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Revitalizing Rural Transit: Transit Analysis and Recommendations for Siskiyou County, California

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Revitalizing Rural Transit

Transit Analysis and Recommendations
for Siskiyou County, California

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Client: Siskiyou County Local Transportation Commission

June 2024

Disclaimer: This report was prepared in partial fulfillment of the requirements for the Master in Urban and Regional Planning degree in the Department of Urban Planning at the University of California, Los Angeles. It was prepared at the direction of the Department and of the Siskiyou County Local Transportation Commission as a planning client. The views expressed herein are those of the authors and not necessarily those of the Department, the UCLA Luskin School of Public Affairs, UCLA as a whole, or the client.

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Executive Summary

This client project aims to provide actionable recommendations for improving public transportation in Siskiyou County by leveraging data analytics, case studies, and innovative transportation models. The primary focus is on developing strategies to increase ridership, optimize route coverage, and enhance overall system efficiency while considering the unique challenges of provisioning rural transit.

The project employs a multi-faceted approach, including quantitative data analysis using LODES, Google Maps POI, and STAGE transit data, a comprehensive literature review of case studies highlighting successful rural transit initiatives, and an assessment of the current transit system's accessibility and connectivity to key points of interest. Semi-structured interviews with local planners, city officials, and transit professionals provide valuable insights into the current state of transit and inform the subsequent recommendations.

The access analysis reveals varying levels of transit accessibility for different points of interest, with significant gaps in coverage for lodging, tourist attractions, home locations, and work locations. The routing analysis proposes strategic interventions, such as a South County Hub-and-Spoke System, Siskiyou Seasonal Explorer Programs, partnered and subsidized rideshare, and community engagement initiatives.

The project identifies numerous grant funding opportunities that Siskiyou County can pursue to support the implementation of the proposed transit enhancements, including the FTA Section 5311 Formula Grants for Rural Areas, the Caltrans Sustainable Transportation Planning Grant Program, and the California State Transportation Agency Transit and Intercity Rail Capital Program, among others.

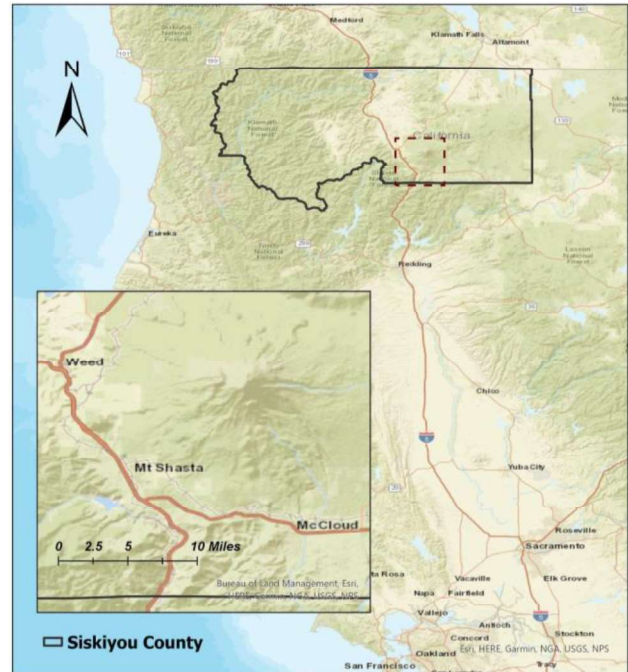
By implementing these data-driven recommendations and leveraging the identified funding opportunities, Siskiyou County can create a more efficient, accessible, and user-friendly public transportation system that effectively meets the needs of its residents and visitors, ultimately enhancing mobility, supporting economic development, and improving the overall quality of life for its communities.

I. Introduction

Background

Siskiyou County is a rural county in Northern California with a population of approximately 44,000 people, and a land area of 6,347 square miles (70 miles north to south). The county is known for its scenic and diverse geography, including the Klamath Mountains, Cascade Range, and most notably, Mount Shasta. The county's economy is primarily driven by agriculture, forestry, and tourism, with the population spread across several small cities and unincorporated communities.

Siskiyou County's demographic profile skews older, with a median age of 47.2 years, compared to the California median of 36.5 years (U.S. Census Bureau, 2022). This aging population presents unique challenges for the public transit system, as older residents may have increased mobility needs and a greater reliance on public transportation. The county experiences hot, dry summers and cold, wet winters, with higher elevations receiving significant snowfall during the winter months.



The county's public transit system faces significant challenges due to its large land area, extreme weather conditions, limited financial resources, and the diverse needs of both long-time residents and tourists, particularly those in South County cities such as Dunsmuir, Mt. Shasta, and McCloud. The vast distances between communities and the dispersed population make it difficult to provide efficient and cost-effective transit services, while the county's limited financial resources constrain the ability to invest in and expand the public transit system.

Despite these challenges, Siskiyou County recognizes the importance of providing accessible and reliable public transportation to its residents and visitors. The county's transit system, operated by the Siskiyou Transit and General Express (STAGE), offers

weekday fixed-route services along the I-5 corridor to connect communities and provide access to essential services, such as healthcare, education, and employment opportunities.

Research Question

This project aims to provide actionable recommendations for improving public transportation in Siskiyou County by leveraging data analytics, case studies, and innovative transportation models. The primary focus is on developing strategies to increase ridership across key groups, optimize route coverage, and enhance the overall system efficiency while considering the unique challenges of provisioning rural transit. The central research question driving this analysis is: *How can rural municipalities like Siskiyou County utilize data-driven insights, best practices from successful case studies, and innovative transportation models to improve mobility, accessibility, and overall transit service quality for both residents and tourists?*

City	Population	Median Age	Median Household Income	Med. Commute Time (min)	Cars per Household	Top Industries
Dunsmuir	1,826	37.3	\$39,737	18.2	2	1. Office & Administrative Support, 2. Management Occupations, 3. Healthcare Support
McCloud	870	52.8	\$41,950	18.8	2	1. Accommodation & Food Services, 2. Health Care & Social Assistance, 3. Agriculture, Forestry, Fishing & Hunting
Mt. Shasta	3,247	58.7	\$45,020	14.2	2	1. Health Care & Social Assistance, 2. Retail Trade, 3. Professional, Scientific, & Technical Services
Weed	2,870	41.7	\$28,857	18.9	2	1. Manufacturing, 2. Health Care & Social Assistance, 3. Accommodation & Food Services
Yreka	7,807	35.6	\$44,444	14.3	2	1. Health Care & Social Assistance, 2. Public Administration, 3. Accommodation & Food Services

data.io (2021)

To address this question, this project will:

- Conduct an in-depth analysis of the current challenges faced by Siskiyou County's transit system, including:
 - Examining factors contributing to low ridership levels and underutilization of transit services
 - Assessing the impact of extreme weather conditions and climate on transit operations and ridership
 - Evaluating the limitations of the current route coverage and its effect on accessibility for residents and tourists
 - Identifying the specific needs and challenges of key demographic groups, such as commuters, students, the elderly, and visitors

- Employ a multi-faceted approach to analyze these challenges, incorporating:
 - Quantitative data analysis using LODES, Google Maps POI, and STAGE transit data to identify trends, patterns, and areas for improvement in the current transit system
 - A comprehensive literature review of case studies highlighting successful rural transit initiatives to identify best practices and potential solutions that can be adapted to Siskiyou County's context
 - An assessment of the current transit system's accessibility and connectivity to key points of interest, including employment centers, medical facilities, educational institutions, and tourist attractions
- Develop a comprehensive set of data-driven recommendations for revitalizing Siskiyou County's rural public transit system, with an emphasis on:
 - Exploring route optimization techniques to enhance service coverage and accessibility, particularly for underserved areas and popular destinations
 - Proposing innovative approaches to increase ridership
 - Identifying strategies for enhancing operational efficiency and cost-effectiveness
 - Locating potential funding sources to support the implementation of proposed recommendations

By addressing these key points, this project seeks to provide Siskiyou County with actionable recommendations for revitalizing its rural public transit system and providing a more efficient, accessible, and user-friendly service.

