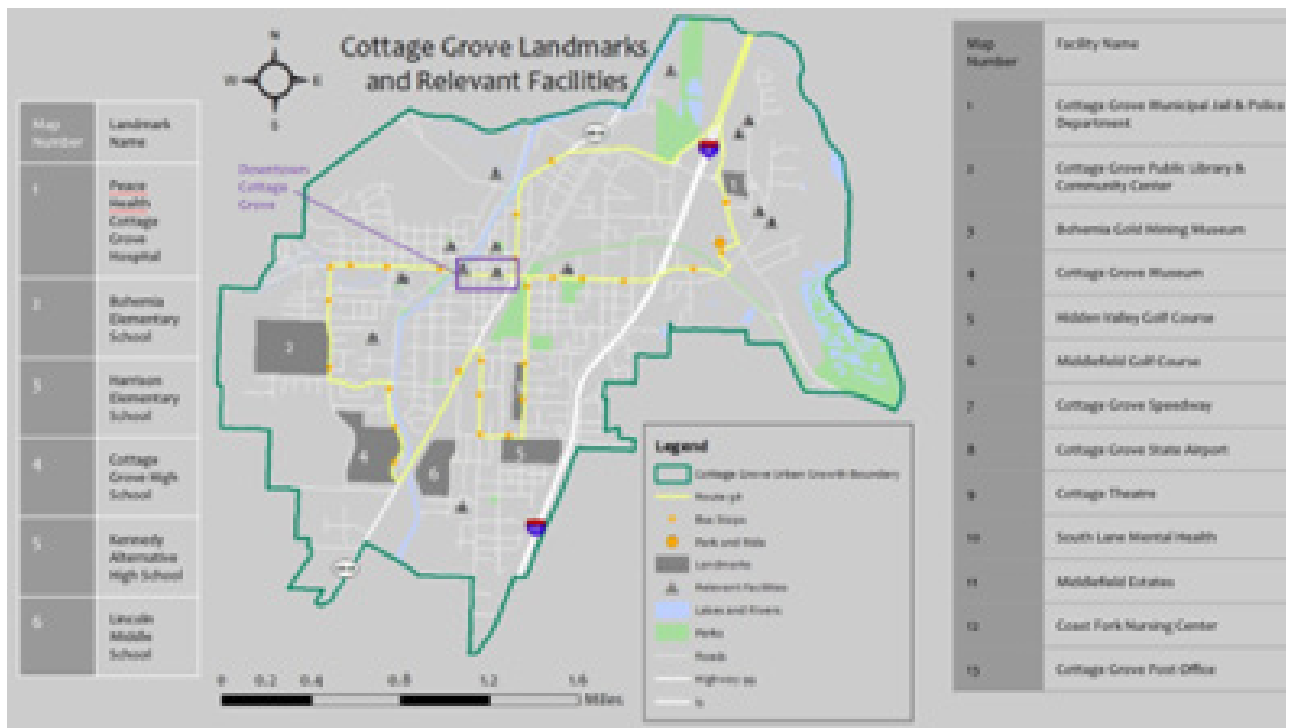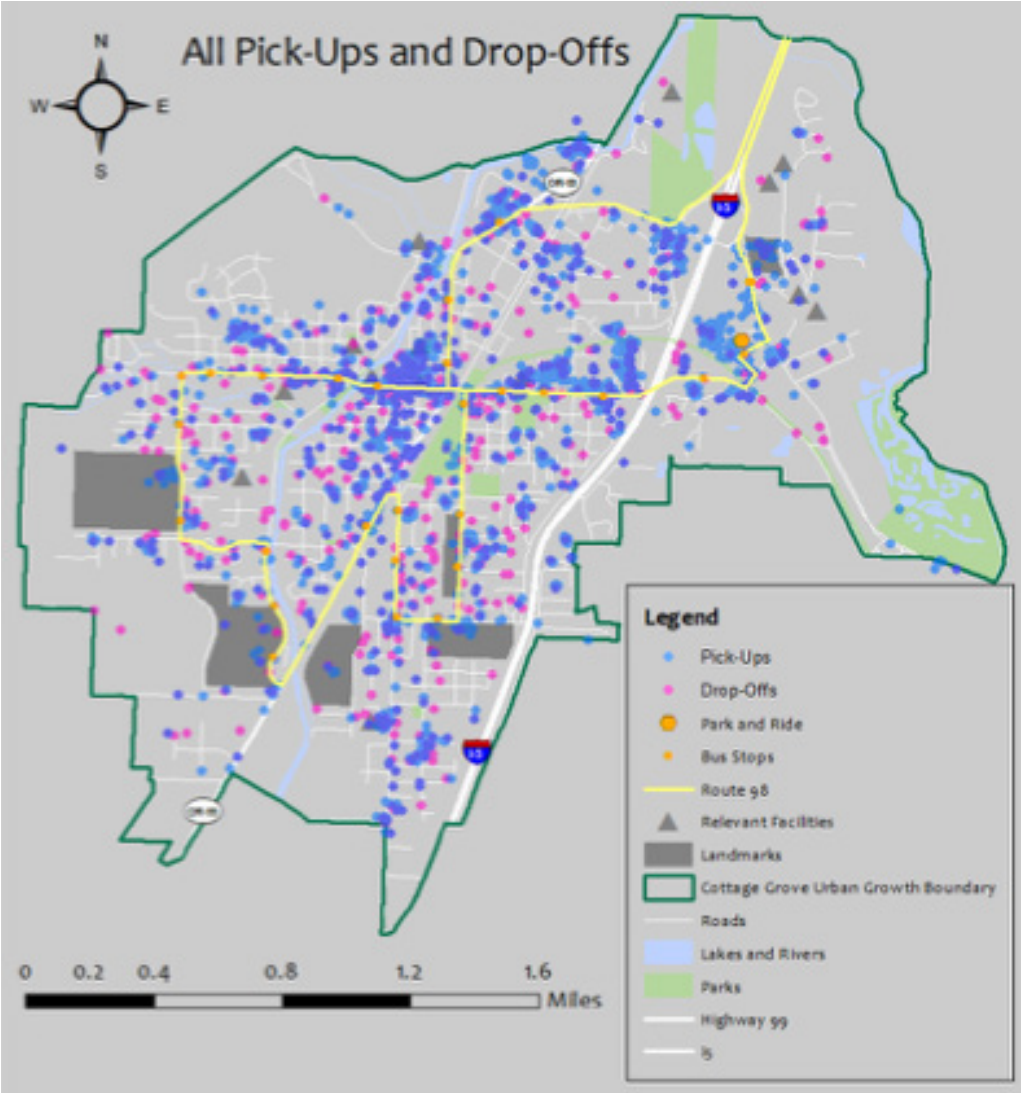