

# Mobility & Access on American Indian Reservations in the Western United States

Department of Urban & Regional Planning  
 Eastern Washington University  
 • Jason Y. Scully, PhD, assistant professor, jsully@ewu.edu  
 • Zachary R. Becker, MURP candidate, zbecker@eagles.ewu.edu  
 • Dick G. Hill, PhD, FAICP, professor, dwinchell@ewu.edu  
 • Margo Hill, JD, MURP, assistant professor, mhill86@ewu.edu

Rolland Associates • www.rollandassociates.com  
 • Richard A. Rolland, rrolland@rollandassociates.com



The Small Urban Rural and Tribal Center on Mobility

Funded by the U.S. Department of Transportation, the Small Urban Rural and Tribal Center on Mobility (SURTCOM) is a University Transportation Center representing a partnership between Montana State University, North Dakota State University, and Eastern Washington University. This project includes data on all 72 federally recognized tribal lands within the nine-state SURTCOM study area.

## Abstract

Federally recognized tribal lands are often located in rural areas at great distances from cities. Reasons for these distances are historically rooted in unfair land policies which sought to segregate American Indians and their tribes from newer settlers to land. This legacy has led to Indian communities that are often isolated from the services, conveniences, and resources offered by larger, more urbanized areas. As demonstrated in the food desert literature, access to healthy foods is associated with better health. We consider the possibility that limited access to all resources (as measured by distances to urbanized areas) is likewise linked to a range of negative life course outcomes. This poster presents our preliminary efforts to understand locational characteristics of tribal lands. Using Google Maps, we obtained driving distances and times between tribal headquarters and the following: (1) nearest micropolitan or metropolitan population center with a population > 10K; (2) nearest metropolitan population center with a population > 100K; (3) nearest US Interstate Highway onramp; and (4) nearest Walmart store. On average, reservations were 96 miles (107 minutes) from the nearest metropolitan population center, 46 miles (54 minutes) from the nearest micropolitan population center, 58 miles (67 minutes) from the nearest Interstate, and 39 miles (46 minutes) from the nearest Walmart. Given that some reservations are located within larger population centers and others are very isolated, the means vary greatly for each of the measures.

## Background/History

Access to resources is linked to both health and transportation patterns. This has been demonstrated in public health literature on access to food (Walker, Keane, & Burke, 2010) and health care (Penchansky & Thomas, 1981). The ability to access resources is in part based on individuals' abilities to travel to and from locations. This *mobility potential* as defined by Shareck, Frohlich and Kestens (2014) is theorized to be closely and positively linked to socio-economic status, with both high levels of SES and high mobility potential leading to higher levels of access. Mobility itself is defined as the distance which an individual is willing and/or able to travel for various resources.

A history of governmental actions at the Federal, state, and local levels aimed at limiting movement patterns among Native American populations along with land allocation programs that favored non-indigenous settlers left tribal groups with a fraction of their lands often in locations peripheral to growing centers of trade and economic growth (Hilliard & Irwin, 1972; Prucha, 1963). Today, it is common knowledge that tribal reservations are often located in rural areas and at great distances to modern, or primary, economies. Distances between tribal lands and nearby population centers may be a major factor in limiting mobility and access to a wide range of resources for tribal communities. This project is a first step in identifying the relationships between mobility, access, and transportation in tribal communities.

Distances and drive times to micropolitan population centers (population > 10,000) and/or metropolitan population centers (population over 100,000) are intended to show a general levels of access to a wide range of possible resources. A major part of the country's transportation infrastructure, the United States Interstate Highway System links cities together at the regional, state, and national levels. The distance between a tribal headquarters and the nearest Interstate onramp may be another indicator of the degree to which the headquarters and its tribal members are isolated from other population centers. This research also considers the presence of a nearby Walmart stores as proxy measure of access to both healthy and unhealthy foods, as well as to a wide range of material goods including clothing, sporting goods, hunting goods, automotive maintenance and repair, diapers, children's toys, and school supplies, and other childhood needs, among others.