II. Qualitative Methods

Literature Review

A comprehensive literature review was conducted to examine the current state of academic and non-academic literature on rural transit, with a focus on funding, ridership, and accessibility. The review also included an analysis of case studies documenting successful rural transit improvement projects and an exploration of potential grant funding opportunities. The literature was sourced from various databases and resources, with the RTAP Resource Library proving particularly valuable in providing recent and relevant literature specific to rural America. The literature review aimed to establish a solid foundation for understanding the challenges and opportunities associated with rural transit systems.

Interview Methodology

Semi-structured interviews were conducted with local planners, city officials (including mayors and city managers), and transit professionals from various Siskiyou County organizations to gain insights into the current state of transit. Interview questions were tailored to each interviewee's area of expertise, allowing for an open and candid discussion about their work, the challenges faced by the transit system, and their aspirations for the future. To encourage genuine and honest dialogue, interviews were not recorded or directly transcribed; instead, major themes and points of discussion were documented throughout each interview. The data collected from these interviews were used to inform and guide the subsequent recommendations for grant funding, projects, and routing improvements. This qualitative approach aimed to provide a comprehensive understanding of the local transit landscape and to ensure that the recommendations were grounded in the experiences and expertise of key stakeholders.

III. Literature Review

This literature review examines strategies to enhance rural public transportation in Siskiyou County, focusing on funding, ridership, local transportation case studies, and strategic planning.

1. Funding and Farebox Recovery

Funding and farebox recovery are critical issues for rural transit agencies. The UCLA Institute of Transportation Studies' critique of the Transportation Development Act (TDA) in California highlights the limitations of focusing solely on farebox recovery as a performance metric (Gahbauer et al., 2021). The study suggests that this narrow focus can discourage initiatives to increase ridership and improve service quality. Instead, the authors propose a comprehensive suite of performance metrics, including service accessibility, customer satisfaction, operational efficiency, service reliability, safety and security, environmental impact, and innovation and adaptation.

Ripplinger (2012) also emphasizes the distinct economic, policy, and administrative challenges faced by rural transit systems, underlining the need for innovative funding solutions tailored to the unique needs of rural communities. The study highlights the significant increase in federal funding for rural transit from 2001 to 2011, and subsequent scrutiny over efficiency and funding levels. It provides economic justifications for government involvement in rural transit and emphasizes the critical role of states in managing federal programs. For Siskiyou County, this suggests the importance of leveraging state and federal funding opportunities, while also exploring local partnerships and revenue sources to support transit services.

2. Ridership

In a 2007 report, the National Academies of Sciences, Engineering, and Mathematics examine effective strategies for enhancing transit ridership, emphasizing a blend of internal and external approaches. The report advocates for transit agencies to refine their service design, develop strategic marketing campaigns, and optimize pricing structures to actively stimulate ridership growth. These internal strategies are critical for making public transportation more appealing and accessible to potential users.

However, the report identifies several external factors which can impact transit demand even more profoundly. These include economic conditions, which influence public transportation usage rates during times of economic growth or recession; the availability of alternative transportation modes, such as biking, ridesharing, or driving; and land-use patterns, which affect the density and distribution of work, home, and leisure spaces.

3. Local Transportation Case Studies

3.1 Victor Valley, California

In 2016, the Victor Valley Transit Authority (VVTA) launched the Route 200 Needles Link service to connect the remote city of Needles with Barstow and Victorville in San Bernardino County, California. This service was specifically designed to assist transit-dependent residents of Needles in accessing court hearings, coordinating with the court system to schedule Needles residents' appointments exclusively on Fridays—the same day the service operates. The introduction of the Needles Link has been positively received by the community, and there are ongoing discussions about potential expansion to meet growing demand. This initiative showcases a targeted approach and consolidating demand to address specific transportation needs within a rural community.

3.2 Lake County, California

The Lake Transit Authority (LTA) in Lake County, California (population of approximately 65,000) operates a comprehensive public transit system that includes fixed-route buses, dial-a-ride services, and a community college shuttle bus. The LTA has focused on improving accessibility and mobility for its residents, particularly seniors, individuals with disabilities, and low-income populations. The agency has implemented innovative strategies such as a volunteer driver program, which provides mileage reimbursement for approved volunteer drivers who transport seniors and individuals with disabilities to medical appointments and other essential services (LTA, 2021).

3.3 Nelson, British Columbia, Canada

Nelson, a small city in B.C., with a population of 10,000, implemented a successful rural paratransit system called the "Nelson and Area Transit System" (NATS) (Plazinic & Jovic, 2019). The system combines fixed-route and demand-responsive services

particularly for seniors and individuals with disabilities. Key strategies include 1) flexible routing and demand-responsive services that adapt to the diverse mobility needs of rural residents, 2) strong community partnerships with local organizations, healthcare providers, and senior centers, and 3) a focus on understanding and responding to local needs through ongoing community engagement and outreach.

3.4 Kalispell, Montana

Kalispell, a city with a population of 25,000, implemented a successful demand-response transit system called Mountain Climber/Eagle Transit (KFH Group, 2018). The system serves seniors, individuals with disabilities, and the general public, and has achieved success through strong partnerships with local organizations, such as senior centers, healthcare providers, and human service agencies, a diversified funding mix, including federal, state, and local sources, as well as fare revenues and contracts with partner organizations, the use of advanced scheduling and dispatch software to optimize operations and improve service quality, and a focus on providing affordable and reliable transportation to essential services, such as healthcare and shopping.

3.5 Allendale County, South Carolina

Allendale County, a rural county with a population of 9,000, implemented a fixed-route transit system called the Allendale County Scooter (Smalls, 2014). Despite challenges such as limited funding, low population density, and high levels of poverty, the system has succeeded through strong community partnerships with local organizations, businesses, and faith-based groups, creative funding strategies, including grants, local contributions, and partnerships with employers, a focus on providing access to essential services, such as healthcare, education, and employment opportunities, and ongoing community engagement and outreach to build support for the system and identify unmet needs.

