

# 2020 UDOT RESEARCH PROBLEM STATEMENT

**Problem Statement deadline is March 16, 2020. Submit statements to [UTRAC@utah.gov](mailto:UTRAC@utah.gov)**

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**Title:** Transit to parks (T2P): Connecting people to large parks via transit

**No. (Office Use):** 20.07.06

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Select **ONE** Subject Group  Materials/Pavements  Maintenance  Traffic Mgmt/Safety  Structures/Geotech  
 Planning  Aeronautics  Public Transportation  Other

## 1. Write a brief research project objective:

This project has two objectives: 1) to develop a GIS tool (the *T2P index*) to find communities lacking access to large parks via transit in UTA service areas (addressing the “green equity” issue) and 2) to explore the effectiveness of transit-to-parks solutions by examining case projects from peer agencies (e.g., Los Angeles, Seattle, Albuquerque).

## 2. Explain the problem and why this research is important: (*Importance reflects 50% of the statement score*)

Large parks (e.g., urban regional parks, state parks, and national forests and parks) have particular health, recreational, and environmental benefits. Low-income people, children, the elderly, and people with disabilities are particularly dependent on public parks and open space, as they might have the limited means to afford private recreation settings. To make it worse, they might also have limited mobility options, such as no access to a personal car. Further, disadvantaged groups have worse walking access to large parks. In the western U.S., our analysis shows that neighborhoods near large parks (> 20 acres) have a higher income (\$83,538 on average) than those located farther from large parks (\$71,834). Thus, transit could provide a viable option for low-mobility populations to access large parks.

This issue is particularly important in the Wasatch Front. Our analysis shows that, in the six UTA-serving counties, almost half of large parks (> 20 acres; 33 out of 71) have no direct public transportation access. This is concerning for public health, as lack of transportation is one of the primary barriers why low-mobility populations do not use parks. Further, although Utah has better health outcomes than many other states, its adult obesity rate had risen from 9% in 1990 to 27.8% in 2018, and the direct and indirect costs of diabetes amount to over a billion per year in the state. The odds of being obese and of having Type 2 diabetes can be lowered through frequent physical activity in green space, and particularly through prolonged visits to large parks.

Neither academics nor practitioners have tools to locate communities suffering from a lack of transit-to-parks access and have not explored viable strategies to help disadvantaged groups access large parks. Few examples include Los Angeles Metro’s *Transit-to-parks strategic plan* (2019) and The Wilderness Society’s *Urban to Wild* program. As a result, transit agencies (and UTA, in particular) lack the evidence to make informed decisions for achieving “green equity” through improved transit access. Green equity means a fair access to nature regardless of sociodemographic status (e.g., age, race, income). It is important because many benefits of access to nature, such as improved microclimates and air quality and physical and psychological health benefits, may only be experienced in close proximity to those parks.

Thus, we propose 1) the development of a GIS tool (the *T2P index*) to identify disadvantaged communities without viable transit access to large parks and 2) case studies of peer agencies to evaluate the effectiveness of transit-to-parks solutions. Findings from this project could help UTA and other stakeholders (WFRC/MAG, UDOT, and municipalities) identify priority areas of transit investment (both locations and programs) to improve access to outdoor recreation for disadvantaged populations.

## 3. Describe how the research results will be implemented and benefit Utah: (*Implementation reflects 50% of the statement score*)

Transit agencies such as the UTA, municipal planners, and parks and recreation agencies could use the T2P index and our findings to implement combined efforts to increase access to large parks for people in the Wasatch Front. In particular, the UTA could use our tool to identify priority areas for new transit lines and changed/modified transit routes to make large parks accessible from disadvantaged neighborhoods, which have a combination of the following characteristics: low income, low car ownership, high rates of physical disabilities, high percentages of children, high percentages of older adults, and poor walking access to local parks (using our supplementary *W2P index*).

Parks and recreation agencies could work with the UTA to identify priority large parks that are popular in their communities and that host successful recreation programs. Such priority large parks could be the target of pilot transit-to-parks programs that could help UTA evaluate the effectiveness of new or modified transit routes that reach large parks.