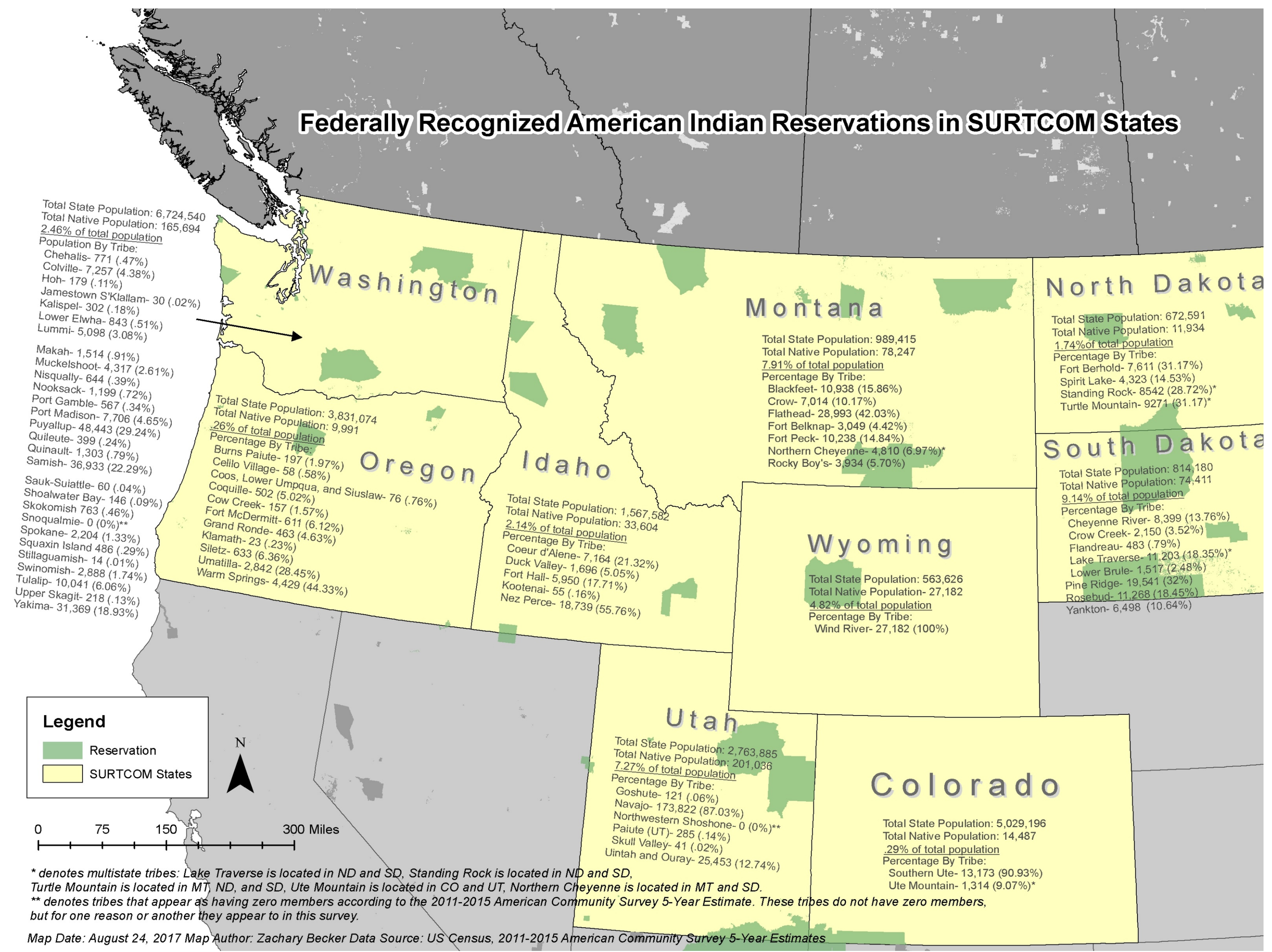


Figure 1: Population and demographic information about the 72 American Indian tribes in the SURTCOM study area

Table 1: Averages drive times and distances by state to the nearest micropolitan CBSA, metropolitan CBSA, US Interstate Highway, and Walmart

