Commercial Package Delivery Through Public Transportation Systems in Rural States
Final Report

Prepared by:

Andrea Hamre, PhD
Research Associate

Sam Coulter
Undergraduate Research Assistant

&

David Kack, MBA
Director & Program Manager

MONTANA STATE UNIVERSITY | Western Transportation Institute

June 2021

About the Western Transportation Institute

The Western Transportation Institute (WTI) was founded in 1994 by the Montana and California Departments of Transportation, in cooperation with Montana State University. WTI concentrates on rural transportation research; as stewards and champions of rural America, WTI also has a strong interest in sustainability. WTI research groups create solutions that work for clients, sponsors, and rural transportation research partners. WTI Research Centers include the Montana Local Technical Assistance Program, the National Center for Rural Road Safety, the Small Urban, Rural and Tribal Center on Mobility, the Federal-Public Lands Transportation Institute, and the West Region Transportation Workforce Center.

About the Small Urban, Rural and Tribal Center on Mobility

The mission of the Small Urban, Rural and Tribal Center on Mobility (SURTCOM) is to conduct research and provide leadership, education, workforce development and technology transfer in all transportation-related aspects of mobility for people and goods, focusing specifically on small urban, rural and tribal areas. Member institutions include the Western Transportation Institute at Montana State University, the Upper Great Plains Transportation Institute at North Dakota State University, and the Urban and Regional Planning program at Eastern Washington University.

Disclaimer

The contents of this report reflect the views of the authors and are disseminated in the interest of serving the project sponsor and sharing information. This study was funded by a grant from the U.S. Department of Transportation's University Transportation Centers Program via the Small Urban, Rural and Tribal Center on Mobility. However, the U.S. Government assumes no liability for its contents or use and the contents do not necessarily reflect the official views or policies of the U.S. Government nor do they reflect any endorsement.

Acknowledgments

We would like to thank representatives from the intercity bus industry for meeting to discuss their package delivery services, including Charles Sweet and Kimberly Buckner (Greyhound), Kathy Pop (Salt Lake Express) and Bonnie Buchanan (Jefferson Lines). We would also like to thank state transportation officials who responded to inquiries regarding case studies, especially Ian Ritz, Steve Hirshfeld, and Kevin Lang from the Wisconsin Department of Transportation's Transit Program. We also benefited from meeting with Zachary Elgart, Associate Research Scientist in the Texas A&M Transportation Institute's Transit Mobility Program. We also appreciated meeting with Via Logistics staff to learn more about their delivery management services. We appreciated information provided to us from FTA's National Transit Database staff, as well as responses to inquiries from the National Rural Transit Assistance Program. Finally, we benefited from meeting with Danielle Nelson, Acting Chief of Rural and Targeted Programs within the Federal Transit Administration's Office of Program Management, to learn more about the regulatory context. We express appreciation to the U.S. Department of Transportation for support of university-based transportation research.

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1. Overview

The purpose of this project is to provide information regarding the market potential for last mile package delivery via public transportation in rural areas and on Tribal Lands. The project also provides an opportunity to compile guidance for rural and Tribal transit agencies interested in pursuing package delivery as a source of revenue.

The primary motivation for this project was an interest in contributing to the knowledge base regarding the potential for rural public transportation systems to play a role in package delivery. This project takes place at a time when several societal trends are converging: 1) increasing reliance on online shopping, remote work, and other virtual experiences leading to an increase in the overall demand for package deliveries; 2) declining revenues, exacerbated by the pandemic, for most domestic public transportation agencies; and 3) technological advancements supporting innovations in package delivery logistics. With these converging trends, package delivery services could offer mutual benefits to rural and Tribal transit agencies, residents of rural areas and Tribal Lands, and private partners (e.g., intercity bus providers and private package carriers).

Over the course of this study, we reviewed prior research, searched for case studies, met with industry and government leaders, and reviewed information about innovations in delivery service management. This final report offers a synthesis of the topic as well as an empirical estimation of market potential at the national (contiguous states) level. We also intend it to serve as a reference for transit agencies considering package delivery services. **Figure 1** summarizes the timeline for this study. The remainder of this report provides a review of prior research, a summary of the policy and regulatory context, a presentation of empirical methods and results, and a concluding discussion.