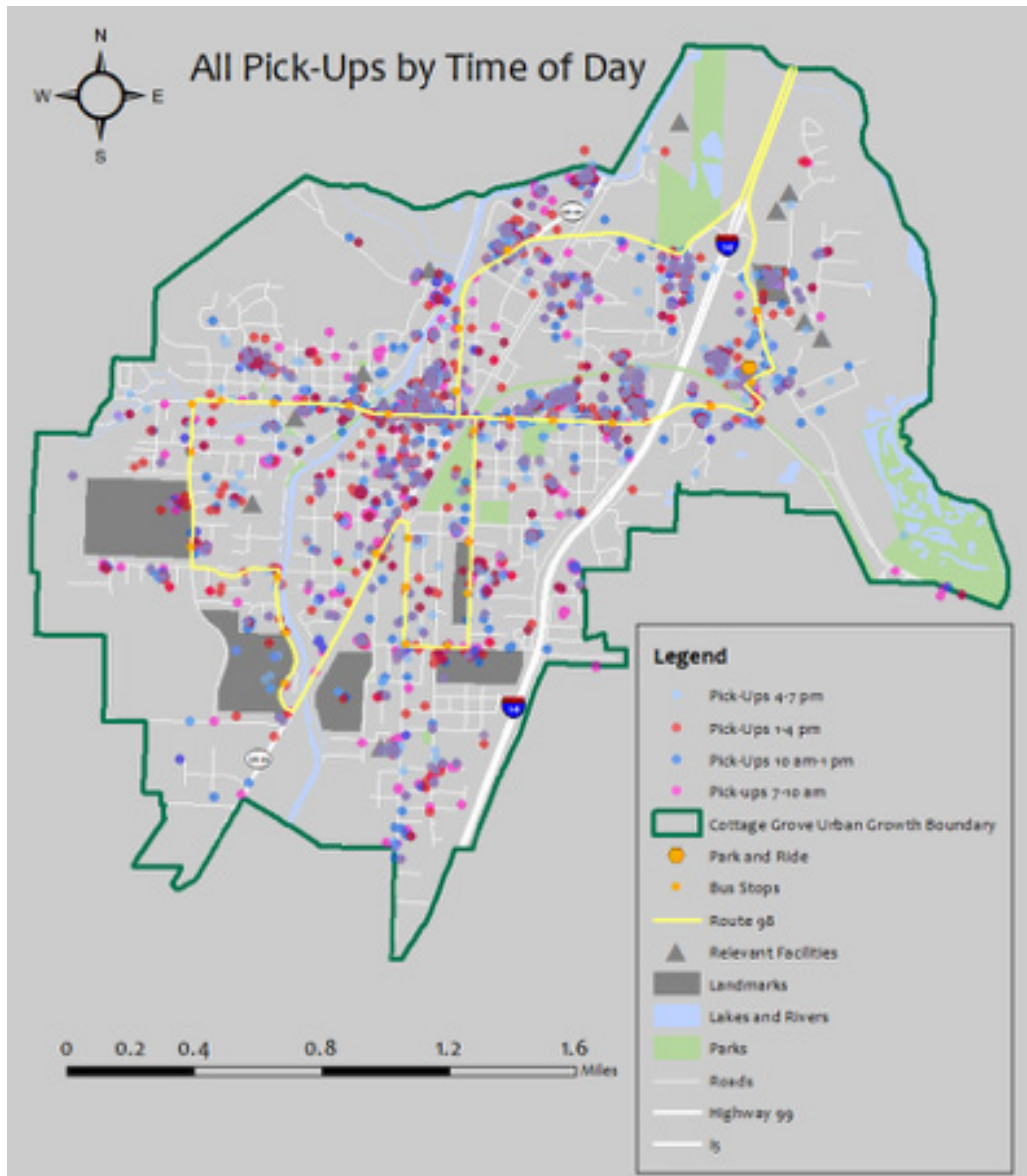
FIG. G1
Cottage Grove landmarks and relevant facilities.