	Average (SD) reservation area and driving distances and times to									
	Number of reservations	Reservation area (sq miles)	Micropolitan (pop > 10K)		Metropolitan (pop > 100K)		US Interstate Onramp		Walmart store	
			Miles	Minutes	Miles	Minutes	Miles	Minutes	Miles	Minutes
<b>TOTAL</b>	72	794 (1365)	46 (41)	54 (43)	96 (72)	107 (72)	58 (52)	67 (57)	39 (36)	46 (38)
<b>By state</b>										
Colorado	2	904 (229)	42 (26)	49 (27)	216 (36)	244 (6)	184 (36)	200 (53)	18 (2)	24 (2)
Idaho	5	570 (485)	46 (37)	51 (38)	83 (48)	90 (48)	66 (46)	71 (49)	40 (34)	46 (32)
Montana	7	1926 (1332)	64 (23)	68 (25)	187 (80)	182 (75)	73 (50)	72 (48)	63 (34)	69 (37)
North Dakota	4	1490 (1594)	83 (19)	89 (17)	142 (51)	144 (50)	97 (26)	100 (27)	48 (30)	52 (30)
Oregon	11	127 (310)	40 (57)	43 (57)	88 (46)	97 (48)	58 (43)	64 (46)	33 (40)	38 (40)
South Dakota	8	1733 (1770)	65 (29)	70 (26)	136 (47)	126 (38)	43 (34)	45 (36)	67 (24)	69 (25)
Utah	6	1498 (2725)	68 (70)	74 (77)	112 (75)	114 (77)	47 (53)	52 (57)	45 (62)	46 (65)
Washington	28	189 (579)	30 (29)	42 (37)	45 (36)	68 (60)	42 (52)	61 (64)	27 (27)	38 (36)
Wyoming	1	3542 (NA)	2 (NA)	4 (NA)	254 (NA)	285 (NA)	119 (NA)	109 (NA)	4 (NA)	8 (NA)