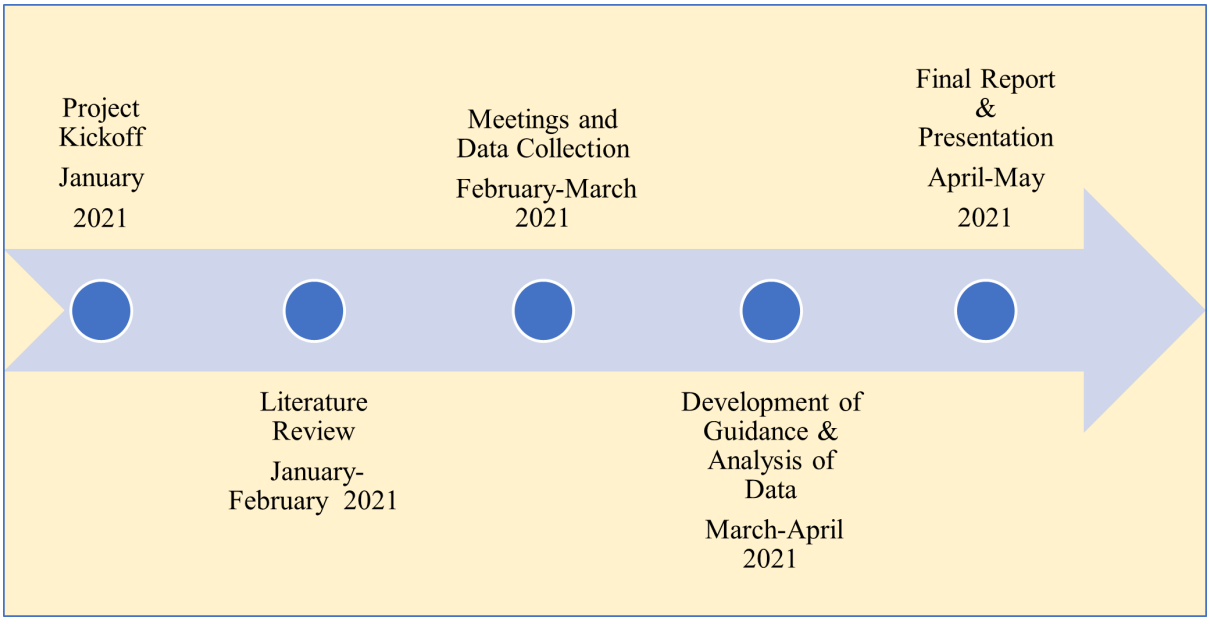


Figure 1. Project Timeline

2. Review of Prior Research, the Policy and Regulatory Context, and the Latest Technologies

This section provides an overview of prior research on package delivery by transit agencies, as well as a summary of the policy and regulatory contexts and an overview of the latest technological developments in package delivery. The information reviewed in this section informed our empirical analysis, and may also serve as a synthesis for practitioners interested in pursuing package delivery services.

2.1. Prior Research

This study primarily builds upon the following four studies, of which the first three maintain a rural focus and the fourth has an urban focus:

- Last Mile Commercial Package Delivery as a Revenue Generation Tool for Rural Public Transportation Systems in Wyoming (Clouser & Chaudhari, 2017)
- Guidebook: Using Public Transportation to Facilitate Last Mile Package Delivery (Edrington, Elgart, Miller, Tan, & Warner, 2017)
- Last Mile Package Delivery Via Rural Transit: Project Summary and Pilot Outcomes (Elgart, Miller, & Tan, 2019)
- Leveraging Public Transit for Robust Last-Mile Distribution (Crepy, 2020)

The study by Clouser and Chaudhari (2017) was sponsored by the Wyoming Department of Transportation and completed by researchers at the Small Urban and Rural Livability Center, the UTC-predecessor to the Western Transportation Institute's current Small Urban, Rural and Tribal Center on Mobility. The research team estimated the potential demand and revenue using the county level as the unit of analysis and Wyoming as the study area. As a conservative basis for their estimates, they used a package demand level of 0.65 per household per week, based upon The Household Diary Study: Mail Use & Attitudes conducted by USPS for fiscal year 2015, as well as a uniform revenue rate of $2.74 per package, based upon the USPS Destination Delivery Unit rate at the time for packages of one pound. With these parameters, the research team estimated a lower-bound revenue per Wyoming county of approximately $24,005, and a potential for revenue as high as $764,456 in Wyoming's largest county, Laramie. In addition, the research team also surveyed Wyoming businesses and transit managers, as well as State Department of Transportation officials. The researchers concluded that both a market and a capacity for package delivery services from transit agencies exist in Wyoming, and could benefit "transit agencies, parent organizations, local communities, businesses, organizations, and e-commerce and shipping industries" and recommended development and initiation of such services (Clouser & Chaudhari, 2017). The present study follows the empirical approach used by Clouser and Chaudhari (2017) in several key respects, as discussed further below, but extends their analysis with a larger study area (contiguous states).

The studies by Edrington et al. (2017) and Elgart et al. (2019) were sponsored by the Texas Department of Transportation and completed by researchers at the Texas A&M Transportation Institute. The guidebook by Edrington et al. (2017) was written to provide "public transit

agencies in rural Texas communities with the information necessary to implement a package delivery service in coordination with a private package delivery partner." It was organized around describing the package delivery niche rural transit agencies could fill, highlighting market segments to pursue, identifying challenges, and presenting potential service models. Along with its comprehensive overview of opportunities, challenges, and fiscal and policy considerations, the guidebook focused on the potential for transit agencies to partner with the intercity bus industry.

Elgart et al. (2019) produced a follow-up publication that summarized the project as well as the outcomes of 2016-2017 pilot package delivery services coordinated with two rural Texas transit operators – SWART (Southwest Area Regional Transit District serving Middle Rio Grande) and CVTD (Concho Valley Transit District serving San Angelo and surrounding areas) – and GPX (Greyhound Package Express). The goals of the pilot included provision of additional services to customers, increased non-program transit revenues, facilitation of expanded intercity bus service, concept and management/training/operations testing, and contributions to economic development in the service areas. The report reviewed the progress toward each of these goals in relation to a list of performance metrics, and the research team identified the following lessons from the pilot project:

- Package delivery coordination with transit agencies introduces additional logistical challenges and therefore requires dedicated communication and education efforts;
- Confusion and miscommunication may arise without clearly defined roles and responsibilities;
- Peer mentors may provide important support for transit agencies seeking to expand their current service portfolios;
- Ongoing marketing efforts to introduce new service offerings are needed;
- Insurance needs should be carefully considered;
- New services may take time to become established and successful by traditional performance metrics (Elgart et al., 2019).

The research team summarized their findings using a Strengths, Challenges, Opportunities, and Threats Analysis (**Table 1**).

Table 1. Strengths, Challenges, Opportunities, and Threats Analysis from the Texas A&M Transportation Institute's Pilot Package Delivery Service.

