MS-GIST Projects Fall 2022
Tuesday, December 06

* There will be 5 minute breaks between each back-to-back presentation to facilitate transitions in Zoom.
** Zoom links are available on request. Please contact Andrew Grogan - atgrogan@arizona.edu

Date/Time	Presentation Title	Student Name
12/06/22 09:00 - 09:25 AM	A Socioeconomic Tier Study of Tucson Unified School District	Julianne Keaster
12/06/22 10:00 - 10:25 AM	Modeling the hydrological impacts of the Yarnell Hill Fire using the Automated Geospatial Watershed Assessment (AGWA) Tool	David Shafer
12/06/22 10:30 - 10:55 AM	Landsat-based Evaluation of Vegetation and Snow around Hoh Glacier, Olympic National Park, Washington between 1987 and 2022	Charlie Drake

A Socioeconomic Tier Study of Tucson Unified School District

Julianne Keaster

jckeaster@arizona.edu

12/06/22, 09:00 - 09:25 AM

Abstract:

Tucson Unified School District (TUSD) has taken steps to ensure they are not segregating students based on socioeconomic status in their schools. At the bequest of their Office of Desegregation, a case study of TUSD's schools was performed. This case study included determining the geographical distribution of schools across the district boundary and analyzing socioeconomic traits as proxies for student segregation. The socioeconomic traits examined were household income, educational attainment, rent vs. owned households, and single-parent vs. two-parent households. The socioeconomic status analyses detailed in this report drew from the Texas Education Agency's 2018 study and aimed to replicate a socioeconomic tier study of their school-aged residents. To complete this study, socioeconomic tiers within TUSD were created. Socioeconomic tiers were calculated based on creating an index from multiple census variables. Tier data was joined to school attendance boundaries to obtain raw percentages of each tier as it was distributed within each TUSD school. Next, schools with disproportionate percentages of students represented by one or more socioeconomic tiers were identified. Lastly, updated school boundaries were formed by redistributing students to represent all socioeconomic tiers more equitably in each school within TUSD. This research will allow TUSD to redefine school attendance boundaries so that students from each socioeconomic tier are more equitably represented. Other school districts in the United States can utilize the model from this study for the same purpose.

Keywords: attendance, boundary, segregation, socioeconomic, Tucson

Modeling the hydrological impacts of the Yarnell Hill Fire using the Automated Geospatial Watershed Assessment (AGWA) Tool

David Shafer
dahveed@arizona.edu

12/06/22, 10:00 - 10:25 AM

Abstract:

The highly publicized 2013 Yarnell Hill Fire is the deadliest wildfire in Arizona history, killing 19 members of the Granite Mountain Hotshots firefighting crew. Wildland fires like Yarnell Hill have immediate effects on human life and property, but they can also increase the frequency and severity of flooding events due to loss of vegetation and hydrophobicity of soils and ash. This study seeks to model hydrological impacts due to land cover change following the Yarnell Hill Fire using the Automated Geospatial Watershed Assessment (AGWA) Tool. AGWA can enable hydrologic modeling using the Soil & Water Assessment Tool (SWAT) or the Kinematic Runoff and Erosion Model (KINEROS2) and can help land and water resource managers make quick decisions regarding flood mitigation strategies following a wildfire. In this study, AGWA is used to model the change in land cover due to the Yarnell Hill fire based on a burn intensity map created using the differenced Normalized Burn Ratio (dNBR) and based on pre- and post-fire Landsat 8 Operational Land Imager (OLI) imagery. Storm conditions included in the model represent a variety of storm recurrence intervals based on National Weather Service data for the town of Yarnell. For all post-fire storm conditions modeled, flooding increases more rapidly and with greater volume as compared to pre-fire conditions.

Keywords: Yarnell Hill, wildfire, hydrology, modeling, AGWA

Landsat-based Evaluation of Vegetation and Snow around Hoh Glacier, Olympic National Park, Washington between 1987 and 2022

Charlie Drake

charlie.drake189@gmail.com

12/06/22, 10:30 - 10:55 AM

Abstract:

Glaciers within the Olympic Mountains, Washington, occupy an important role in local ecosystems by providing cold meltwater to feed rivers and forests downstream. Atop Mount Olympus, glaciers are fed by storm clouds inundated with moisture from the Pacific Ocean during the Autumn, Winter, and Spring seasons. The Hoh Glacier, alongside the Blue and White Glaciers, provide cool meltwater during rain-starved Summers to the Hoh Watershed, allowing keystone salmon and bull-trout populations to flourish. However, due to anthropogenic climate change, glaciers worldwide have receded or outright disappeared. The glaciers atop Mount Olympus are no exception to this global trend and are estimated to disappear by 2070. This project uses remote sensing to quantify how vegetation and snow cover around the Hoh Glacier have changed across 35-years in 5-year intervals starting in 1987 and concluding in 2022. Multispectral Landsat imagery of the watershed surrounding Hoh Glacier will be quantified and classified from the normalized difference vegetation index (NDVI) and the normalized difference snow index (NDSI). Land cover classified by NDVI revealed that barren, rocky, snowy terrain decreased over time while sparse vegetation increased. Through NDSI, land designated as possessing snow decreased, while terrain which lacked snow increased between 1987 and 2022.

Keywords: NDVI, NDSI, Glacier, Climate-Change, Washington, Hoh-Glacier, Olympic-National-Park