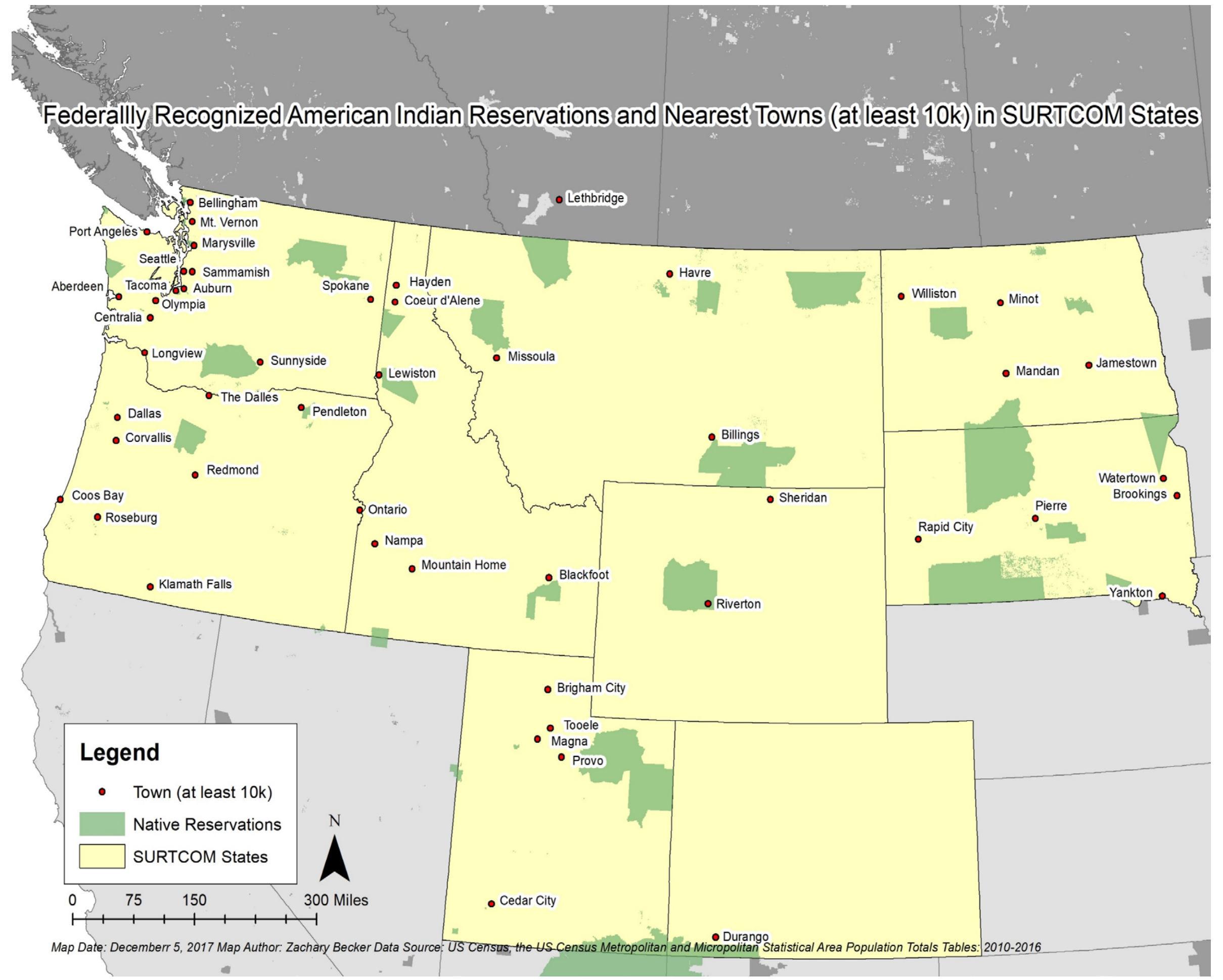


Figure 2: Nearest Micropolitan or Metropolitan CBSA population center to each of the 72 reservations in the SURTCOM study area.