Strengths & Opportunities	Challenges & Threats
Low Cost of Entry	Low Demand for Service
Service Diversity (Packages, Intercity)	Insurance Requirements
Opportunity for Economic Development	Limited Profitability
Buy-In from TxDOT and Stakeholders	

Notes and Source: Adapted from Figure 23 in Elgart et al. (2019).

They conclude "there is not a one-size-fits-all way to implement package delivery in rural areas." Clearly identified "goals, objectives, and performance measures to guide decisions" as well as service agreements with private package delivery companies (such as intercity bus companies)

that offer mutually beneficial outcomes (e.g., increased ridership and exposure to services) support successful implementation (Elgart et al., 2019).

The study by Crepy (2020) was conducted for a Master of Science in Transportation at the Massachusetts Institute of Technology, and used Boston as its study area. Crepy (2020) developed a method for identifying whether a transit role in last-mile parcel distribution was feasible and economically viable for both the transit agency and package carrier, and then applied the method empirically using the Massachusetts Bay Transportation Authority's subway network. He found economic viability under certain constraints, and concluded that, "if designed under favorable conditions, the use of transit-enabled last-mile delivery (TE-LMD) results in significant savings for the carriers, a new revenue stream for the transit agency, and a reduction in pollutant emissions" (Crepy, 2020).

Together, these studies from the past five years of the potential for transit to play a role in package delivery have offered an emerging consensus that: 1) package delivery may provide a new, and in some cases significant, source of revenue for transit agencies; 2) residents and delivery customers may benefit from lower costs, reduced pollution and congestion, and greater delivery service choice; 3) parcel carriers may benefit from lower costs, and in the specific case of intercity bus companies increased ridership as well; 4) a variety of factors may pose challenges for successful implementation of these services and require context-specific awareness and adaptation. Overall, there is optimism for the role transit may play in package delivery, tempered with recognition that implementation should be approached with careful consideration of the local context, potential partners, and policy and regulatory contexts. The following section provides an overview of key policy and regulatory issues that agencies should consider to support successful introduction of these package delivery services and coordinated partnerships.

2.2. Policy and Regulatory Context

The following provides an overview of critical policy and regulatory issues to consider in pursuing package delivery partnerships. We provide this information in the interest of sharing resources; our report is not meant to serve as legal guidance. We recommend consultation with the Federal Transit Administration Office of Program Management as well as Regional Office Staff prior to pursuing package delivery services. The reports by the Texas A&M Transportation Institute also provide excellent overviews of regulatory, operational, fiscal, and marketing challenges to consider (Edrington et al., 2017; Elgart et al., 2019).

2.2.1. Incidental Use

The Federal Transit Administration issues guidance circulars to provide direction to grantees on specific issues and statutory requirements (Federal Transit Administration, 2015). According to Section III.2.d in *FTA Circular 9040.1G Formula Grants for Rural Areas: Program Guidance and Application Instructions*:

> "A rural transit provider may use a Section 5311 vehicle for nonpassenger transportation on an occasional or regular basis, **such as package delivery**, if this **incidental use** does

> not result in a reduction of service quality or availability of public transportation service. The **incidental use** policy does not preclude the recipient's use of Section 5311 assistance to support the transportation of passengers by a private provider that is not primarily engaged in passenger transportation. For example, a recipient may use Section 5311 funds to support a contract mail carrier that incidentally provides intercity passenger transportation, if the carrier has appropriate regulatory authority to carry passengers. Section 5311 funds may only be used to subsidize the passenger transportation services of the mail carrier" (emphasis added) (Federal Transit Administration, 2014).

According to a response to Guidance Request 407 provided by the FTA Office of Program Management (available by request), "FTA policy and the Federal Interagency Coordinating Council on Access and Mobility (CCAM) policy on vehicle resource sharing allow vehicles to be used for purposes other than that specified in the original award on an incidental basis" (Federal Transit Administration, 2019b). The Incidental Use General Guidance presented by the FTA Office of Program Management at the Grants Management and Oversight Meeting held in March 2021 specifies that incidental use "means the limited authorized non-transit use of project property acquired with FTA assistance" – to be in compliance, "such use must not conflict with the approved purposes of the project and must not interfere with the intended transit uses of the project property" or "affect a property's transit capacity or use" (Nelson, 2021). In guidance regarding charter service (discussed next), "incidental service" has been described as service that "does not interfere with or detract from the provision of the mass transportation service for which the equipment or facilities were funded and does not shorten the mass transportation life of the equipment or facilities" (see, e.g., Edrington et al., 2017; Small Urban and Rural Center on Mobility, 2021).

In summary, transit agencies receiving federal funding must limit package delivery to service that is secondary to the primary use of carrying passengers and service that does not reduce the usable life of funded property or facilities. This discussion has focused on the federal context; we did not uncover any state-level regulations regarding incidental use that go beyond what is required at the federal level.

2.2.2. Charter Rule

According to federal law (49 U.S.C. 5323(d)) and regulations (49 C.F.R. Part 604), transit agencies receiving federal funding are prohibited from providing charter service with federally funded equipment and facilities, except as incidental service (i.e., on an incidental basis; see above) and in the presence of one or more applicable exceptions:

- Provision due to a lack of a willing or able private operator;
- Provision of accessible vehicles to private operators to satisfy a capacity need;
- Provision to avoid hardship in rural (i.e., non-urbanized) areas due to remoteness relative to a willing and able private charter provider;
- Provision for extraordinary, special, or singular events;
- Provision to government or non-profit entities serving persons with disabilities or persons receiving public assistance;

- Provision of service for elderly adults in rural (i.e., non-urbanized) areas by a government or non-profit entity chartering a trip consistent with the function and purpose of the organization and in compliance of civil rights law; and/or
- Provision in the presence of a formal agreement with all private charter operators (Small Urban and Rural Center on Mobility, 2021).