3.6 Huron County, Ontario, Canada

Huron County, a rural county with a population of 60,000, implemented a community transportation pilot program focused on the needs of seniors and individuals with disabilities (Marr, 2015). The program used a combined fixed-route and demand-responsive service model and achieved success through a thorough needs assessment that engaged the community and identified key transportation gaps and priorities, collaboration with local partners, including healthcare providers, senior centers, and disability organizations, flexible and affordable service options that responded to the diverse needs of intercity routes that connect rural communities to larger towns and transportation hubs, coordination with neighboring transit systems to provide seamless connections and transfer options, integration with active transportation modes, such as

bicycling and walking, through bike racks on buses and bus stops located near trails and pedestrian facilities, and partnerships with local tribes, social service agencies, and healthcare providers to identify and serve the transportation needs of specific populations.

3.8 Laramie, Wyoming

Laramie, Wyoming, is a small city with a population of approximately 32,000, home to the University of Wyoming and a growing tourism industry (Saha & Shinstine, 2015). The city's transit system has implemented several strategies to enhance transit services and meet the needs of both residents and visitors, including a comprehensive analysis of the existing bus transit network, identifying inefficiencies and opportunities for improvement, such as closing underutilized stops and redesigning routes to increase efficiency and ridership, proposing a new loop route to increase ridership without adding buses, exploring partnerships with local businesses and organizations to promote transit services and increase ridership among visitors and tourists, and investing in technology solutions, such as automatic vehicle location systems and passenger information displays, to improve the reliability and accessibility of transit services.

4. Tourism and Transit

Daigle (2008) explores the relationship between transit and tourism in rural areas, highlighting the importance of integrating transit planning with tourism development strategies. The study emphasizes the need for collaboration between transit agencies, tourism boards, and local businesses to develop services that meet the needs of visitors, such as shuttle services to popular attractions, seasonal routes, and integrated ticketing and information systems.

Kline, Cardenas, Viren, and Swanson (2015) examine the factors that influence tourist satisfaction with transit services in rural areas, based on a case study of the Island Explorer system in Acadia National Park, Maine. The study finds that factors such as frequency of service, ease of use, and quality of information are key drivers of tourist satisfaction with transit. The authors also highlight the importance of marketing and outreach efforts to promote transit services to visitors, as well as the need for ongoing evaluation and improvement based on visitor feedback. For Siskiyou County, this highlights the importance of designing transit services that are easy to use and understand for visitors, as well as investing in marketing and outreach efforts to promote transit options to tourists.

5. Vision and Strategy Development

Developing a successful rural transit system begins with a comprehensive strategy, as detailed in the Rural Transit Assistance Program (RTAP) guide, *Getting Started*:

Creating a Vision & Strategy for Rural Transit (2022). The process first starts by engaging a broad array of community stakeholders, including local businesses, healthcare providers, and educators, to ensure diverse needs are considered. Then, a steering committee of dedicated local leaders guides the project, prioritizing thorough community engagement to map out current and future transportation needs through surveys and data analysis. This phase also involves identifying available resources, such as existing infrastructure and potential funding sources, to support the initiative. With these elements in place, the committee can then craft a strategic plan that sets clear, actionable goals and regularly updates these objectives to adapt to evolving community needs. The guide asserts that this methodical approach ensures the transit system remains robust, adaptable, and well-supported by the community.

This literature review highlights significant aspects of improving rural transit systems, such as innovative funding mechanisms, targeted strategies to boost ridership, and the importance of comprehensive planning. These strategies will be essential for Siskiyou County to develop an efficient and sustainable transportation system that addresses the current and future needs of both visitors and residents.

IV. Interview Findings

1. Weather and Climate

Weather was consistently listed as the top factor impacting ridership. The planner, city manager and transit operator (STAGE) all emphasized the extreme weather conditions, particularly snow in the winter months and heat/fire in the summer. The transit operator is looking into utilizing more buses and emergency funding to help community members evacuate in summer wildfires. The transit operator also mentioned challenges with the implementation of EVs, given Siskiyou's heavy snowfall and routes of about 200 mi on average - making both electric and hydrogen buses difficult to implement. They estimated they would need to double their fleet (and workers) in order to accommodate these zero emission buses.

2. Ridership

Current ridership spans across several key groups. All interviewees (Planner, City Manager, Mayor, and Transit Operator) emphasized south-north commuters along I-5, with the south county cities of Dunsmuir, McCloud, Mt. Shasta, and Weed serving as bedroom cities for Yreka. Tourism was a consistently mentioned theme, particularly in the warmer months when there are hikers from the Pacific Crest Trail. This group has been such a key block (presumably because they are traveling without vehicles, and comfortable walking long distances) that STAGE has successfully added extensions in

Castella and Etna to accommodate these hikers for the past 4 years. The transit operator also mentioned high school and college student commuters, the elderly, and unhoused community members as frequent riders. The phenomenon of “aging in place” was mentioned by the Planner and Mayor, with many residents having few financial options if they did choose to relocate out of Siskiyou County.

3. Recreation and Tourism

Seasonal routes were mentioned by each interviewee, with a winter emphasis on skiing and snow sports (Mt. Shasta and McCloud) and a summer emphasis on hiking and water-based activities (Lake Siskiyou, South County Local Travel, Campgrounds, PCT Connections). Connections to the Mt. Shasta Ski Park were especially emphasized. The possibility of public-private partnerships was brought up by the transit operator and city manager to meet this need.

4. System Accessibility

System accessibility and education were mentioned by the transit operator, mayor, and city manager. The mayor emphasized the importance of defining system users, surveying needs, building a strong customer base, and transit education - saying politics will be a major driver in Siskiyou’s transit quality. The city manager emphasized the importance of maintaining a consistent schedule, meeting community and budget needs, and advertising transit to the community - possibly using a third party to do so. The transit operator mentioned challenges staffing certain routes, but has been actively hiring and expanding to better accommodate early morning South-North commuters headed to Yreka. They also expressed a desire for more local travel systems, possibly loops with connections to I-5. The transit operator and mayor expressed a strong desire for cashless payment, with the mayor emphasizing its importance in easing the “transit anxiety” tourists may experience.

Key Takeaways and Recommendations

1. Ensure transit maps are digitally available and accessible. Pursue grant funding to upgrade payment systems and explore cashless options.
 - a. Will help in capturing tourists and easing “transit anxiety.”
2. Explore grant funding and scheduling possibilities for seasonal routes.
 - a. STAGE expressed successful projects to community pools, and local champions for a Lake Siskiyou Bus.
 - b. Connect these seasonal route programs to state and federal climate goals such as reduced vehicle travel, equitable access to parks and recreation, and local economic development.

3. Utilize climate/sustainability, safe routes to school, and aging/disability transportation funds to upgrade infrastructure and expand routes.
 - a. Extreme weather conditions impact ridership, making upgrades to bus/stop infrastructure, free/reduced transit funding, and service expansion funding possibilities. Students and the elderly as key populations highlight this need.
4. Consolidate trips for ridership groups when possible.
 - a. While certain groups will be more difficult to capture, such as the elderly and seasonal/service workers, many travel patterns are fairly consistent across groups. Condensing trips for commuters (S-N Yreka commuters, students) and tourists (Ski Parks, Lakes/Campsites, Hikers) could be a way to potentially 1) provide more consistent and easily advertised routes 2) save on operating costs.
 - i. STAGE expressed that it is relatively easy to add new routes and stops *when there is capacity to do so*.

