MS-GIST Projects Spring 2023
Tuesday, May 02

**** 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
05/02/23 10:00 - 10:25 AM	Childs Play: Park availability across Maricopa County, Arizona	Dean Pritchard
05/02/23 12:00 - 12:25 PM	Monitoring Harmful Algal Blooms in Small Inland Lakes Utilizing Sentinel-2 Multispectral Imagery	Crystal Mendoza
05/02/23 01:00 - 01:25 PM	A Normalized Burn Ratio Analysis of The 2012 Pine Creek, Montana, Wildfire	Brad Beall
05/02/23 02:00 - 02:25 PM	STREET TREE EQUITY: UNDERSTANDING SOCIOECONOMIC AND ZONING FACTORS OF STREET TREE DISTRIBUTION IN THE CITY OF LOS ANGELES, CALIFORNIA	Matthew Skyberg

Childs Play: Park availability across Maricopa County, Arizona

Dean Pritchard
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05/02/23, 10:00 - 10:25 AM

Abstract:

In an ideal world, parks would be available to everyone within a half mile of the places where they live. This is especially important for young children under the age of 9, as having places to play and run can greatly improve multiple positive traits in young children. The City of Phoenix has over 250,000 children between the ages of 0 and 9 living within its city limits. This study compares the areas within half a mile to a park and those without, to see whether any racial or economic groups do not have equal access to a public funded playground. A secondary study was narrowed down to parks that feature either a splash pad or pool, since during the summer months in Phoenix, that would be a major benefit. Data was pulled from the US census and turned into graphs to see where the discrepancies lay. About 25% of children within Phoenix live within census tracts that do not have a park within a half mile. The groups that have the least access to parks are Asian and White populations. The data would also suggest a slight bias against those of higher income.

Keywords: Socio-economic, race, playgrounds, children, Phoenix

Monitoring Harmful Algal Blooms in Small Inland Lakes Utilizing Sentinel-2 Multispectral Imagery

Crystal Mendoza
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05/02/23, 12:00 - 12:25 PM

Abstract:

Population growth and climate change continue to jeopardize food security. Modern agricultural practices adapt to these changes by increasing the use of chemicals and fertilizers which directly affects our water quality. Harmful Algal Blooms (HABs) is an overgrowth of blue-green algae, in some cases it contains toxic bacteria caused by excess nutrients in water sources. Local governments test water sources to ensure levels of algae remain safe for consumption and water activities, however the cost to test the water remains high. There is remotely sensed imagery currently that can identify and monitor HABs, however the spatial resolution is too low for small inland lakes and rivers to provide accurate data. This project uses Sentinel-2 multispectral imagery to identify HABs using a normalized difference chlorophyll index (NDCI). The results of the project revealed that the application successfully displayed the location and extent of possible algal blooms based on NDCI values and visual interpretations. The in-situ samples of excess chlorophyll did correlate with the increased chlorophyll of the index when there was in-situ sample data available. As a recommendation for use of NDCI, local testing facilities could focus their sample locations to the locations of where there is high chlorophyll content.

Keywords: Harmful Algal Blooms, Normalized Difference Chlorophyll Index, Remote Sensing, Sentinel-2

A Normalized Burn Ratio Analysis of The 2012 Pine Creek, Montana, Wildfire

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05/02/23, 01:00 - 01:25 PM

Abstract:

Severe wildfires are an all-too-common feature of the Western American landscape. Moreover, the frequency of such fires is on the increase. Each year, new wildfires add hundreds of thousands of fire-damaged acres to the millions of acres of forests burned in previous years. While some of these areas can recover naturally, forests that suffer prolonged, severe burning may not recover without human assistance. Due to the increase in frequency of such events, America's reforestation needs have exceeded available reforestation resources (e.g., seedlings for replanting, forestry professionals experienced in wildfire remediation, labor for replanting and maintenance, etc.). Passage of the Federal REPLANT Act in November of 2021 means that more resources will be available in the future, but forestry managers must still decide which of the most severely damaged and at-risk areas of the American West should be given priority for remediation. One commonly used tool for evaluating wildfire damage is a mathematical index known as the normalized burn ratio. Using reflectance data captured by satellites, the normalized burn ratio is used to assess 1) wildfire boundaries, 2) relative wildfire severity, and 3) whether natural regrowth in a previously burned area is taking place. The normalized burn ratio can be calculated as an index using two different combinations of reflectance data. The goal of this project is to assess the effectiveness of the normalized burn ratio index using the 2012 Pine Creek (Montana) Fire as a test case.

Keywords: NBR, wildfire, Pine Creek, Montana, reforestation, Landsat

STREET TREE EQUITY: UNDERSTANDING SOCIOECONOMIC AND ZONING FACTORS OF STREET TREE DISTRIBUTION IN THE CITY OF LOS ANGELES, CALIFORNIA

Matthew Skyberg
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05/02/23, 02:00 - 02:25 PM

Abstract:

Urban tree canopy (UTC) serves a critical role in the health and well-being of city inhabitants. The city of Los Angeles is amid a campaign to install 90,000 new trees and increase tree canopy by at least 50% in low-income areas. Street trees play a pivotal role in the composition of the urban tree canopy as it occurs in the public realm. This study seeks to determine how street trees are distributed in the City of Los Angles based on socioeconomic and zoning variables. A tree index value was calculated for each census block group and tested against 37 socioeconomic and zoning factors as well as historic HOLC redline designations. This study then used regression analysis to approximate a relationship between the explanatory factors, and the dependent variable of the calculated street tree index. Exploratory regression identified substantial positive relationships between tree index values and the significant explanatory variables of the Asian household language, associate or bachelor's degree education attainment, commute by public transportation or walking, and Spanish household language. There were negative relationships between the tree index and the significant explanatory variables of population density, Black or African American population, the population at or below the poverty line, Indo-European household language, and renter-occupied housing. There was a positive relationship between the tree index and areas zoned as residential only. A negative relationship existed for areas zoned as open space, industrial, public facility, parking, and commercial. There was also a negative relationship for areas included in the city's hillside zoning ordinance. Historically redlined areas with a grade of A, B, or C included an entirely positive relationship with the tree index, however, areas with a grade of D had a less robust positive relationship. This study can aid the City of Los Angeles with prioritizing block groups for street tree planting or provide insight for future studies with a more robust set of variables.

Keywords: Street Tree, Urban Tree Canopy, Tree Inequity, Redlining, Green Infrastructure