Also, our case studies of other transit-to-parks programs in Los Angeles, Seattle, and Albuquerque will provide evidence on (a) the best practices to implement such programs and (b) whether these programs are effective to help disadvantaged groups visit large parks. Those programs range from special shuttles that connect rail stations to parks during weekends and rerouted existing transit lines. To help UTA implement pilot transit-to-parks programs, we will analyze the transit ridership (and demographics, when available) of programs in other metro areas, interview stakeholders who created and manage other programs, and evaluate the funding methods used to make other programs function, including public-private partnerships with the outdoor recreation industry.

If the pilot transit-to-parks programs created by UTA will be successful, we anticipate that our T2P index and that the findings of the case studies in other metro areas can also help UTA scale up its operation to provide convenient access to large parks for disadvantaged groups. Moreover, the T2P index and associated programs developed in Utah will be disseminated as exemplary approaches through both academic and practical venues (e.g., conferences, journals).

#### 4. List the major research tasks:

**(1) Data collection and processing:** Two key inputs for T2P index are parks of interest (urban regional parks, state parks, and national forests and parks) and communities of interest (low income, low car ownership, high rates of physical disabilities, high percentages of children, and high percentages of older adults). We will collect park location data from Utah AGRC and ParkServe® and community sociodemographic data from the U.S. Census Bureau's American Community Survey 2014-2018. Transit feed information will be compiled from General Transit Feed Specification (GTFS), and road network will be built based on Utah AGRC and Census TIGER/Line Shapefiles.

**(2) Development of a GIS tool** to identify disadvantaged communities without access to large parks: Using network analysis with transit feed data and park location data, we will calculate the *T2P index*—to what extent large parks can be reached by using public transit within a specific time limit—for every census block group in the UTA-serving areas (i.e., six Wasatch Front counties). A gravity model will be used to measure the T2P index using ArcGIS Pro ModelBuilder and Python. The final model will become a *stand-alone GIS toolbox* so that practitioners at UTA and other agencies can run it with new input data (i.e., updates on transit route/schedule, road network, park location, and/or Census data). As a supplementary tool to the T2P index, we will also measure walking-to-parks (*W2P index*)—walking access in 10 minutes to parks of *any size*.

**(3) Multiple case studies** of peer agencies to find effective transit-to-parks solutions: Using our connections with The Wilderness Society and Los Angeles Metro, we will survey existing “transit-to-parks” initiatives (also known as “transit-to-trails” or “urban-to-wild”) and explore what projects and programs have worked for peer agencies. We will examine both system solutions (e.g., line extension and shuttles, operation, modal integration) and programs (e.g., demand management, partnership and funding sources, marketing and education, and performance monitoring). Potential case regions include Los Angeles, Seattle, and Albuquerque.

#### 5. List the expected research deliverables (reports, manual, specification, design method, training, video, etc.):

**(1) Maps:** parks of interest, communities of interest, and spatial distribution of T2P index in the Wasatch Front.

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~~(2) GIS toolbox (as well as developed databases, model scripts, and associated documentation):~~ UTA and other agencies can use the toolbox with new data (e.g., transit route/schedule, road network, park location) to find disadvantaged communities without viable access to large parks.

**(3) Final report:** documenting the details of the entire research effort, including data collection and processing, model components, case study results, and implications for UTA and other state/regional/local agencies.

**6. Requested from UDOT:** \$28,000  
**Cost:** \$40,000

**Other/Matching Funds:** \$12,000 (USU; in-kind)

**Total**

**Briefly explain funding sources:** For works done in July and December 2020, PI Park at USU will provide a matching fund for one graduate student to help with data processing, mapping, and modeling (a total of \$12,000 including stipend, benefits, insurance, and tuition)

### 7. Outline the proposed schedule, including start and major event dates:

This research may take approximately 18 months to complete, according to the following schedule:

- 2020 Jul: Meet with a technical advisory committee to refine scope, timeline, and deliverables  
Aug-Sep: Collect and process data (including park location, size, and entrance points, Census sociodemographic data from the ACS 2014-2018, transit feed data from GTFS, and road network data from AGRC)  
Oct-Dec: Develop a GIS model to identify disadvantaged communities without access to large parks using ArcGIS Pro
- 2021 Jan-Mar: Develop a prototype GIS toolbox for interactive modeling and mapping  
Apr: Prepare interim report and receive feedback from the technical advisory committee  
May-Oct: Conduct case studies of peer agencies to find effective transit-to-parks solutions  
Oct-Nov: Prepare a draft report, maps and documents, and presentation summarizing the project's results.  
Receive feedback from the technical advisory committee  
Dec: Revise and submit the final project deliverables