All Pick-Ups and Drop-Offs

Legend
- Pick-Ups
- Drop-Offs
- Park and Ride
- Bus Stops
- Route 98
- Relevant Facilities
- Landmarks
- Cottage Grove Urban Growth Boundary
- Roads
- Lakes and Rivers
- Parks
- Highway 99
- I5

0   0.2   0.4   0.8   1.2   1.6   Miles

FIG. G2
All pick-ups and drop offs.

78

All Pick-Ups by Time of Day

Legend
Pick-Ups 4-7 pm
Pick-Ups 1-4 pm
Pick-Ups 10 am-1 pm
Pick-ups 7-10 am
Cottage Grove Urban Growth Boundary
Park and Ride
Bus Stops
Route 98
Relevant Facilities
Landmarks
Lakes and Rivers
Parks
Roads
Highway 99
I5

0   0.2   0.4   0.8   1.2   1.6
Miles
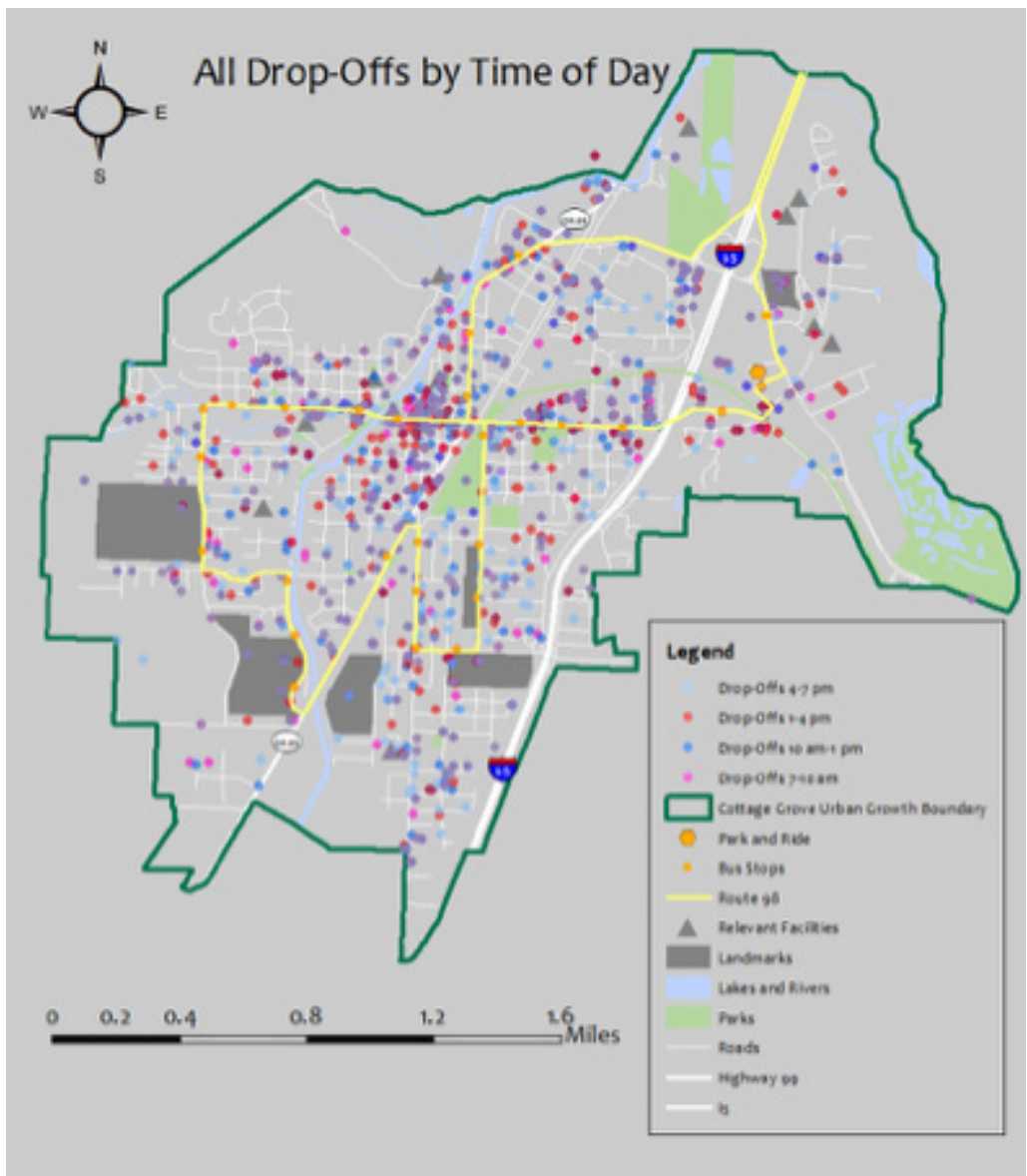
All Drop-Offs by Time of Day

Legend
- Drop-Offs 4-7 pm
- Drop-Offs 1-4 pm
- Drop-Offs 10 am-1 pm
- Drop-Offs 7-10 am
- Cottage Grove Urban Growth Boundary
- Park and Ride
- Bus Stops
- Route 98
- Relevant Facilities
- Landmarks
- Lakes and Rivers
- Parks
- Roads
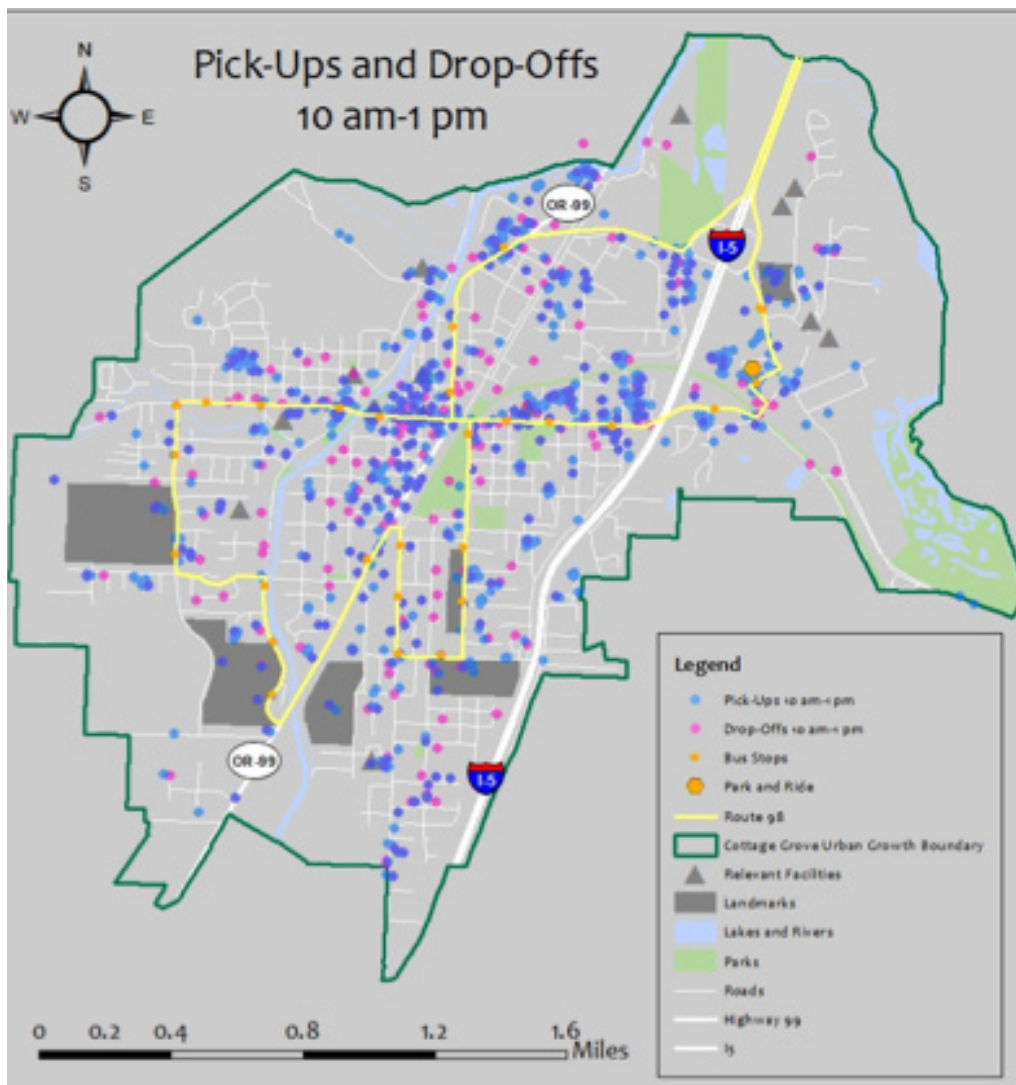- Highway 99
- I5

0   0.2   0.4   0.8   1.2   1.6 Miles

FIG. G5
All pick-ups and drop offs, 7-10am.