If a grantee of federal transit funds provides charter service under one of these exemptions, documentation on the impact on the useful life of equipment (e.g., mileage and/or hours), fares and schedules, and public benefit are required (Small Urban and Rural Center on Mobility, 2021). The legislative intent of what has become known as "the Charter Rule" was to avoid unfair competition from federally subsidized entities (i.e., public transit agencies) in charter service provision, but concerns have been raised that this provision in the law has become a "transportation coordination barrier" (Nelson, 2021). The exemptions as currently codified are increasingly considered as "outdated, inaccurate" and costly; there is interest in updating the Charter Service Rule Appendix A list of 64 programs from 2008 to match the 2019 list of 130 programs from the Coordinating Council on Access and Mobility (Nelson, 2021).

The implications of the Charter Rule are likely to pose the greatest challenge to transit agency partnerships for package delivery (Nelson, 2021). Entities seeking more specific guidance are encouraged to submit questions to FTA, which are received by FTA staff, answered, and compiled in the ProGuide (Program Guidance) database for future reference.

2.2.3. Other Issues

Beyond adherence to guidance relating to incidental use and charter service in the regulations for grantees of federal transit formula funds, package delivery by transit agencies entails consideration of additional issues. As outlined in Texas A&M Transportation Institute reports, (Edrington et al., 2017; Elgart et al., 2019), commercial package delivery by transit agencies may require additional driver and operator licensure and insurance coverage, adjustments to driver training and service schedules, new procedures for the safe handling and storage of packages, additional reporting and technology investments to track packages, and new approaches to marketing. We hope the prior research on this topic, along with this report, will contribute to dialogue among transit agencies, FTA staff, and potential private partners, and to a growing knowledge base surrounding strategies to effectively navigate the policy and regulatory challenges surrounding package delivery by transit agencies.

2.3. Overview of the Latest Developments in Package Delivery Technology

Package delivery logistics have undergone significant disruption and adjustment with the introduction of new technologies in recent years. Shaheen et. al (2020) provide an excellent overview of recent innovations in last-mile delivery services:

- Courier network services (also called flexible goods delivery) have introduced on-demand delivery options for consumers to access groceries, restaurant meals, and other goods;

- Locker-based delivery has enabled self-service at various locations and reduced concerns about package security or the need to be present when an item is delivered;
- Mobile warehousing has introduced flexibility to inventory storage and enabled greater adaptability for supply chain managers;
- Micro warehousing has expanded the spectrum of facilities used in supply chains and enabled reduced delivery times through more dispersed storage; and
- Delivery subscriptions have allowed consumers access to low-cost package delivery.

With respect to transit agency participation in package delivery, we envision locker-based delivery to have the potential to support partnerships with private companies, such as intercity bus companies. Lockers could enable asynchronous (non-scheduled) transference at locations such as intercity bus depots. In addition, transit agencies might play a role in courier network services in certain circumstances. During the COVID-19 pandemic, FTA and the U.S. Department of Housing and Urban Development's Office of Public and Indian Housing (HUD-PIH) have partnered to encourage transit agency participation in the delivery of essential services, such as meal delivery and public Wi-Fi access at parking lots (Federal Transit Administration, 2020), in accordance with regulatory guidance on incidental use. This effort has demonstrated the potential for transit agencies to play an expanded role in delivery services. In addition, transit agency partnerships with private Mobility on Demand providers may provide opportunities to incorporate package delivery. For example, Via Logistics provides last-mile delivery management services that could potentially be integrated with its Software as a Service or Transportation as a Service passenger services (Brinker, 2021; Via Logistics, 2021). We envision the coming years to offer increasing opportunities for transit agencies to take advantage of technology-enabled partnerships and expanded service portfolios.

3. Empirical Methods and Results

3.2. Methods

To contribute to the knowledge base regarding the market potential for transit agency participation in package delivery, we applied the methods used by Clouser and Chaudhari (2017) for the State of Wyoming to a national (contiguous states) study area. In addition, we added to the analysis an assessment of transit agency proximity to intercity bus stops. To do this, we combined information from several data sources:

- National Transit Database (USDOT-FTA)
  - We obtained a list of rural and Tribal transit agencies in spreadsheet form from the NTD's 2019 Annual Database Agency Information file (Federal Transit Administration, 2019a), as well as in geospatial shapefile form from the Bureau of Transportation Statistics Open Data Catalog's GTFS NTM Agencies file (Bureau of Transportation Statistics, 2021).
- American Community Survey (USCB)
  - We accessed county population and household totals from the American Community Survey via the Census Bureau's TIGER/Line with Selected Demographic and Economic Data product, which combines geospatial and sociodemographic information (U.S. Census Bureau, 2014-2018). We also used this data product for the boundaries and total households in Urbanized Areas (agglomerations of more than 50,000 persons) and the contiguous states.
- Intermodal Passenger Connectivity Database (USDOT-BTS)
  - We used the Intermodal Passenger Connectivity Database to identify the locations of intercity bus stops (Bureau of Transportation Statistics, 2020). We utilized a version downloaded in September 2020, as the database does not appear to be currently available via the BTS website.
- The Household Diary Study: Mail Use & Attitudes in FY 2019 (USPS)
  - We used *Table 1.6 Pieces Received and Sent Per Household* from this study (Finance and Planning Department, 2020) to obtain estimates on household package demand (annual pieces per household and pieces per household per week in the Packages & Shipping Services category). Respondents to the survey used in this study were instructed to include packages delivered by USPS as well as all other carriers. We accessed this document from the Postal Regulatory Commission website; for more information, visit the USPS household diary information webpage at: https://about.usps.com/what/performance/household-diary/.
- Notice 123: Price List (USPS)
  - We followed Clouser and Chaudhari (2017) in using the Destination Delivery Unit price for a one-pound package, currently set at $3.30 (U.S. Postal Service, 2021). We searched for but were unable to obtain data on the distribution of packages by weight, for USPS or any other carriers. As a result, we chose to use

the relatively conservative value for one-pound packages; revenues could average above our estimates if the average package weight skews significantly higher.