V. Quantitative Methods

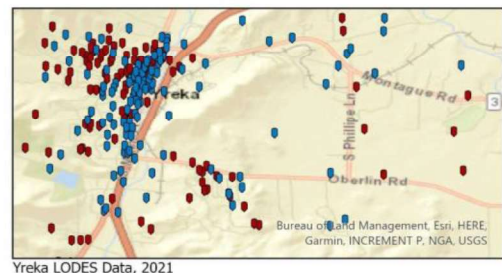
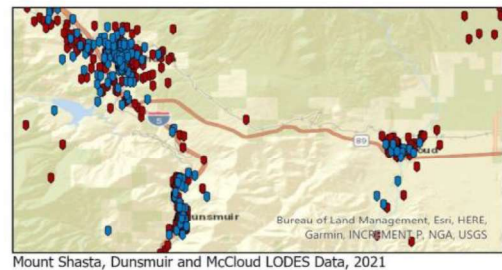
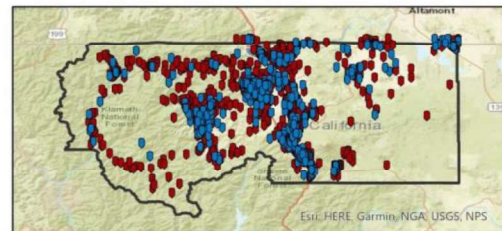
1. Data Acquisition

LODES Dataset

The data collection and preparation process for the Siskiyou County transit analysis began by accessing the U.S. Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) program website (<https://lehd.ces.census.gov/>). The LODES (LEHD Origin-Destination Employment Statistics) dataset for the state of California and 2021 (the most recent year data available as of Jan, 2024) was selected. Two specific datasets were chosen: the Workplace Area Characteristics (WAC) dataset, which provides information on employment patterns within Siskiyou County, and the Residence Area Characteristics (RAC) dataset, which

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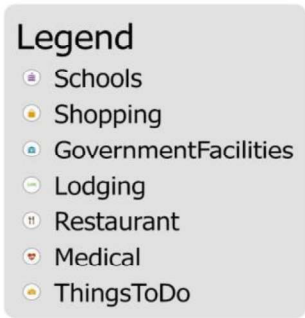
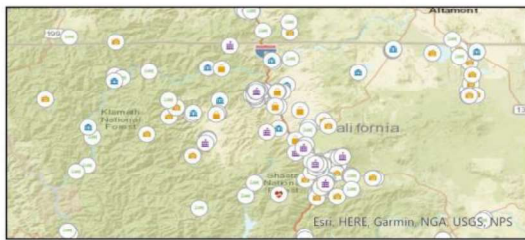
- workpoints_2021
- homepoints_2021
- Siskiyou County



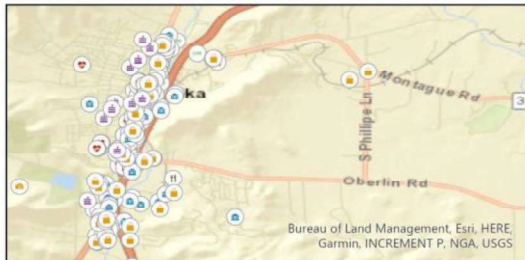
offers insights into residential distributions at the block level. These datasets were downloaded in CSV format and stored in a designated folder for further processing.

Google Maps POI Data

To supplement the LODES data, Octoparse, a web scraping tool, was utilized to extract points of interest (POIs) data from Google Maps. A new task was created in Octoparse, configured to search for specific POI categories, including (1) Schools, (2) Shopping, (3) Government Facilities, (4) Lodging, (5) Restaurants, (6) Medical Facilities, and (7) ‘Things to Do’ within Siskiyou County. The task was executed to automatically navigate Google Maps and scrape relevant POI data, including names, addresses, categories, and geographical coordinates. The scraped data was then exported from Octoparse in CSV format and saved in the same folder as the LODES datasets. Since the searches were conducted based on specific categories, the resulting POI data was automatically categorized, eliminating the need for manual categorization.



Mount Shasta, Dunsmuir and McCloud POI Data, 2024



Yreka POI Data, 2024



Mt. Shasta POI Data, 2024

STAGE Transit Data

To analyze the existing transit network, shapefiles of the STAGE transit lines were created using ArcGIS Pro. Stop locations were manually obtained from the STAGE route list and assigned coordinate points from Google Maps searches.

2. GIS (Geographic Information Systems) Integration

LODES Data

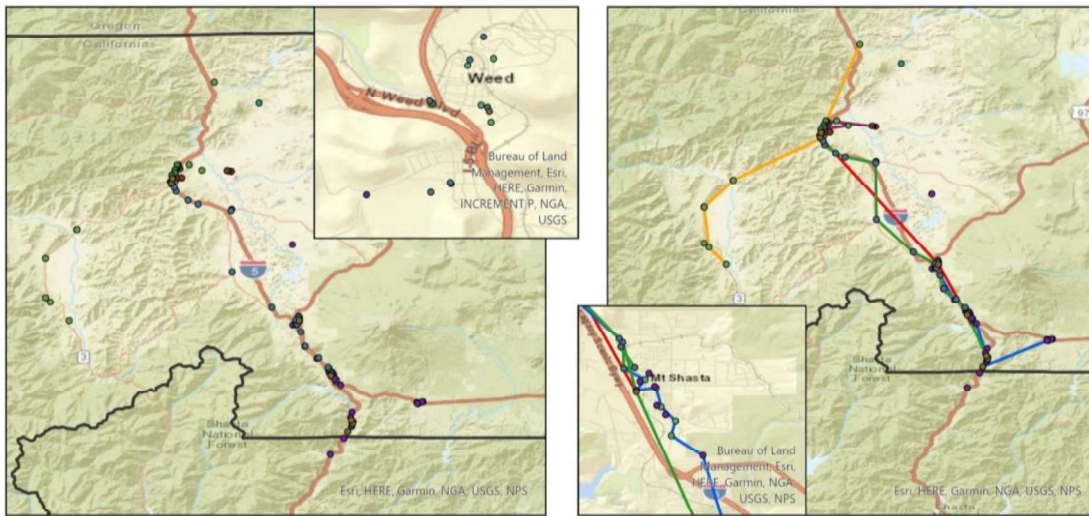
To integrate the cleaned data into a GIS-compatible format, the LODES files were downloaded as point-based shapefiles (.shp) from the LEHD website. These shapefiles contained the necessary spatial information, including coordinates and projections, making them ready for direct import into ArcGIS Pro.

POI Data

The Google Maps POI data, after being manually cleaned and converted to excel format, was imported into ArcGIS Pro, and the "XY to Point" tool was used to convert the various POI coordinates into point features.

STAGE Transit Data

Excel files containing STAGE transit stop names, routes, and coordinates were imported into GIS and converted into point shapefiles using the "XY to Point" tool.



Existing Stage Transit Stops and Point-to-Point routing for analysis purposes.