81
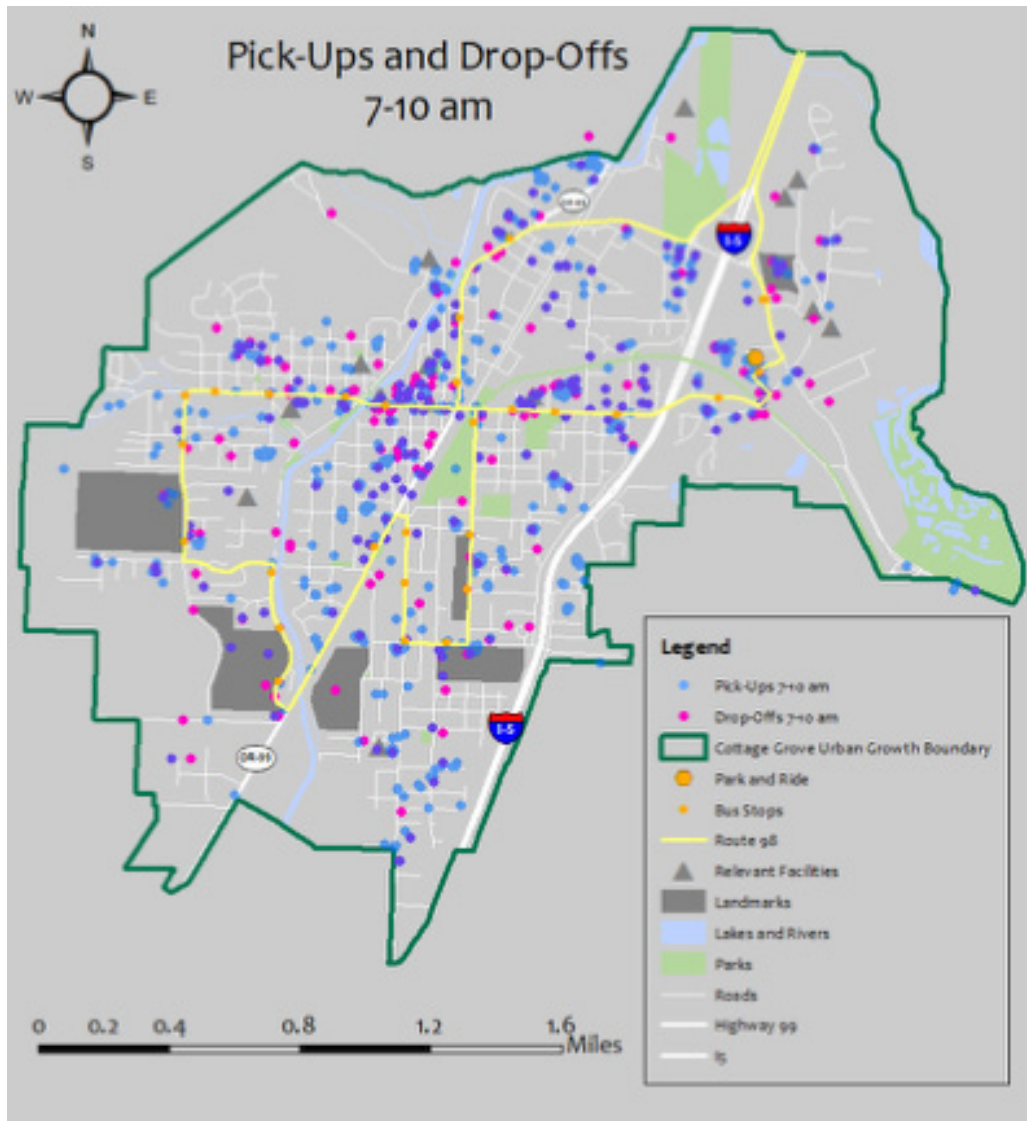
FIG. G6
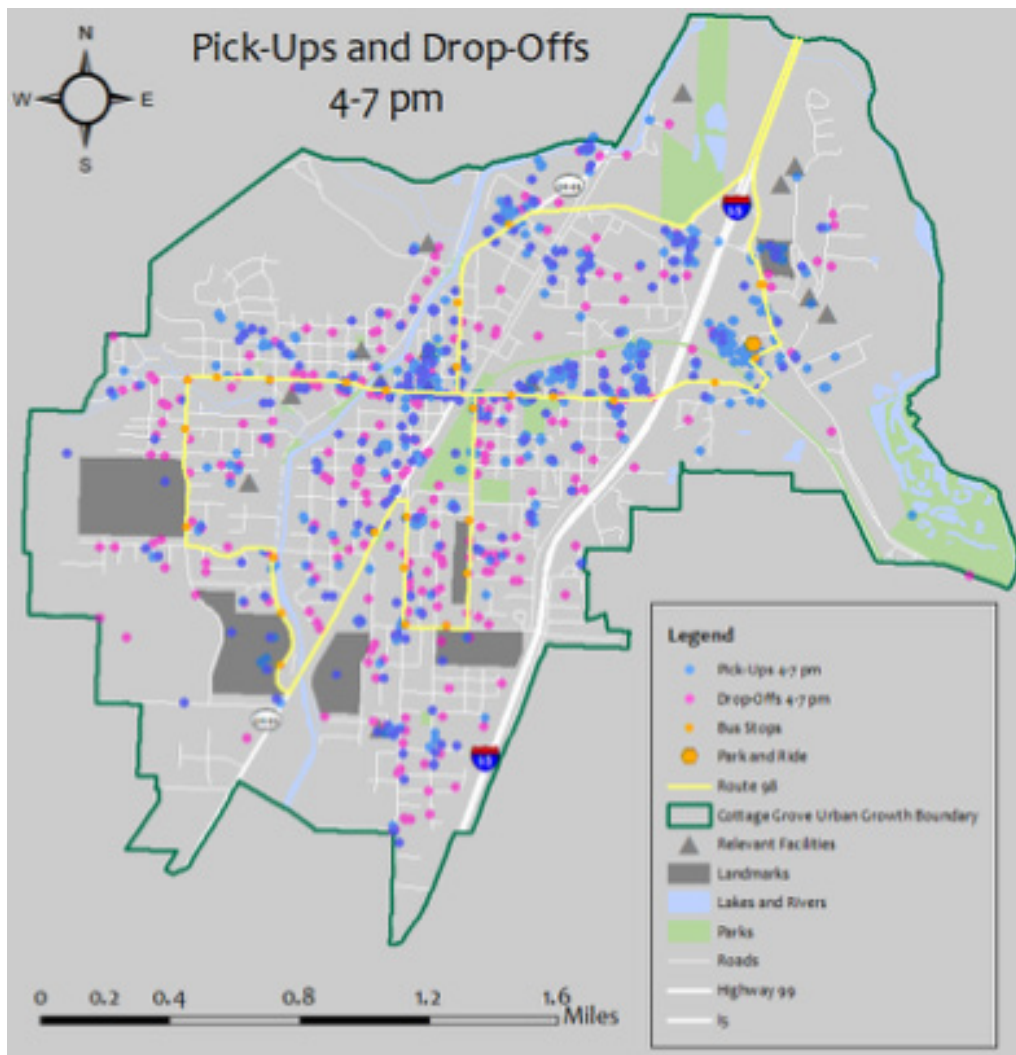All pick-ups and drop offs, 10am- 1pm.