We utilized Microsoft Excel and ArcGIS software for our analysis, and generated results in the forms of tables, static maps, and a webmap.

In addition to the market potential estimation, we met with several members of the intercity bus industry and conducted a search for case studies via outreach to state transportation officials (typically transit program staff at State Departments of Transportation). Unfortunately, we were unable to obtain disaggregate package volume data from the intercity bus industry to incorporate into our analysis at this time, and had limited success in developing a case study portfolio.[1] Future research on this topic could expand upon these efforts to incorporate intercity bus industry package delivery services, as well as highlight cases of transit agencies providing package delivery services.

3.3. Results

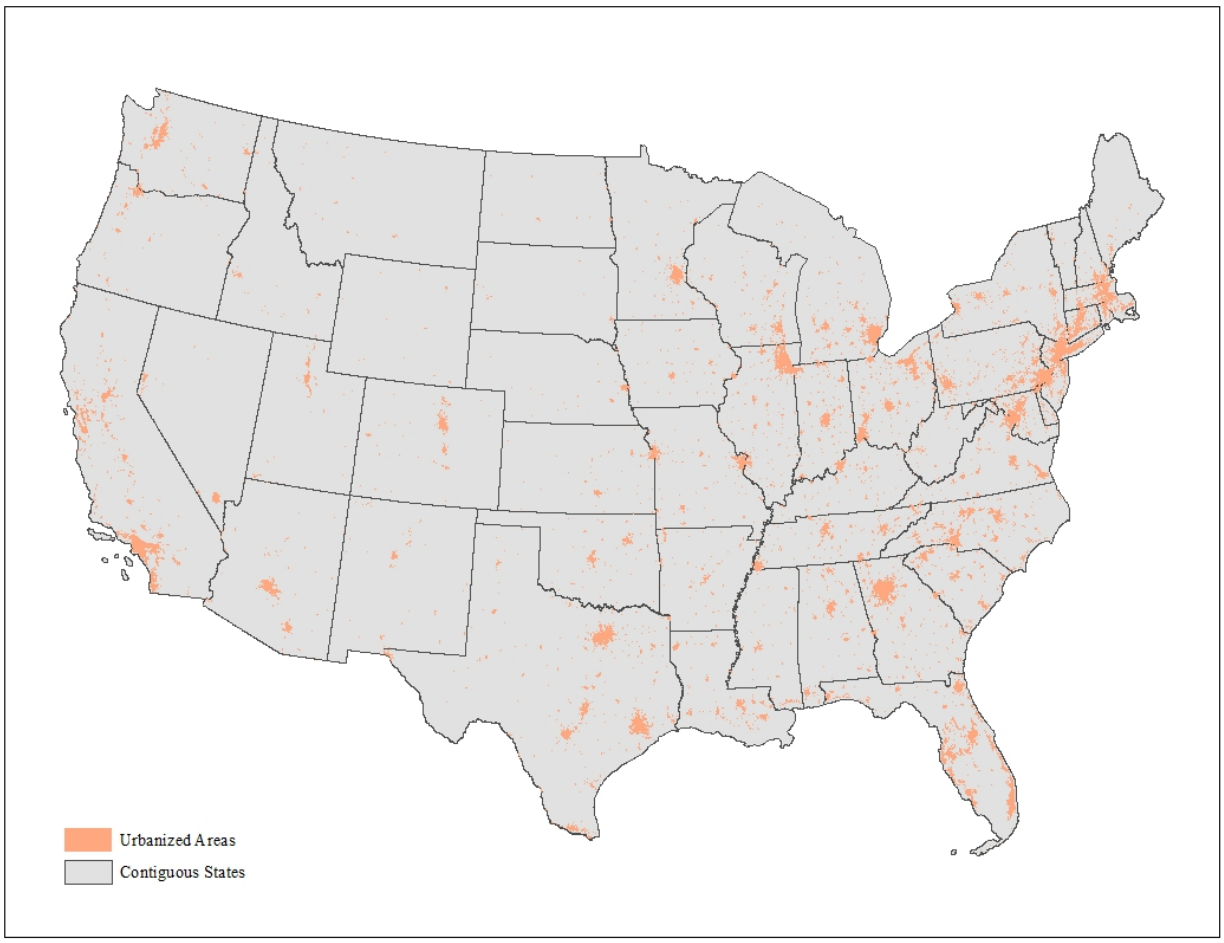
Table 2 summarizes our estimates of the market potential for package delivery by transit agencies in the contiguous states (inclusive of Washington, D.C.). Out of a total of 119,019,884 households in the study area, 23,029,572 (about 19%) are located outside of Urbanized Areas. Using an estimate of volume of 38 annual pieces received and sent per household in the Packages & Shipping Services category (Finance and Planning Department, 2020; see Table 1.6) and a destination delivery unit price of $3.30, we conservatively estimate package revenue in non-urbanized areas to total $2,887,908,328.80. Assuming rural and Tribal transit agencies could participate in only a fraction of all deliveries, we estimate the potential to range from $28,879,083.29 (1% of total revenues) to $577,581,665.76 (20% of total revenues). **Figure 2** presents in map form the Urbanized Areas across the contiguous states.