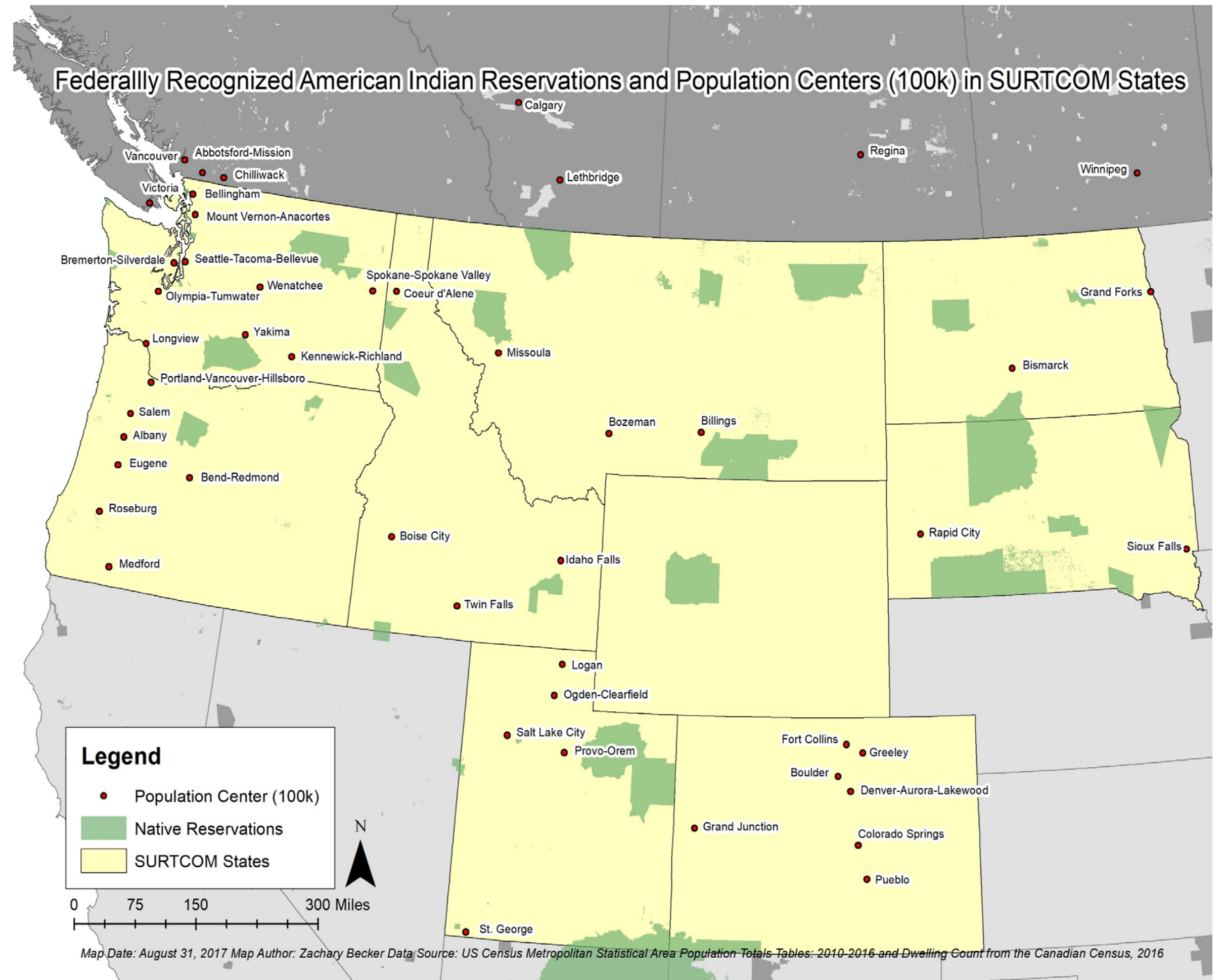


Figure 3: Major Metropolitan CBSA population centers, over 100,000 residents, located within the SURTCOM study area.

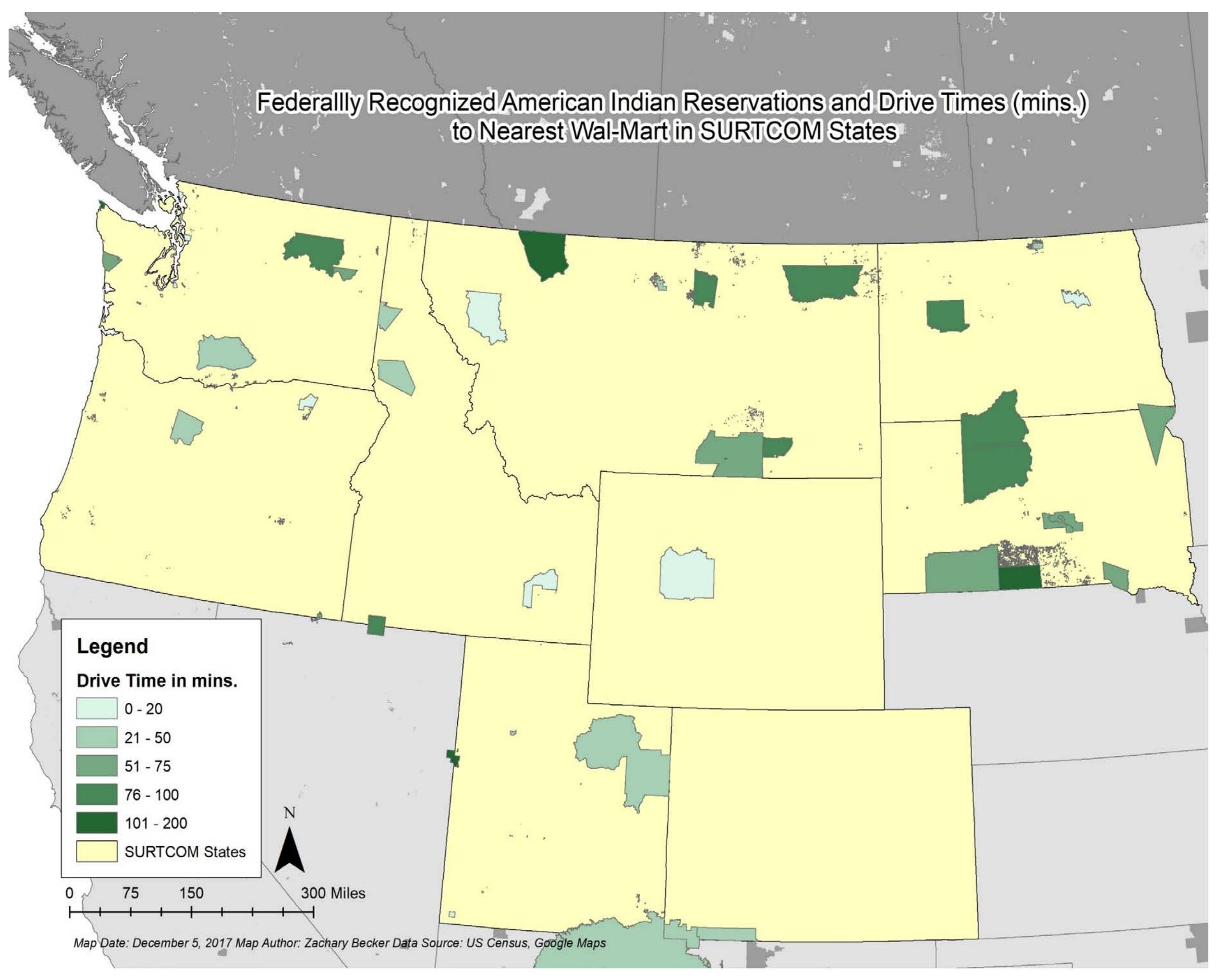


Figure 4: Distance to the nearest Walmart from all 72 Reservations located within the SURTCOM study area.

