Investigating the Influence of Light Pervasiveness on the distribution of population demographics in three Rocky Mountain Western cities

By Alice O'Neal-Freeman, '27

The Rocky Mountain West is one of the fastest growing regions in the country. As people continue to move near the mountains for access to outdoor recreational activities, economic opportunity, and surrounding views of rugged mountainous landscape, we are challenged with the problems of population growth and an increasing built environment.

Stunning, star-filled night skies are also a draw to the region. Increased artificial lighting is a threat to this pristine night sky visibility. As the development in the Rocky Mountain region increases, does light pollution rise with it? And within these mountainous cities are there demographic differences based on levels of light?

State of the Rockies sutdent researcher, Alison Mueller-Hickler, 26', is focused on light pollution and development in the greater Rocky Mountain region.

She is studying the relationship of artificial light pollution and growth and development in three Rocky Mountain West cities. Phoenix: the fastest growing and fifth largest city in the West, Albuquerque: a city that grew rapidly but is now on the decline, and Colorado Springs, one of the fastest growing cities on the Front Range of Colorado.

She is investigating who the biggest contributors of light pollution are in addition to their location, and whether race and crime in the most/least artificially lit areas is the same. Alison's project is related to Megan's in that they are both trying to identify major contributors to light pollution in the Rocky Mountain West. Alison in already heavily populated areas, and Megan in areas where population growth and development is increasing in towns proximal to popular outdoor recreation locations (Moab, Monticello) who are also seeing increases in tourism.

Alison taking pictures of a site on a research trip to Albuquerque. Photo by Cyndy Hines

Alison Mueller-Hickler, '26

Alison is interested in the relationship between the amount of artificial light emitted and development. She set out to study some of the fastest growing cities in the Rocky Mountain West: Phoenix, Albuquerque, and Colorado Springs. She traveled to and through these cities to dozens of sites she mapped over them, taking pictures during the day and returning for light measurements and more pictures at night. Sometimes she finished a day's work at 12:30 am.

Alison's project is the bigger picture of light pollution in the Rocky Mountain West, with historical vs current photo comparisons from the more rapidly developing cities. Alison is also using historical aerial images from the USGS to track development. She is then visualizing her collected data and VIIRS data on the three cities using GIS. She is working to determine if there is a correlation between demographics and light pollution. She pulled age, sex, location, and other demographic information from the census data, and is comparing this data on demographics to crime rates in these cities, as well as comparing it to the light measurements she took. She will do an analysis of the linear regression modeling this data. She has interviewed many people over Zoom, including the founder of Dark Sky international. She was invited to show her work at a Dark Skies seminar in October. Alison is looking to publish a paper on her research.