Table 2. Estimated Market Potential (Annual Revenue) for the Contiguous States

	Contiguous States		
	States/ Counties (All)	**Urbanized Areas**	**Non-Urbanized Areas**
Total Households	119,019,884	95,990,312	23,029,572
Annual Package & Shipping Volume	4,522,755,592	3,647,631,856	875,123,736
Annual Revenue	$14,925,093,453.60	$12,037,185,124.80	$2,887,908,328.80
Market Potential for Transit Agencies			
1 Percent of Revenue	$149,250,934.54	$120,371,851.25	$28,879,083.29
5 Percent of Revenue	$746,254,672.68	$601,859,256.24	$144,395,416.44
20 Percent of Revenue	$2,985,018,690.72	$2,407,437,024.96	$577,581,665.76

Notes: Prepared by WTI using the American Community Survey 5-Year Estimates provided for household totals in the TIGER/Line with Selected Demographic and Economic Data product (U.S. Census Bureau, 2014-2018, Table X11 Households Families Subfamilies, inclusive of Washington, D.C.).

[1] For example, we did not receive any responses to an email survey of transit agencies identified by a State Department of Transportation as providing package delivery services.



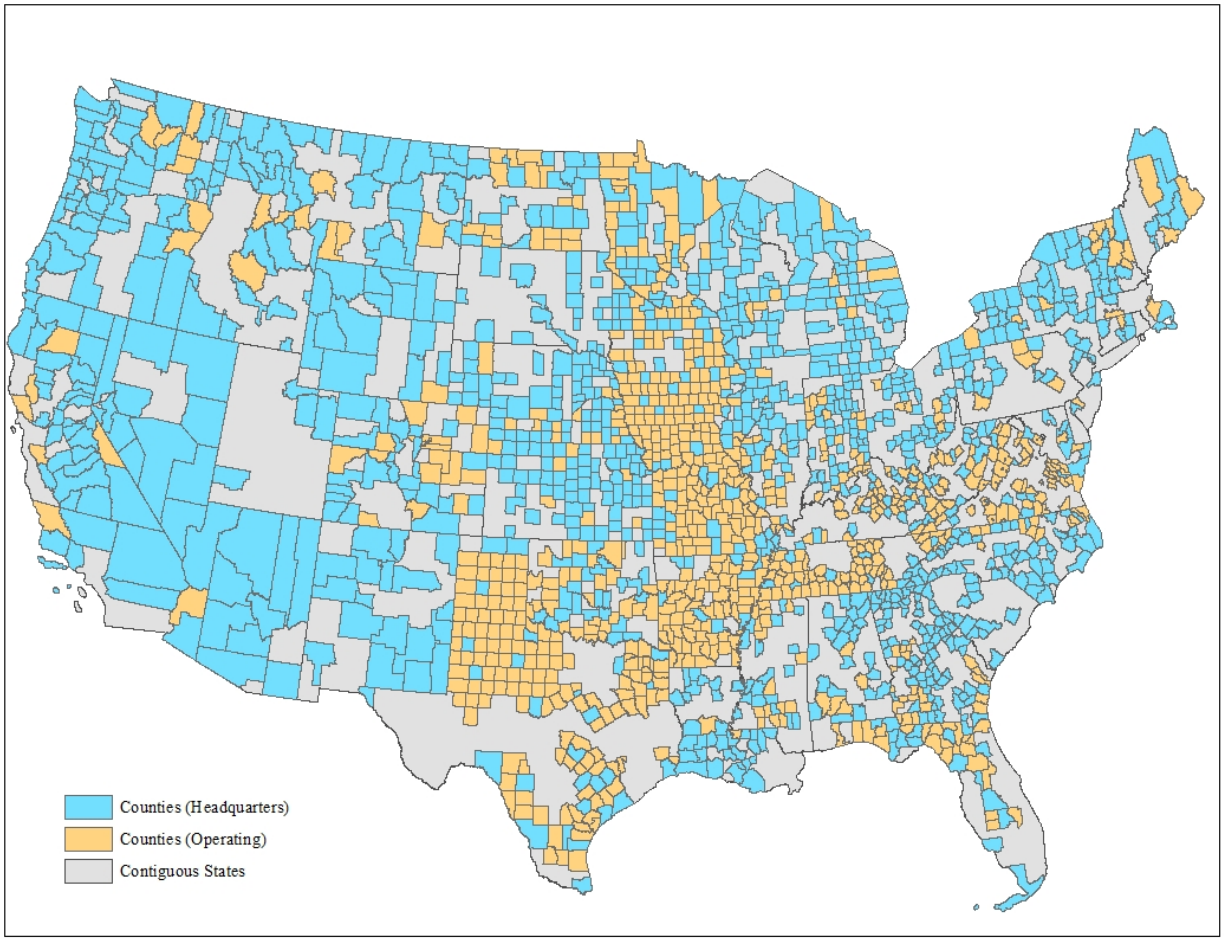
Notes: Prepared by WTI using the TIGER/Line with Selected Demographic and Economic Data product (U.S. Census Bureau, 2014-2018).

Figure 2. Urbanized Areas Across the Contiguous States.