Then, bus line shapefiles were approximated using the “Point to Line” feature to connect the stops based on their Object ID (assigned order). Note: Bus *line shapefiles* stops were plotted directly point-to-point rather than along roadways, failing to gather certain route complexities, but largely capturing bus routing along existing roadways within a half-mile buffer.

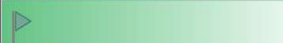








3. Layer Creation

This process resulted in the created of 3 distinct data groups: Points of Interest for both tourists and residents (schools, shopping, government facilities, lodging, restaurants, medical facilities, and things to do), LODES data (Siskiyou County work and home block locations), and STAGE transit data (bus stops and approximated bus routes.) This data was used to perform the following quantitative and quantitative analysis exercises detailed in the following sections.

VI. Access Analysis

To determine the approximate service area of STAGE transit lines (noting the limitations listed in section 5), a 0.5-mile buffer was generated around each stop and line using ArcGIS Pro. This buffer represents the area within a reasonable (~10 minute) walking distance from the transit stops (Untermann, 1984).

Using ArcGIS Pro’s Intersect function, the POI and LODES data points were then joined with the 0.5-mile transit buffer to determine the percentage of locations currently accessible via STAGE bus routes, and a reasonable walking distance for transit users.

	Total	Within 0.5 Mile Buffer	Accessible By Transit
Schools	36	27	 75%
Shopping	119	115	 97%
Government Facilities	87	72	 83%
Lodging	132	65	 49%
Restaurants	99	90	 91%
Medical Facilities	120	108	 90%
Things to Do	64	16	 25%
Home Locations	1822	697	 38%
Work Locations	601	320	 53%

The access analysis revealed varying levels of transit accessibility for different POI categories in Siskiyou County. Schools (75%), shopping centers (97%), government facilities (83%), restaurants (91%), and medical facilities (90%) showed high accessibility within the 0.5-mile buffer around STAGE transit lines. However, significant gaps were identified in transit coverage for lodging (49%), tourist attractions (“things to do”) (25%), home locations (38%), and work locations (53%).

These findings highlight the strengths and weaknesses of the current transit system. While many essential destinations like schools, shopping, and healthcare are well-served, the limited accessibility of lodging and tourist attractions may hinder tourist’s ability to utilize transit. Siskiyou's tourist destinations are primarily nature-based and situated in remote outdoor locations, which poses challenges for providing adequate transit services to these areas. To better serve the tourist population, targeted routes could be implemented by STAGE or another operator to directly connect visitors to these remote destinations, building upon the success of the existing Pacific Crest Trail (PCT) route extensions.

The low accessibility of home and work locations highlights the challenges faced by residents, especially the aging population and job seekers, in accessing services and employment. Expanding transit coverage in residential areas and connecting to key employment centers and services, such as medical and government facilities, could improve quality of life and economic opportunities for local residents.

VII. Routing Analysis

Existing Transit Accessibility:

- a. Dunsmuir:
 - Current Access: LODES (Longitudinal Employer-Household Dynamics) points and Points of Interest (POIs) are generally well-served by existing transit, indicating good coverage within the town center.
- b. Mt. Shasta:
 - Current Access: Coverage is less comprehensive, with only about 50% of LODES points and two-thirds of the POIs currently accessible by transit routes.
- c. McCloud:
 - Current Access: Approximately two-thirds of residential areas are accessible, though key attractions like mountain trailheads and ski parks remain outside the accessible areas, highlighting a gap in service to significant tourist destinations.

- d. Weed:
 - Current Access: While POIs are almost entirely accessible, only about half of the LODES points are within a 0.5 mile of transit stops.
- e. Yreka and Montague:
 - Current Access: Most areas are well-covered, though some homes in the northern regions are outside the effective service buffer, potentially isolating certain residents from essential services.

Proposed Strategic Interventions:

1. South County Hub-and-Spoke System

This system aims to improve connectivity by establishing a central transit hub in the city of Mt. Shasta, with strategic spoke routes connecting outwards to the surrounding communities of Yreka, Weed, Dunsmuir, and McCloud. This model draws upon the success of the Amador Transit model in Sutter Creek, CA, a rural Hub-and-Spoke System with routes that run twice daily.

Mt. Shasta is an ideal location for the central hub due to its centrality and role as a regional draw for both residents and tourists. The hub should be established in the downtown area, or adjacent to amenities (either public or private) such as Wi-Fi, food and beverage, shopping, and restrooms. This will better accommodate passengers during long wait times and allow for easier travel planning.



*Downtown Transit Hub in Juneau, Alaska,
Google Maps, 2023*

Infrastructure enhancements at the hub should include covered or enclosed waiting areas with seating, wayfinding devices such as maps and signage, bicycle/pedestrian infrastructure, and designated pick-up/drop-off zones for potential integration with ride-sharing services. Though the Downtown area is fairly dense already, and is within walking distance of existing transit stops, the pedestrian/transit infrastructure is not enough to motivate drivers to use transit. Situating a hub with benches, shade structures, and other amenities in a visible and accessible location will be key to enhancing ridership.

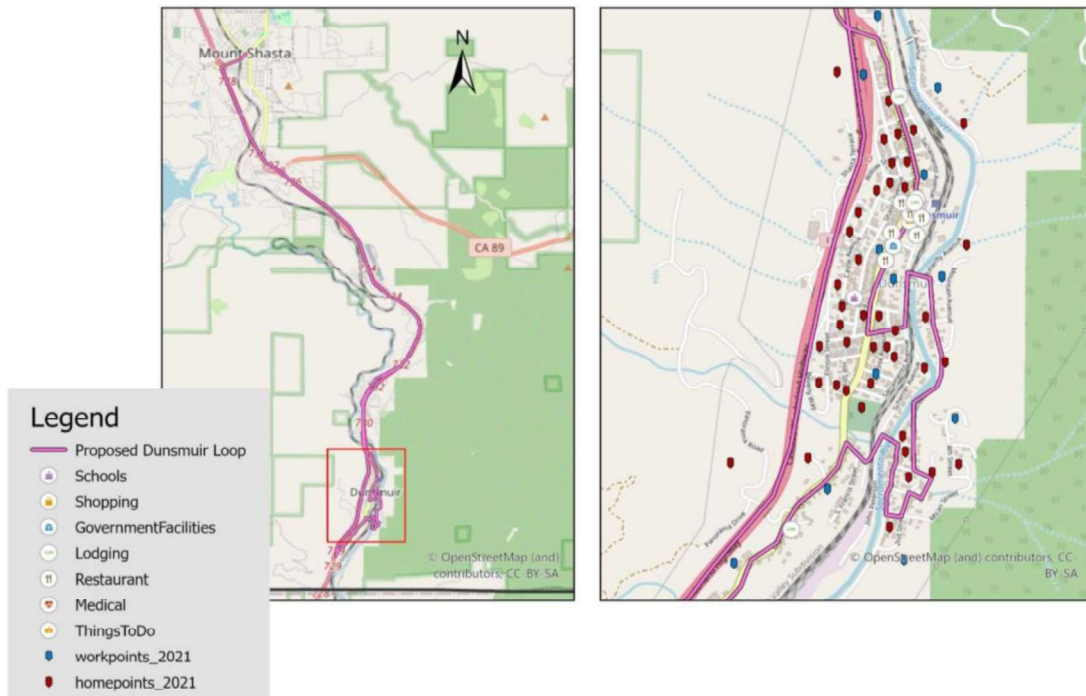


Rendering of what a potential Mt. Shasta Transit Hub could look like. This sample site is in front of the Mt. Shasta Police Station, features benches, trash cans, shelter, signage, and its adjacent to shops and local eateries. Rendering over Google Maps, 2024

The proposed spoke routes would connect Mt. Shasta to the following communities:

- **Yreka:** Implement a direct route with limited stops to reduce travel time from Yreka to Montague, Etna, and the Mount Shasta Hub.