Pick-Ups and Drop-Offs
1-4 pm

Legend

- Pick-Ups 1-4 pm
- Drop-Offs 1-4 pm
- Cottage Grove Urban Growth Boundary
- Bus Stops
- Park and Ride
- Route 98
- Relevant Facilities
- Landmarks
- Lakes and Rivers
- Parks
- Roads
- Highway 99
- I5

0   0.2   0.4   0.8   1.2   1.6
Miles

83

Pick-Ups and Drop-Offs
4-7 pm

Legend
- Pick-Ups 4-7 pm
- Drop-Offs 4-7 pm
- Bus Stops
- Park and Ride
- Route 98
- Cottage Grove Urban Growth Boundary
- Relevant Facilities
- Landmarks
- Lakes and Rivers
- Parks
- Roads
- Highway 99
- I5

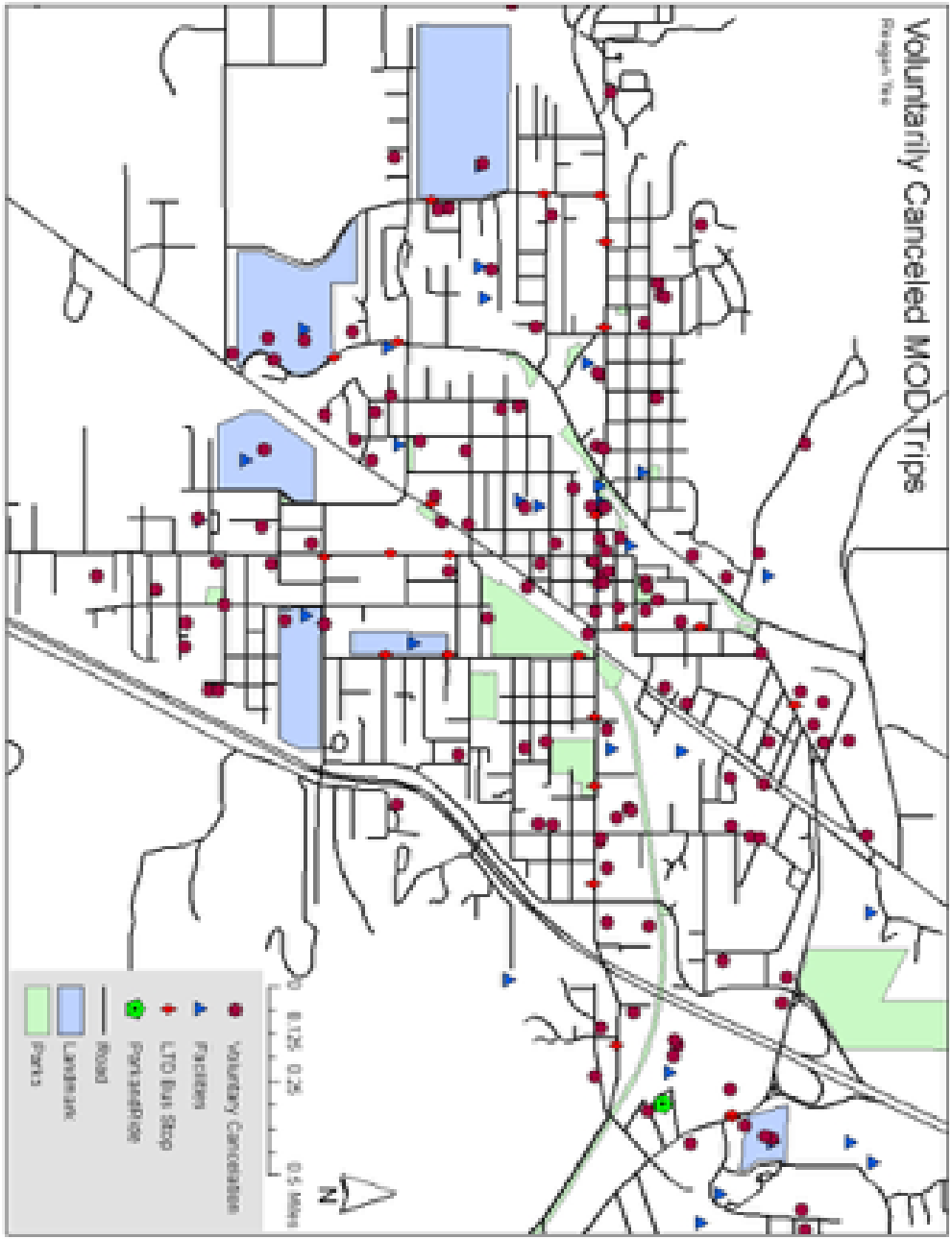0   0.2   0.4   0.8   1.2   1.6
Miles
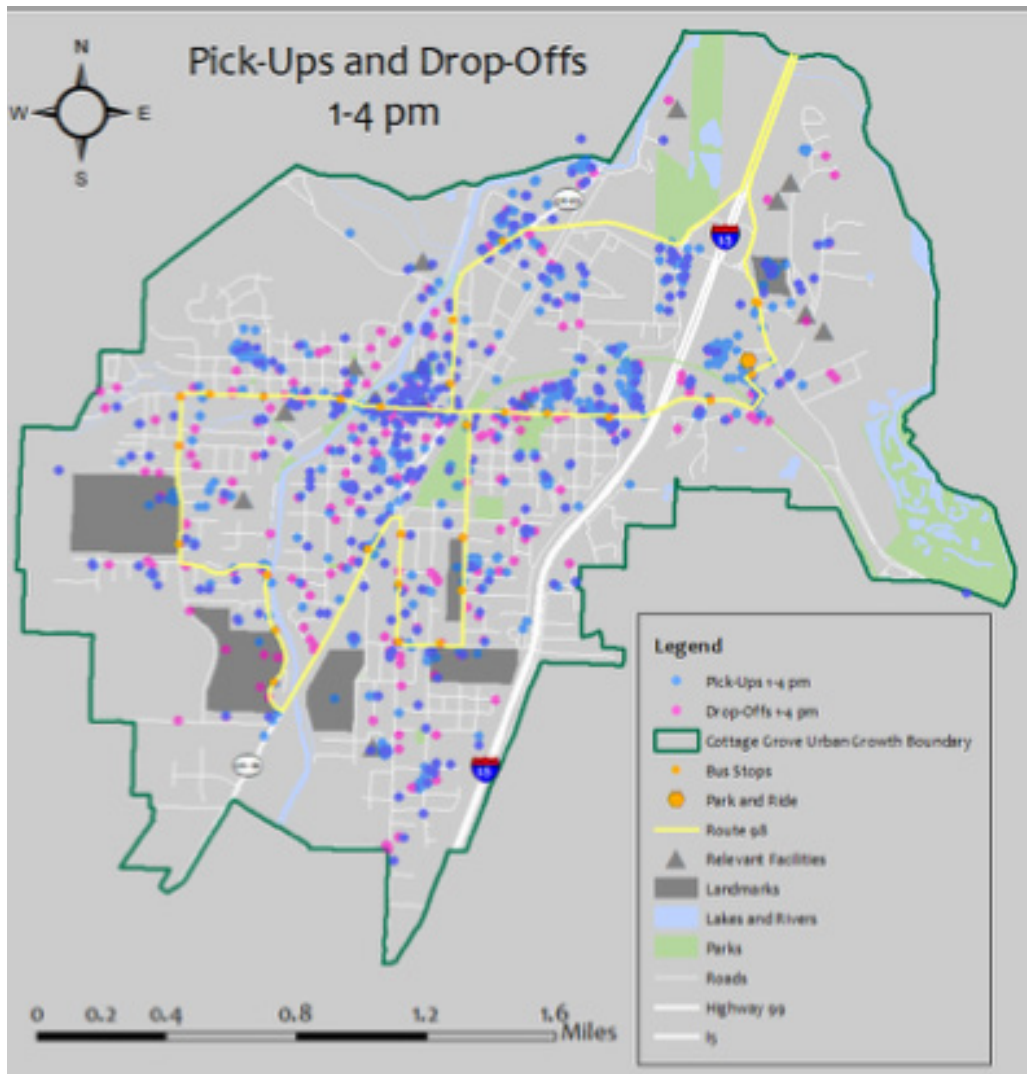
Total Canceled MOD Trips
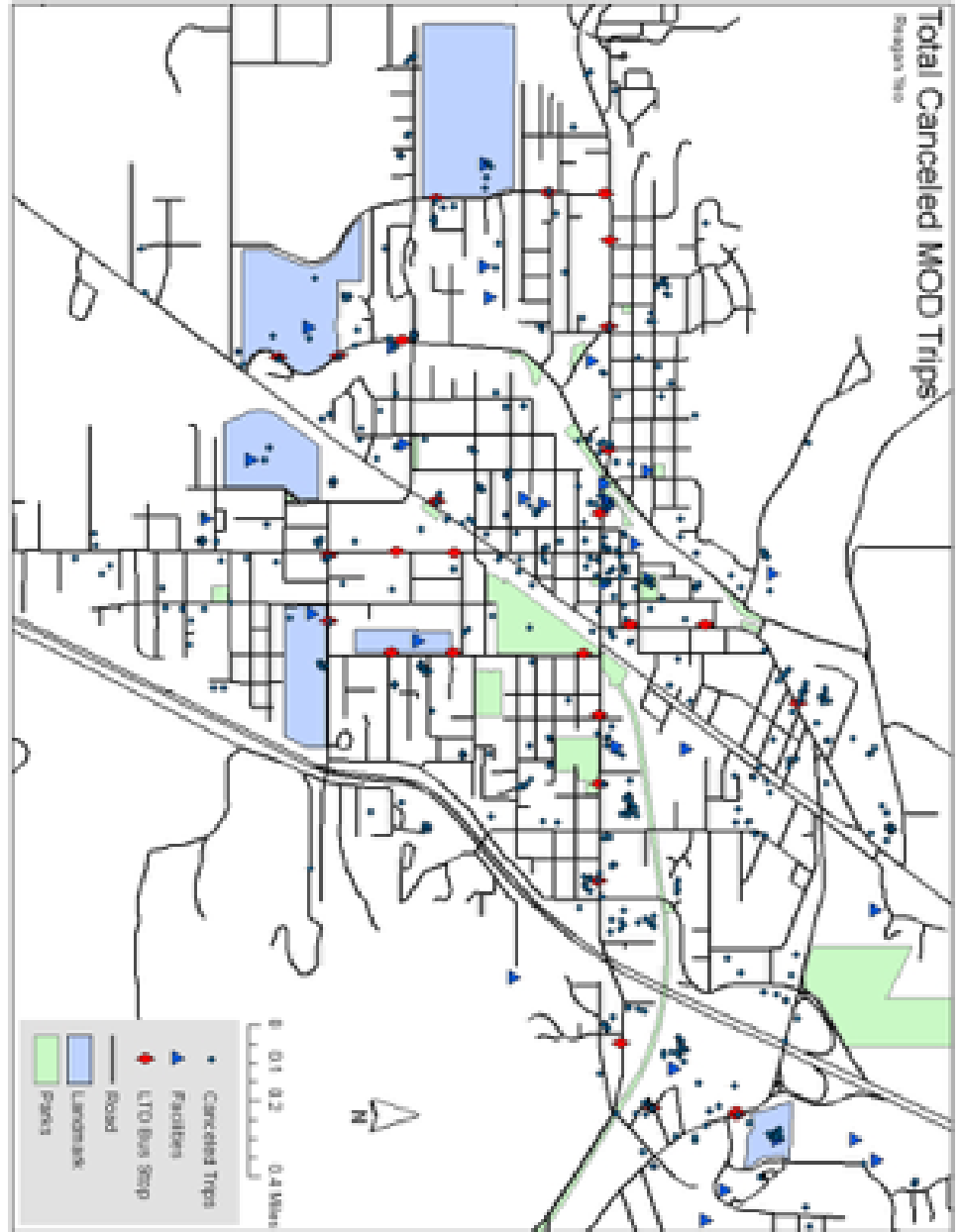
FIG. G10
Voluntarily canceled
MOD trips.

Trips canceled due to MOD failure.