In addition to examining non-urbanized areas, we also compiled the counties in which rural and Tribal transit agencies are headquartered and operate (**Figure 3**).[2] Out of the 3,220 total U.S. counties, 3,108 are located in the contiguous states; of these, 2,495 counties include the headquarters of one or more rural or Tribal transit agencies and 2,940 have one or more rural or Tribal transit agencies operating within the county boundaries. There are a total of 91,064,662 households in the counties in which one or more rural or Tribal transit agencies are headquartered, and 103,878,504 households in the counties in which one or more rural or Tribal transit agencies operate. Because portions of these counties include urbanized areas (which have boundaries that often overlap with multiple counties and state boundaries), apportionment of the county populations into urbanized and non-urbanized categories may be inexact. As a result, we chose to focus our national estimate (**Table 2**) based on the total households in non-urbanized areas, but we identified the counties in which rural and Tribal transit agencies are headquartered

[2] While the NTD list of agencies provided the location of agency headquarters, we manually compiled via web searches all of the counties in which rural and Tribal transit agencies operate.

and/or operate in the webmap accompanying this report, along with the estimates for total households in each county, for those interested in further analysis.



Notes: Prepared by WTI using information about the location of transit agencies from the National Transit Database contained in the GTFS NTM Agencies file from the BTS Open Data Catalog (Bureau of Transportation Statistics, 2021) and the TIGER/Line with Selected Demographic and Economic Data product (U.S. Census Bureau, 2014-2018). The list of counties in which rural and Tribal transit agencies operate was based upon manual web searches, and includes (overlaps with) all of the counties in which rural and Tribal transit agencies are headquartered.

Figure 3. Counties in which Rural or Tribal Transit Agencies Are Headquartered or Operate

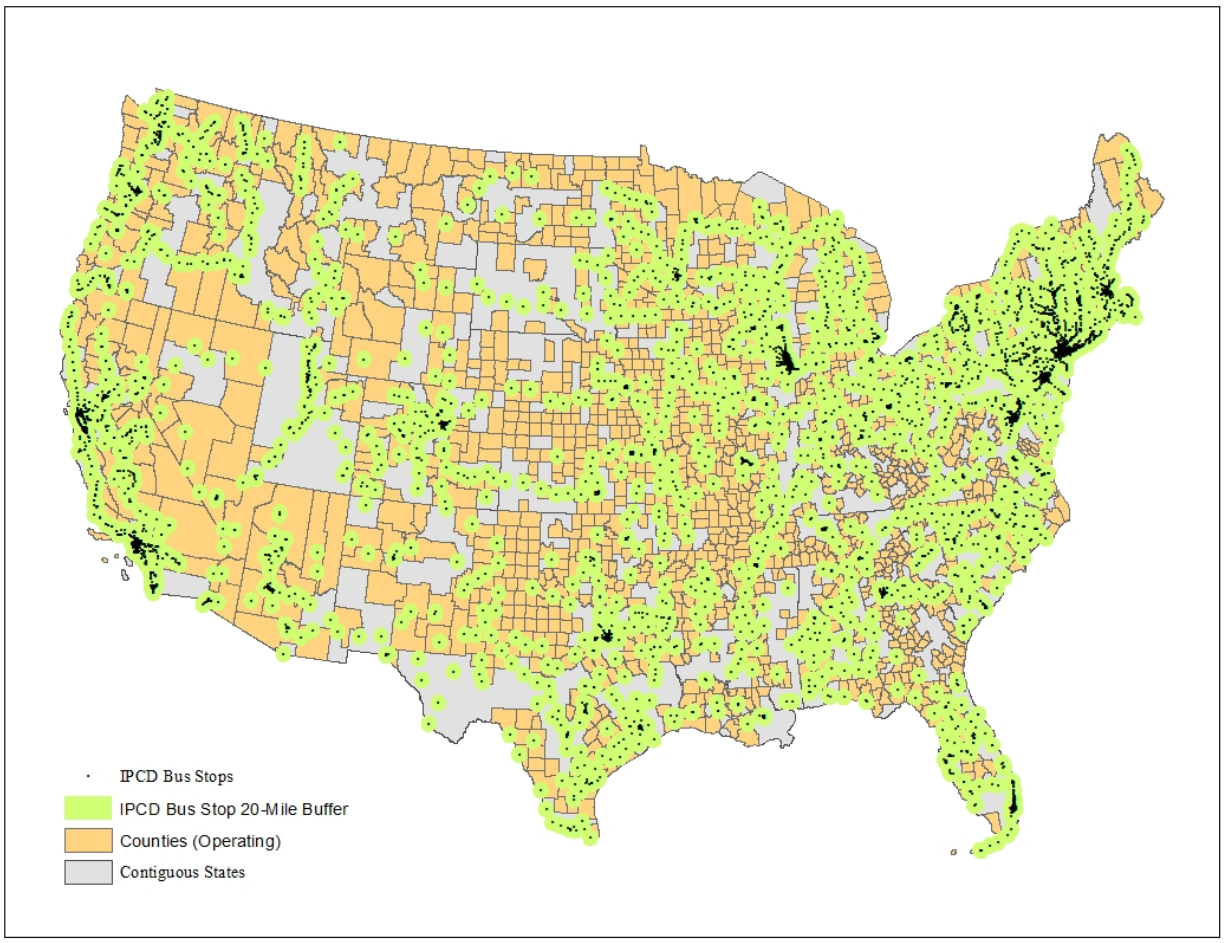
Finally, we used the intercity bus stop location information in the Intermodal Passenger Connectivity Database (Bureau of Transportation Statistics, 2020) to identify rural and Tribal transit agencies with the greatest potential for package delivery partnerships with the intercity bus industry. We chose proximity buffers of 5 and 20 miles as reasonable for this purpose. The webmap accompanying this report identifies the intercity bus stop locations and buffers. **Table 3** provides a tabulation by state of the number of rural and Tribal transit agencies in relatively close proximity to intercity bus stop locations. The number of agencies per state ranges from as low as one (for Connecticut, with only a single rural or Tribal transit agency within 5 miles of an intercity bus stop) to as many as 56 (for Michigan, based upon the 20-mile buffer). **Figure 4**

presents in map form the locations of intercity bus stops across the contiguous states, along with the 20-mile buffer around each stop, and the counties in which rural and Tribal transit agencies operate.