- The county seat, Yreka, has a high concentration of services but struggles to meet the needs of its significant unhoused, aging, and low-income populations. With major improvements underway on the main SR-3 arterial, there is an opportunity to implement pedestrian infrastructure, enhance transit access, and encourage development. Key transit investments should provide accessible service to essential services, affordable housing projects, and leisure destinations to improve mobility and equity for underserved residents.
- **Weed:** Establish a route with stops at points of interest and educational institutions, such as College of the Siskiyou, that connects to the Yreka and Mount Shasta Hubs.
 - Weed, like Yreka, has a significant low-income population and notable Black, Asian, and Native communities, reflecting historical equity concerns. To improve accessibility, key recommended transit stops include College of the Siskiyou, Ray's Market, City Hall, Siskiyou County Food Assistance (Davis Blvd.), Weed High School, and ideally routes serving the Lake Shastina community, as advised by Commissioner Susan Tavalero of the Local Transportation Commission. Prioritizing these locations will help ensure transit serves the needs of disadvantaged residents and connects Weed to surrounding communities.
- **Dunsmuir:** Create a route that serves both the downtown and recreational areas.

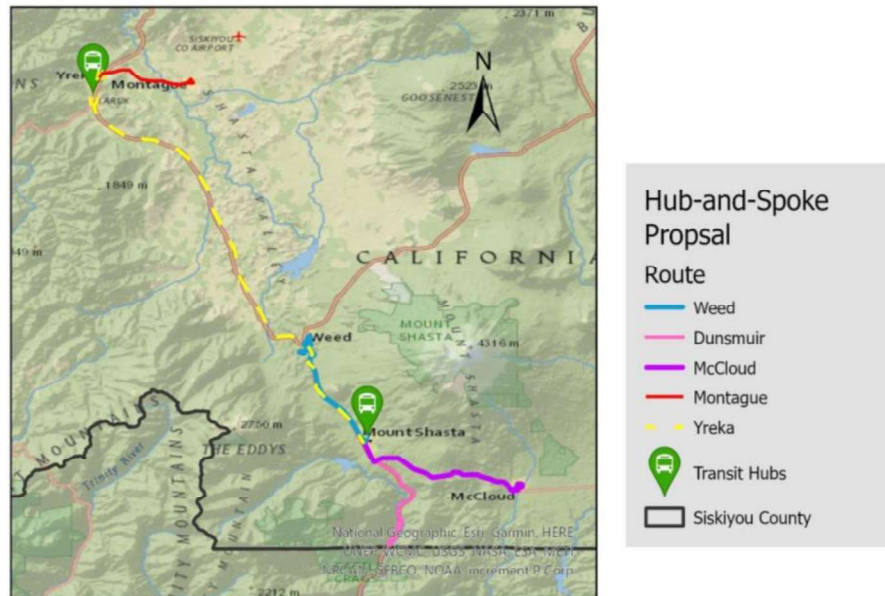


- Dunsmuir, a compact town served by Amtrak, albeit at inconvenient hours, holds a charming downtown main street that appeals to both locals and visitors. Transit planning should focus on connecting Dunsmuir's downtown to key destinations like Mount Shasta and Yreka, while also ensuring that elderly residents in the more sprawling neighborhoods beyond downtown have reliable access to transportation services. This could potentially occur through ADA transportation programs, enabling aging residents to reach essential amenities and maintain their independence. Ideally, transit should provide convenient connections to popular outdoor recreation spots such as Hedge Creek Falls within Dunsmuir and the nearby Pacific Crest Trailhead in Castella.
 - This sample route for Dunsmuir Begins up near the Cedar Lodge Motel and Hedge Creek Falls area, runs down Dunsmuir Avenue through Downtown Dunsmuir, and over to Butterfly Avenue East of the Sacramento River. It then runs South to Mican Street, and back up South 1st Street. The route could then run South to the Dunsmuir Railroad Park Resort (likely an on-call stop) and would finish by traveling back north to the proposed Mt. Shasta Transit Center. This route covers both tourist (access to shops, restaurants and natural attractions) and resident (work/medical travel, efficiency, and neighborhood access) needs.
- McCloud: Develop a route that connects residential and recreational areas to the hub and other essential services.
 - McCloud, a historic logging town near Mount Shasta, could benefit from a transit route connecting its residential areas to job centers, schools, and recreation in neighboring communities via the Mount Shasta Hub. Seasonal transit connections to *Sample spoke route for Dunsmuir, CA* popular outdoor destinations like the McCloud River Waterfalls could be greatly beneficial in enhancing access to nature and supporting local tourism.

To optimize efficiency and reduce operational costs, these spoke routes should be designed to consolidate demand during peak school and work commuter times, and ideally, the travel patterns of other transit riders. This may include medical appointments, recreation and hospitality workers, and tourists.

To ensure seamless connectivity, the South County Hub-and-Spoke System should collaborate with regional transit agencies to coordinate schedules, offer combined ticketing options, and provide clear information on transfer points.

A comprehensive marketing and outreach campaign should be developed to promote the benefits of the hub-and-spoke system to the community, highlighting convenience, cost savings, and environmental benefits. Partnering with local employers and institutions to encourage transit use among employees and students, as well as offering incentives such as discounted fares or loyalty programs, can further boost ridership.



2. Siskiyou Seasonal Explorer Programs:

In addition to the South County Hub-and-Spoke System, Siskiyou County should consider implementing ‘Seasonal Explorer Programs’ to enhance transit options for tourists and support the local industry. The routes would operate during peak tourist seasons, aligning with local events and popular travel times. By providing convenient access to natural and recreational sites, these routes would encourage visitors to use public transportation, reducing traffic congestion and parking issues at popular destinations.

The Siskiyou Seasonal Explorer Programs could include two main types of routes:

1. **Tourist Destination Loops:** These routes would capture multiple tourist destinations in a single loop, operating 2-3 times per day.

2. **Specialty Trips:** These routes would focus on providing park-and-ride services to high-traffic destinations, operating 1-2 times per day. For instance, a specialty trip could be designed to transport visitors from a designated parking area directly to the Mt. Shasta Ski Park or Lake Siskiyou during peak season. Ideally, these lots would connect with transit routes and hubs along the hub-and-spoke system.

To ensure the success of the Siskiyou Seasonal Explorer Programs, the County should collaborate with local tourism boards and leverage existing local champions in government, the private sector, and the tourism industry. These partnerships can help effectively market seasonal routes to potential visitors using platforms that tourists frequently consult, such as travel blogs, hotel booking sites, and visitor centers.