Trips Canceled Due to MOD Failure

Total Canceled MOD Trips by Month
Rogue No

Legend:
- Canceled 03-06 (red)
- Canceled 07-11 (yellow)
- Canceled 12-02 (orange)
- Road
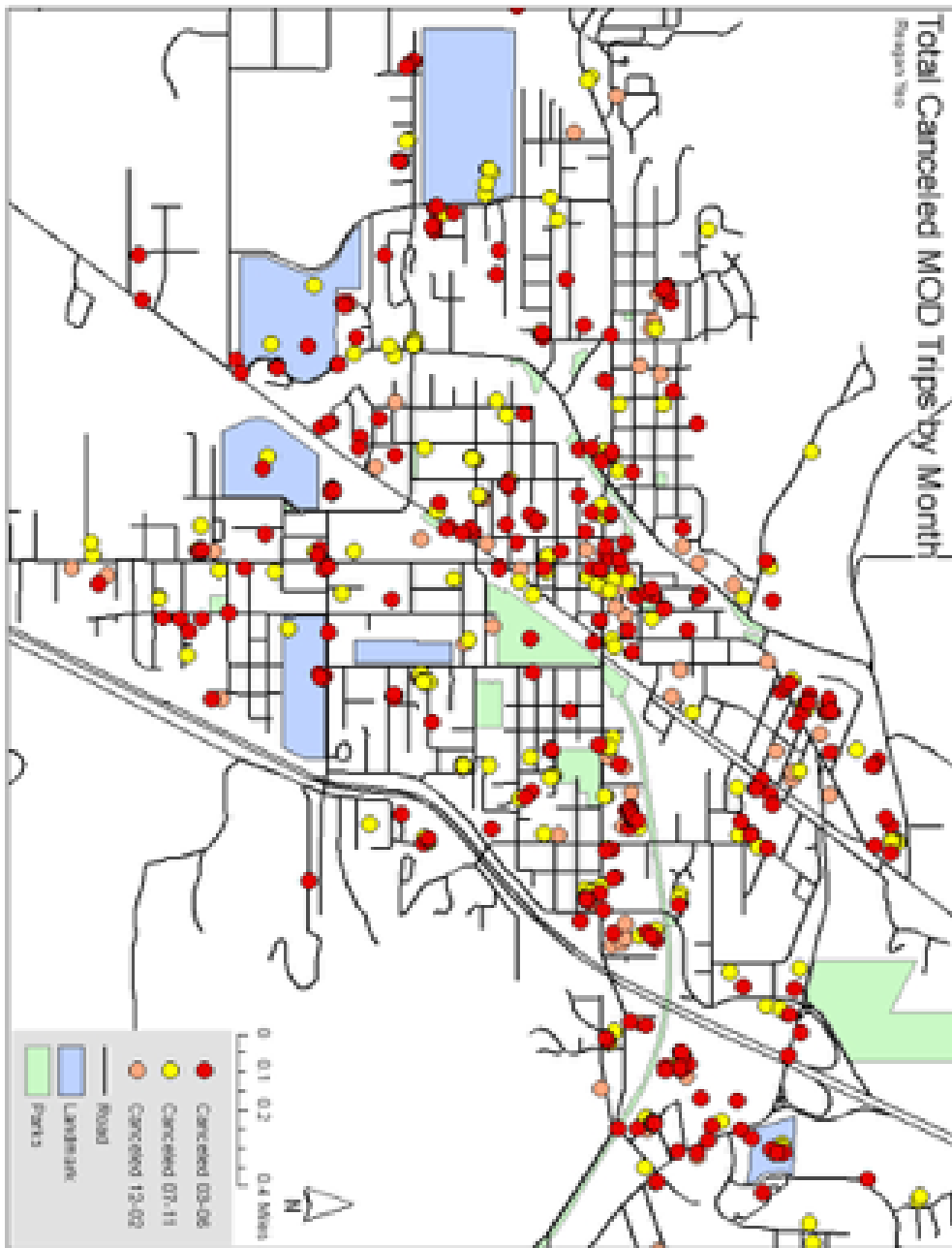- Landscape
- Parks

0 0.1 0.2   0.4 Miles
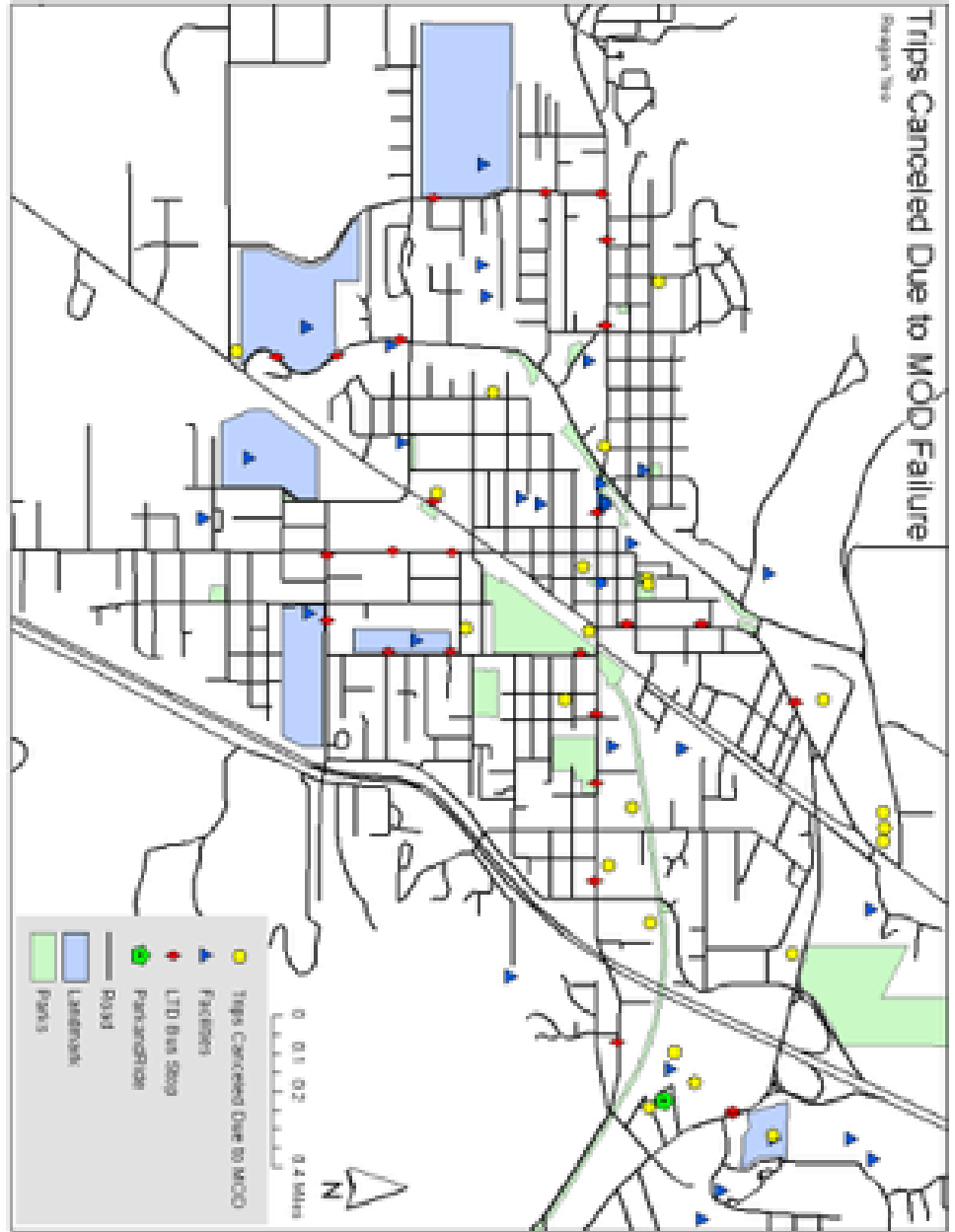
FIG. G12
Total canceled MOD trips by month.