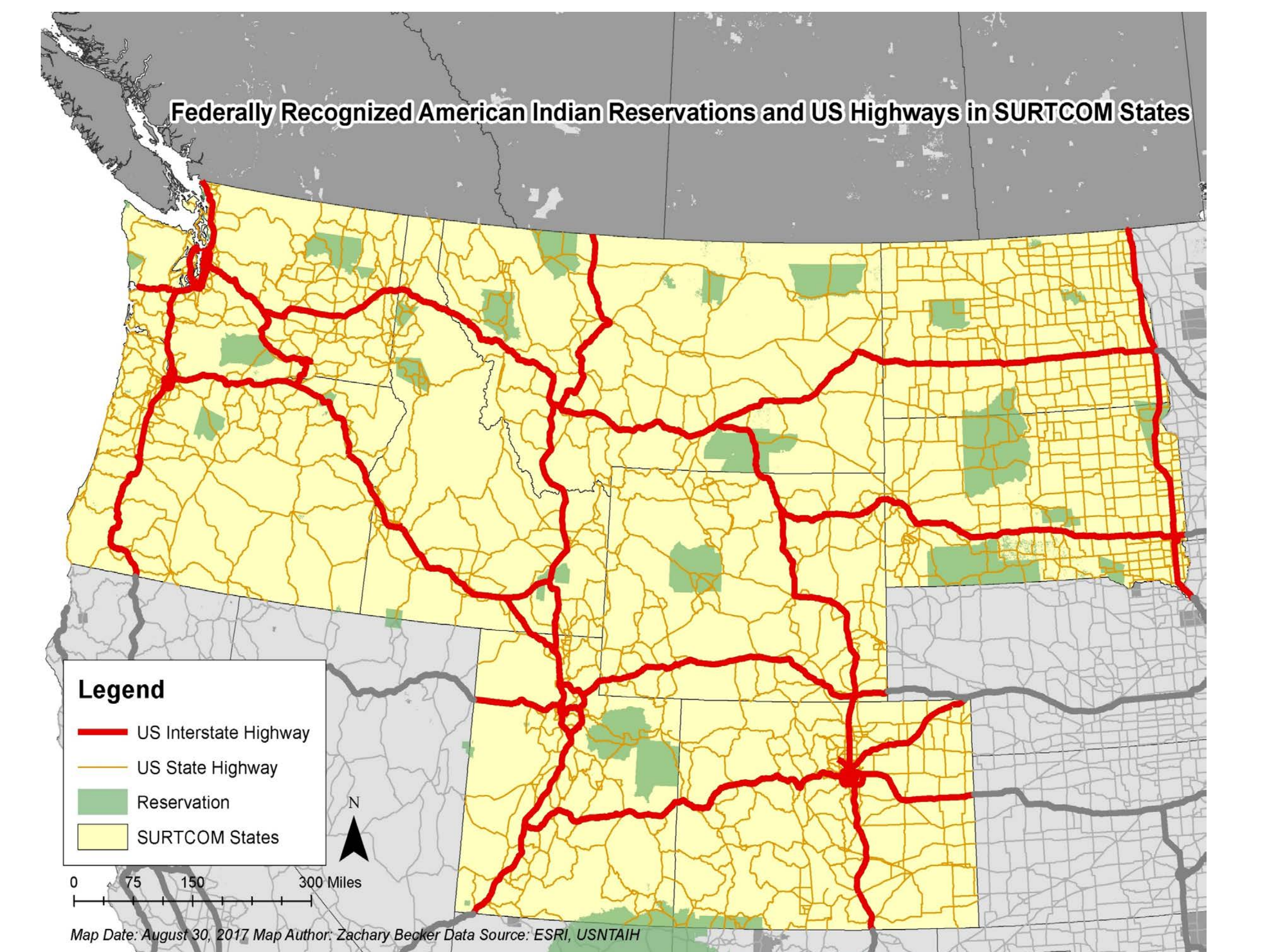


Figure 5: US Interstate Highways and US State Highways displaying the relationship between major roads and the American Indian Reservations located in the SURTCOM study area.