Marketing efforts should highlight the convenience, cost savings, and environmental benefits of using the seasonal routes, as well as the opportunity to explore Siskiyou County's natural beauty without the stress of driving and parking.

Promotional materials should be made available at key tourist entry points, including train and (intercity) bus stations, visitor centers, and online.



View from a STAGE Bus Yreka-Weed, 2024

To further incentivize the use of the Siskiyou Seasonal Explorer Programs, the county could consider offering special discounts or package deals in partnership with local businesses and attractions. For example, visitors who use the Siskiyou Explorer routes could receive discounted admission to participating sites, or special offers at local restaurants and shops. This would not only enhance the visitor experience, but also encourage tourists to visit local businesses.

3. Partnered and Subsidized Rideshare:

Siskiyou County could form partnerships with rideshare companies and local taxi services to extend transportation options into underserved areas, particularly during off-peak hours or for residents with accessibility needs. To ensure affordability for targeted groups, such as the elderly, disabled, and low-income families, the county should explore potential grant opportunities like the FTA Section 5310 program. By using these grants, Siskiyou County can subsidize the costs of rideshare and taxi services, making them more accessible to those who need them.

4. Community Engagement

Siskiyou County should conduct regular workshops and forums within each community to actively involve residents in the transit planning process. These events provide an opportunity for residents to share their experiences and offer input on potential improvements, ensuring that transit services meet the needs and preferences of local communities.

- **Ambassador Program:** The county can develop an ambassador program that engages local volunteers to assist with navigation, promote transit usage, and gather informal feedback at major transit hubs. These ambassadors serve as friendly faces and knowledgeable resources for transit users, helping them navigate the system and providing guidance on routes, schedules, and connections. By gathering feedback from users, ambassadors can help identify areas for improvement and relay this information to transit planners and operators, fostering a more responsive and user-friendly transit environment.

Evaluation and Adaptation:

1. **Feedback Mechanism:** Integrate a digital feedback system on the STAGE website, allowing for easy reporting of issues and suggestions. This system should support ongoing adjustments to services based on user input and community needs.
2. **Grant Utilization for Enhancements:** Identify and apply for relevant grants that support transit infrastructure improvements, operational enhancements, and service expansions to ensure the financial viability of these proposed interventions.

VIII. Grant Funding Opportunities

Based on a comprehensive analysis of interviews, existing literature, and quantitative data, the following grants have been identified as promising funding opportunities for enhancing transit services and infrastructure in Siskiyou County.

FTA Section 5311 Formula Grants for Rural Areas:

<https://www.transit.dot.gov/rural-formula-grants-5311>

- The Federal Transit Administration (FTA) Section 5311 - Formula Grants for Rural Areas is the largest federal grant program supporting rural transit, providing financial assistance for capital investments, planning initiatives, and operating expenses. *Siskiyou County (STAGE) is already utilizing these funds.*

FTA Enhanced Mobility of Seniors & Individuals with Disabilities (Section 5310):

<https://www.transit.dot.gov/funding/grants/enhanced-mobility-seniors-individuals-disabilities-section-5310>

- The FTA Enhanced Mobility of Seniors & Individuals with Disabilities (Section 5310) grant program supports transportation services and projects that improve mobility for seniors and individuals with disabilities. This program is essential for ensuring that these populations have access to safe, reliable, and accessible transportation options, enabling them to remain active and engaged in their communities. Funds can be used for a variety of purposes, including purchasing accessible vehicles, providing door-to-door service, and making capital improvements such as installing bus shelters and benches that enhance accessibility and safety for these riders.

Caltrans Sustainable Transportation Planning Grant Program:

<https://dot.ca.gov/programs/transportation-planning/division-of-transportation-planning/regional-and-community-planning/sustainable-transportation-planning-grants>

- The Caltrans Sustainable Transportation Planning Grant Program provides a significant opportunity for local, regional, and tribal governments, as well as transit agencies, to secure funding for transportation planning projects that promote sustainability, reduce greenhouse gas emissions, and enhance the resilience of California's transportation system. Applicants who are not Metropolitan Planning Organizations (MPOs) can apply for the Sustainable Communities Competitive and Technical grant program or the Climate Adaptation Planning grant program. These programs fund projects such as active transportation plans, corridor enhancement studies, complete streets plans, transit-oriented development studies, climate vulnerability assessments, evacuation planning, transportation infrastructure adaptation plans, and nature-based solutions. Successful projects will demonstrate a strong commitment to sustainability, innovation, and equity while addressing the needs of underserved communities

California State Transportation Agency (CalSTA) Transit and Intercity Rail Capital Program (TIRCP):

<https://calsta.ca.gov/subject-areas/transit-intercity-rail-capital-prog>

- California State Transportation Agency (CalSTA) Transit and Intercity Rail Capital Program (TIRCP) offers transit agencies funding for a wide range of transformative capital projects that reduce greenhouse gas emissions, expand and improve transit services, and enhance transit safety. While well-suited for purchasing zero-emission buses and associated infrastructure, the program also supports initiatives such as transit

route optimization, transit signal priority, fare payment system improvements, passenger amenities, and the construction of new transit centers, mobility hubs, and charging infrastructure. The program encourages collaboration and partnerships among transit providers, local governments, and regional planning organizations to develop comprehensive, regional solutions that improve transit connectivity and accessibility.

Caltrans Adaptation Planning Grant Program:

<https://dot.ca.gov/programs/transportation-planning/regional-planning/adaptation-planning-grants>

- The Caltrans Adaptation Planning Grant Program funds local and regional planning efforts to prepare for and adapt to climate change impacts on transportation infrastructure. This program is particularly relevant for rural areas vulnerable to extreme weather events and sea-level rise. Eligible projects include vulnerability assessments, adaptation strategies, and resilience plans. In 2023, Humboldt County received a grant to assess the vulnerability of its coastal transportation assets and develop adaptation strategies to ensure long-term sustainability.

Caltrans Active Transportation Program (ATP):

<https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/active-transportation-program>

- The Caltrans Active Transportation Program (ATP) primarily focuses on funding walking and biking infrastructure projects, but it can also support improvements to transit stops, such as installing benches, shelters, and signage. These enhancements are particularly relevant when they improve access and connectivity to transit, making it easier and more comfortable for people to use public transportation in conjunction with active modes of travel. By creating safe, attractive, and accessible transit stops, the ATP helps to encourage multimodal transportation and promote sustainable mobility options.

California Low Carbon Transit Operations Program (LCTOP):

<https://dot.ca.gov/programs/rail-and-mass-transportation/low-carbon-transit-operations-program-lctop>

- Funded by Cap-and-Trade revenue, the California Low Carbon Transit Operations Program provides operating and capital assistance for transit agencies to reduce greenhouse gas emissions and improve mobility, with a priority on serving disadvantaged communities. This program is critical for enabling agencies to invest in low carbon transit operations such as expanding services, implementing fare-free transit programs, or purchasing zero-emission buses. Projects under this program must demonstrate how they will achieve a reduction in greenhouse gas emissions while also providing benefits to disadvantaged or low-income communities.