FIG. G13
Pick-ups and drop
offs for wheelchair
requests.

Pick-Ups and Drop-Offs for Wheelchair Requests

Legend
Wheelchair Pick-Ups
Wheelchair Drop-Offs
Cottage Grove Urban Growth Boundary
Park and Ride
Bus Stops
Route 98
Relevant Facilities
Landmarks
Lakes and Rivers
Parks
Roads
Highway 99
I5

Pick-Ups by Wait Times

Legend

All Pick-Ups

Wait Time
- 0-5 minutes
- 5-10 minutes
- 10-15 minutes
- 15-20 minutes
- 20-25 minutes
- More than 25 minutes
- Cottage Grove Urban Growth Boundary

- Park and Ride
- Route 98
- Relevant Facilities
- Landmarks
- Lakes and Rivers
- Parks
- Roads
- Highway 99
- 99

0   0.2   0.4   0.8   1.2   1.6
Miles

Frequency of Riders by Number of Trips
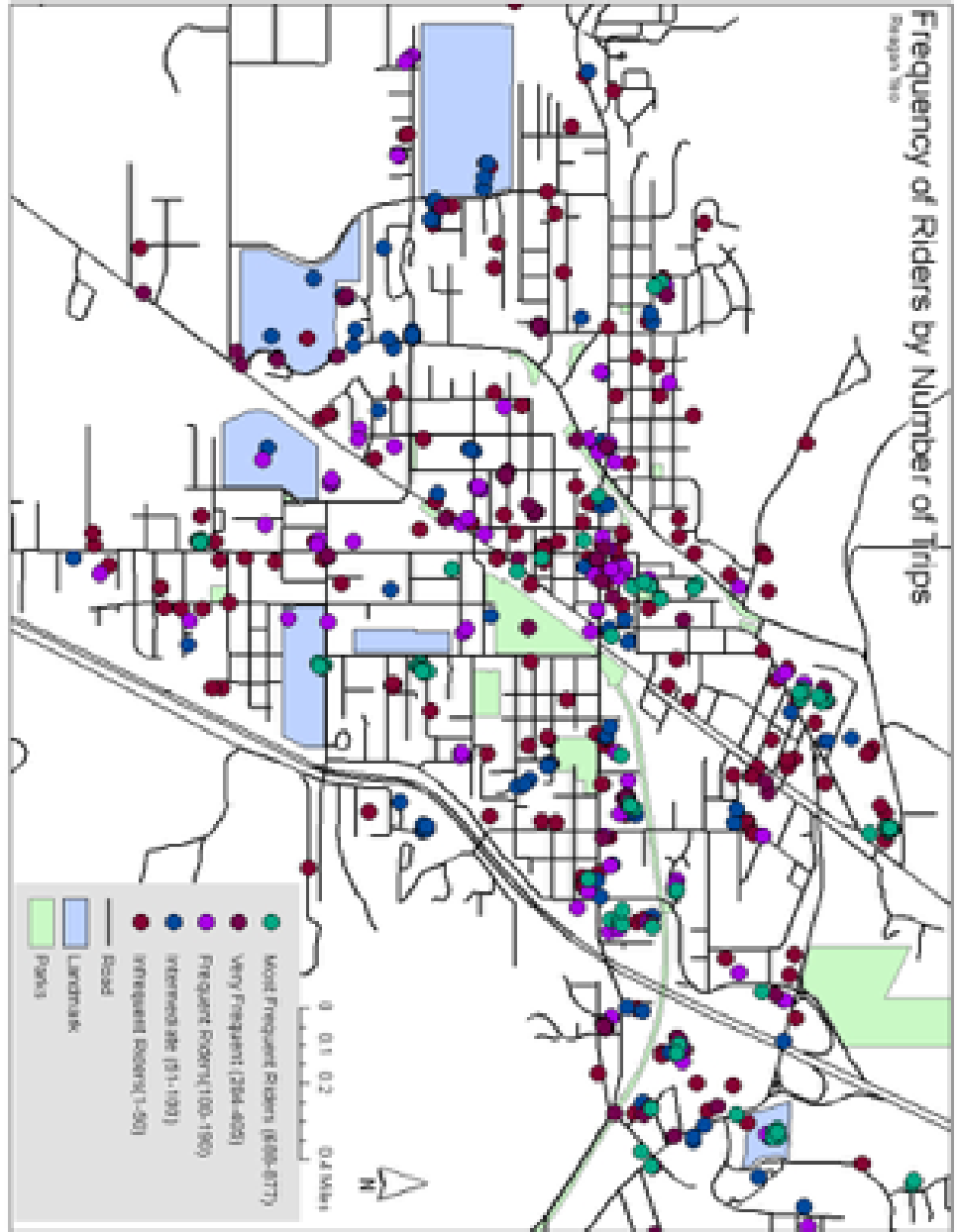
SCI Directors and Staff

Marc Schlossberg	SCI Co-Director, and Professor of Planning, Public Policy, and Management, University of Oregon
Nico Larco	SCI Co-Director, and Professor of Architecture, University of Oregon
Megan Banks	SCYP Director, University of Oregon
Sean Vermilya	Report Coordinator
Katie Fields	SCYP Graduate Employee
Danielle Lewis	Graphic Designer