## Methods

Network distances (miles) and drive times (minutes) from all reservations to locations of interest were obtained using Google Maps (maps.google.com). The addresses for each reservation's tribal headquarters were used as starting points for the Google routing queries. Metropolitan population centers with over 100,000 residents, as well as, micropolitan population centers, with at least 10,000 residents, were identified using Core Based Statistical Areas (CBSAs) from the US Census Metropolitan and Micropolitan Statistical Area Population Totals Tables: 2010-2016. For large population centers, the downtowns of the largest cities within the nearest Metropolitan CBSA with a population of over 100,000 were used as the destinations for the routing queries. For small population centers the downtown of the nearest Micropolitan CBSA with a population of over 10,000, or if a Metropolitan CBSA was closer in proximity to the reservation it was substituted, as the destination for the routing queries. The closest Interstate onramp to each reservation was determined through visual inspections of maps. Google Maps was also used to identify the network distance and drive times to the nearest Walmart store for each reservation. No distinction was made between types of Walmart stores (e.g. Supercenters, Discount Stores, etc.). All Google Maps queries were conducted between September 13 and September 20, 2017.

A major advantage to using Google Maps is its availability, which is contingent solely on having access to the Internet and web browsing software. It is also quite easy to use. Another advantage of Google Maps is that it calculates drive times based on posted speed limits, which in turn are a reflection of road or geologic conditions (such as quality of paving, changes in elevation, number of twists and turns along the route, etc.). Thus roads with challenging conditions require slower speeds. Under these circumstances the number of miles between a reservation and a destination may be low but the actual drive time may be very high.

Though Google Maps is a powerful tool, its routing algorithm is a proprietary secret that is often changed without informing end users of those changes. Thus an exact replication of this study would rely on using the same routing algorithm or algorithms employed by Google Maps between September 13 and September 20, 2017, when all queries were originally conducted.

## Discussion/Conclusions

Locational characteristics among reservations vary greatly. For example, with a distance of 285 miles (288 minutes) to a Metropolitan CBSA, the Fort Belknap Reservation is among the most isolated communities, but it is also only 47 miles (50 minutes) from the nearest Micropolitan CBSA. Another isolated community, the Southern Ute Reservation is 210 miles (237 minutes) from a US Interstate Highway on ramp and is only 23 miles (30 minutes) from the nearest Micropolitan CBSA. By comparison, the Cowlitz and Puyallup tribal headquarters are located within 1 mile and 3 miles, respectively, of Metropolitan areas with populations greater than 100K.

Given the variability, one trend was evident; distances and drive times to Walmarts were on average shorter than those for the other destinations. Only four of the reservations were farther than 100 miles from their nearest Walmart, with the Goshute Reservation being the farthest at a distance of 171 miles (177 minutes).

**References**  
 Hilliard, S. B., & Irwin, D. (1972). Map Supplement Number Sixteen: Indian Land Cessions. *Annals of the Association of American Geographers*. Taylor & Francis, Ltd. Association of American Geographers. <https://doi.org/10.2307/2559410>  
 Penchansky, R., & Thomas, J. W. (1981). The concept of access: definition and relationship to consumer satisfaction. *Medical Care*, 19(2), 127-140. <https://doi.org/10.2307/3764310>  
 Prucha, F. P. (1963). Indian Removal and the Great American Desert. *Indiana Magazine of History*. Indiana University Press. <https://doi.org/10.2307/2778910>  
 Shareck, M., Frohlich, K. L., & Kestens, Y. (2014). Considering daily mobility for a more comprehensive understanding of contextual effects on social inequalities in health: A conceptual proposal. *Health & Place*, 29, 154-60. <https://doi.org/10.1016/j.healthplace.2014.07.007>  
 Walker, R. E., Keane, C. R., & Burke, J. G. (2010). Disparities and access to healthy food in the United States: A review of food deserts literature. *Health & Place*, 16(5), 876-84. <https://doi.org/10.1016/j.healthplace.2010.04.013>