FTA Buses and Bus Facilities Program:

<https://www.transit.dot.gov/bus-program>

- The FTA Buses and Bus Facilities Program provides funding for transit agencies to replace, rehabilitate, and purchase buses and related equipment, as well as to construct

bus-related facilities. This program is crucial for maintaining and upgrading bus fleets and infrastructure, ensuring that transit systems can provide safe, reliable, and accessible service. Eligible projects include purchasing new buses, retrofitting existing vehicles with modern amenities and safety features, and constructing or renovating bus shelters, benches, and signage.

Federal Lands Access Program (FLAP):

<https://highways.dot.gov/federal-lands/programs-access>

- The Federal Lands Access Program (FLAP) provides funding for transportation projects that improve access to, and within, federal lands, such as national parks, forests, and wildlife refuges. This program is crucial for enhancing the visitor experience, reducing congestion, and protecting sensitive natural resources. Eligible projects include transit services, such as shuttles and bus routes, which connect visitors to popular destinations within these federal lands. By providing convenient and sustainable transportation options, FLAP helps to promote responsible tourism and ensure that visitors can easily access and enjoy these public spaces. While the call for projects in California is currently closed, it is slated to reopen in 2026.

Caltrans Division of Local Assistance:

<https://dot.ca.gov/programs/local-assistance>

- The Caltrans Division of Local Assistance serves as a valuable resource for local transportation agencies, including those in rural areas, by providing technical assistance and support for a wide range of transportation projects. This division is dedicated to helping local agencies navigate the complex process of securing funding, planning, and implementing transportation improvements that enhance mobility, safety, and sustainability in their communities.
 - The division's staff can help local agencies identify appropriate funding opportunities, such as the Active Transportation Program (ATP), Highway Safety Improvement Program (HSIP), and other state and federal grants. They can also provide guidance on developing strong grant proposals, ensuring that projects meet eligibility criteria, and assembling the necessary documentation.

VIII. Conclusion

This capstone project provides a comprehensive analysis of the challenges and opportunities for improving public transportation in Siskiyou County, California. By employing a multi-faceted approach that includes quantitative data analysis, a literature review of rural transit case studies, and qualitative insights from local stakeholders, this report offers an analysis of the current state of transit in the county and proposes actionable recommendations to address identified issues.

The quantitative analysis, utilizing LODES, Google Maps POI, and STAGE transit data, reveals significant gaps in transit accessibility for key points of interest, particularly

lodging, tourist attractions, home locations, and work locations. The qualitative findings from interviews with local planners, city officials, and transit professionals provide valuable context and highlight the challenges posed by extreme weather conditions, the need for improved system accessibility and education, and the potential for leveraging seasonal routes to serve both residents and tourists.

To address these challenges, this project proposes strategic interventions, including a South County Hub-and-Spoke System, Siskiyou Seasonal Explorer Programs, partnered and subsidized rideshare, and community engagement initiatives. These recommendations aim to improve connectivity, better serve tourists, extend transportation options in underserved areas, and ensure that transit services meet local needs. This project also identifies numerous grant funding opportunities that Siskiyou County can pursue to secure the necessary resources for implementing these recommendations and revitalizing its rural public transit system.

Successful implementation of these recommendations will require close collaboration among various stakeholders, including the Siskiyou County Local Transportation Commission, transit operators, local government agencies, community organizations, and the general public. By embracing the insights derived from both quantitative and qualitative analysis, leveraging funding opportunities, and fostering partnerships, Siskiyou County can transform its rural transit system into a vital asset that enhances mobility, supports economic development, and improves the overall quality of life for its communities.

References

- Daigle, J. J. (2008). Transportation needs in national parks: A summary and exploration of future trends. *The George Wright Forum*, 25(1), 57-64.
<http://www.georgewright.org/251daigle.pdf>
- Gahbauer, J., Lederman, J., Huang, E., Wachs, M., Matute, J., & Taylor, B. D. (2021). An assessment of performance measures in the Transportation Development Act. UCLA Institute of Transportation Studies.
<https://escholarship.org/uc/item/0dk5g542>
- KFH Group. (2018). Kalispell case study: Paratransit services. Federal Transit Administration. <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/147521/kalispell-case-study-report-final.pdf>
- Kline, C. S., Cardenas, D., Viren, P. P., & Swanson, J. R. (2015). Using a community tourism development model to explore equestrian trail tourism potential in Virginia. *Journal of Destination Marketing & Management*, 4(2), 79-87.
<https://doi.org/10.1016/j.jdmm.2015.01.001>
- Lake Transit Authority (LTA). (2021). Lake Transit Authority annual report 2020-2021. <https://laketransit.org/wp-content/uploads/2021/12/LTA-Annual-Report-2020-2021.pdf>
- Marr, E. (2015). Huron County transportation pilot: A case study in rural transportation service [Master's thesis, University of Guelph].
<https://atrium.lib.uoguelph.ca/server/api/core/bitstreams/9700b7e4-46f9-4a39-8ee9-a81b99ca250f/content>
- National Academies of Sciences, Engineering, and Medicine. 2007. Elements Needed to Create High-Ridership Transit Systems. Washington, DC: The National Academies Press. <https://doi.org/10.17226/23175>.
- National RTAP. (2022). Getting started: Creating a vision & strategy for rural transit. <https://cloud.nationalrtap.org/Resource-Center/Advanced-Search/fid/161>

- Plazinic, B. R., & Jovic, J. J. (2019). Improving mobility in rural areas: The contribution of paratransit services. *Transportation Research Record*, 2673(8), 659-670. <https://doi.org/10.1177/0361198119843847>
- Redwood Coast Transit (RCT). (2021). Redwood Coast Transit short range transit plan 2021-2030. https://www.redwoodcoasttransit.org/images/RCTA_SRTP_2021-2030_FINAL.pdf
- Ripplinger, D. (2012). Organizing transit in small urban and rural communities. Small Urban & Rural Transit Center, Upper Great Plains Transportation Institute, North Dakota State University. <https://library.ndsu.edu/ir/handle/10365/26729>
- Saha, P., & Shinstine, D. S. (2015). Analysis and expansions of a bus transit network considering the needs of a rural university town. *Journal of Urban Planning and Development*, 141(3), 05014020. [https://doi.org/10.1061/\(ASCE\)UP.1943-5444.0000248](https://doi.org/10.1061/(ASCE)UP.1943-5444.0000248)
- Smalls, S. L. (2014). Allendale County Scooter: A rural fixed-route transit system in South Carolina [Master's thesis, University of South Carolina]. <https://scholarcommons.sc.edu/etd/2764/>
- Untermann, R. K. (1984). Accommodating the pedestrian: Adapting towns and neighborhoods for walking and bicycling. Van Nostrand Reinhold Company.
- U.S. Census Bureau. (2022). QuickFacts: Siskiyou County, California. U.S. Department of Commerce. <https://www.census.gov/quickfacts/fact/table/siskiyoucountycalifornia/INC110222>
- Victor Valley Transit Authority (VVTA). (2016). VVTA Route 200 Needles Link begins service. <https://vvta.org/2016/06/14/vvta-route-200-needles-link-begins-service/>

GIS data sources created for this project are stored here:

<https://bit.ly/siskiyoucapstonemapping>