Table 3. Tabulation by State of Rural and Tribal Transit Agencies within 5- and 20-miles of Intercity Bus Stops

State	5 Miles	20 Miles	State	5 Miles	20 Miles
Alabama	10	15	North Carolina	15	44
Arkansas	5	8	North Dakota	8	10
Arizona	13	18	Nebraska	13	29
California	24	49	New Hampshire	6	6
Colorado	17	27	New Jersey	1	6
Connecticut	1	5	New Mexico	11	20
Florida	5	14	Nevada	11	13
Georgia	8	44	New York	28	40
Iowa	18	19	Ohio	10	33
Idaho	5	14	Oklahoma	2	15
Illinois	21	33	Oregon	19	30
Indiana	15	41	Pennsylvania	9	13
Kansas	22	47	South Carolina	3	11
Kentucky	6	12	South Dakota	9	13
Louisiana	4	19	Tennessee	3	7
Massachusetts	3	4	Texas	17	22
Maryland	3	5	Utah	3	4
Maine	7	10	Virginia	5	12
Michigan	28	56	Vermont	8	11
Minnesota	19	38	Washington	18	33
Missouri	4	17	Wisconsin	20	44
Mississippi	7	12	West Virginia	4	7
Montana	18	24	Wyoming	14	16
			Totals	263	531

Notes: Prepared by WTI using the National Transit Database (Federal Transit Administration, 2019a), Intermodal Passenger Connectivity Database, and web searches to identify counties in which rural and Tribal transit agencies operate. We used the distance between transit agency headquarters and the intercity bus stop locations for the purposes of this calculation.



Notes: Prepared by WTI using information about the location of transit agencies from the National Transit Database contained in the GTFS NTM Agencies file from the BTS Open Data Catalog (Bureau of Transportation Statistics, 2021) and the TIGER/Line with Selected Demographic and Economic Data product (U.S. Census Bureau, 2014-2018), as well as the Intermodal Passenger Connectivity Database (Bureau of Transportation Statistics, 2020). Counties (Operating) based upon our manual web searches for all counties in which rural and Tribal transit agencies operate.

Figure 4. Location of Intercity Bus Stops Across the Contiguous States in Relation to the Counties in Which Rural and Tribal Transit Agencies Operate.

4. Conclusions

This study provided an opportunity to generate a national estimate of the market potential for last mile package delivery via public transportation in rural areas and on Tribal Lands, and to compile information for rural and Tribal transit agencies interested in pursuing package delivery as a source of revenue. This topic was first studied by WTI five years ago in relation to the State of Wyoming (Clouser & Chaudhari, 2017) and then examined in relation to Texas (Edrington et al., 2017; Elgart et al., 2019) and most recently the Boston area (Crepy, 2020). Converging trends regarding increasing demand for package deliveries, declining public transportation revenues, and technological advancements in delivery logistics support renewed consideration of the potential for mutual benefits for rural and Tribal transit agencies, residents of rural areas and Tribal Lands, and private partners of package delivery partnerships.

The results of this study are generally consistent with the emerging consensus from prior research that: 1) package delivery may provide a new, and in some cases significant, source of revenue for transit agencies; 2) residents and delivery customers may benefit from lower costs, reduced pollution and congestion, and greater delivery service choice; 3) parcel carriers may benefit from lower costs, and in the specific case of intercity bus companies increased ridership as well; 4) a variety of factors may pose challenges for successful implementation of these services and require context-specific awareness and adaptation. We reviewed the policy and regulatory contexts, including interpretation of "incidental use" and what is commonly referred to as "the Charter Rule" as well as additional considerations, such as insurance, new training requirements, and safe handling and storage of packages. In addition, we summarized the latest technological developments in package delivery logistics and found locker-based delivery to be especially promising for transit participation in package delivery.

Our empirical estimation of the national market potential indicates that the 23,029,572 non-urbanized area households in the contiguous states may generate an annual package and shipping volume by mail of 875,123,736 pieces. Using a conservative revenue level of $3.30 per package, we estimate this could generate at least $2,887,908,328.80 in total revenue. If rural and Tribal transit agencies could partner to share in at least a small share of this revenue, it could serve as a significant supplemental source. For example, across the contiguous states, 1% of this revenue would represent $28,879,083.29 for rural and Tribal transit agencies.

We also compiled information on the counties in which rural and Tribal transit agencies are headquartered and operate and analyzed intercity bus stop locations in relation to rural and Tribal transit agencies. This information could serve as the foundation for further market potential estimation, given intercity bus package volume data. We hope this study serves as a useful contribution to the knowledge base surrounding transit agency partnerships for package delivery services and encourage readers to view the interactive webmap accompanying this report.[3]

[3] The interactive webmap may be accessed from the project webpage, located at: https://westerntransportationinstitute.org/research_projects/commercial-package-delivery-through-public-transportation-systems-in-rural-states/.

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