

11/19/24

Legislative Water Development Commission

Greenspace Analysis

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Utah Division of Water Resources

water.utah.gov

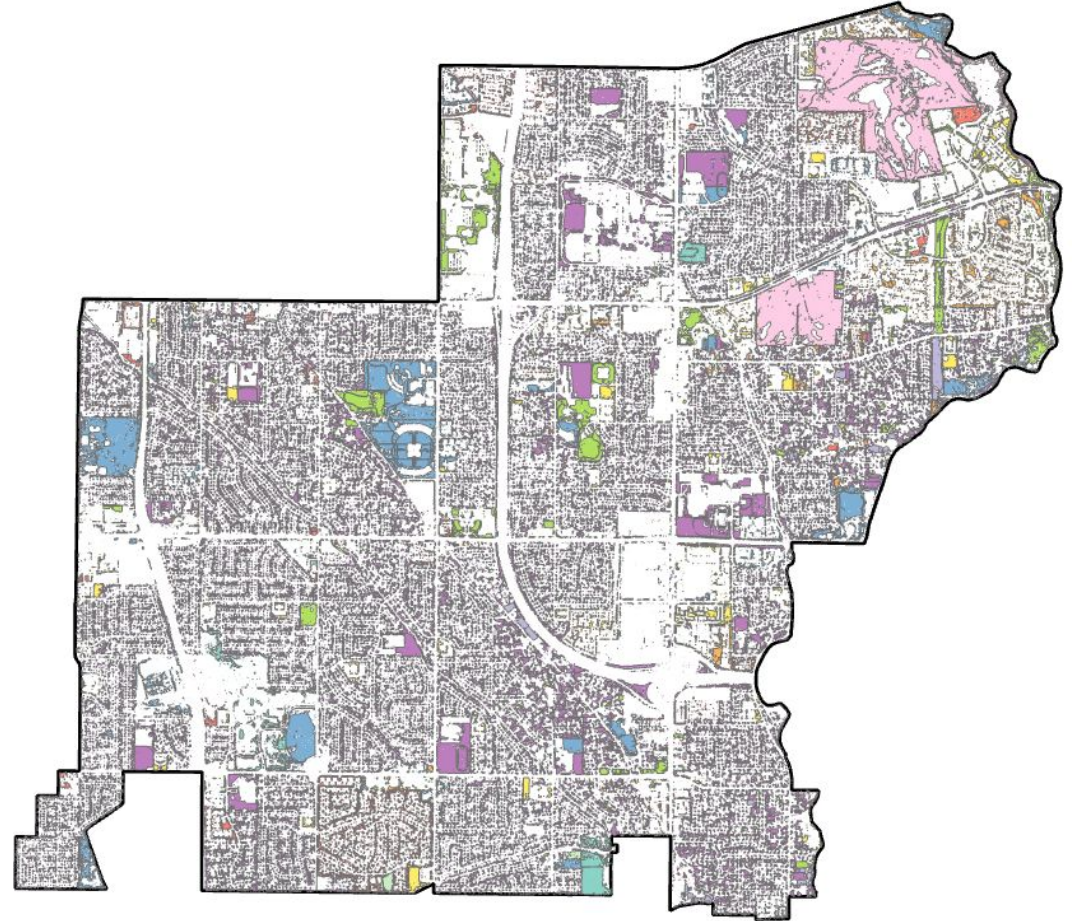
What is the Greenspace Model?

- **Definition:** A remote-sensing driven tool designed to quantify the area of green spaces (lawns, parks, recreational areas)
- **Purpose:** To estimate urban green spaces and amount of healthy vegetation. To create meaningful area estimates at varying scales
- **Key Features:**
 - Detailed spatial mapping
 - Water consumption projections
 - Scenario planning



Who will use the Greenspace Model?

- State Government
- City Planners
- Water Utilities
- Research Institutions

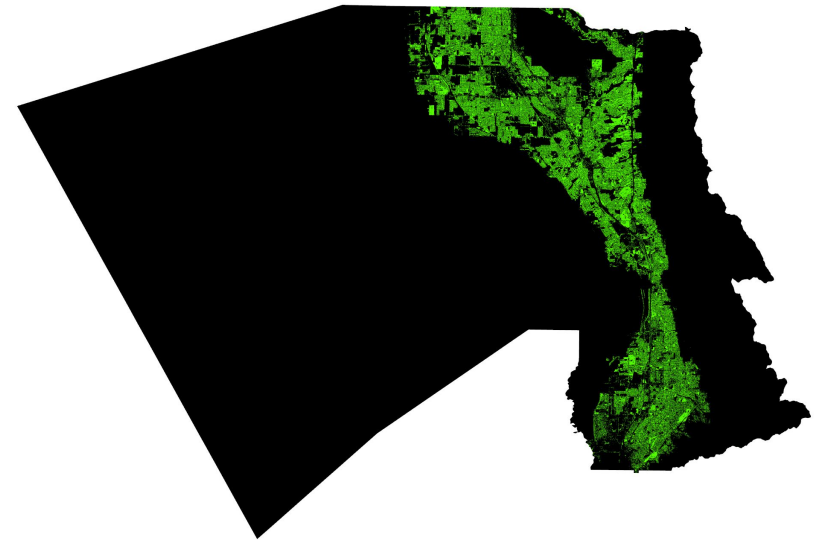


Taylorsville City



Why do we need it?

- **Challenges:**
 - Increased population and urbanization in Utah
 - Limited water resources amid ongoing drought conditions
 - High water use in traditional green space management
- **Opportunities:**
 - Additional dataset for improved decision-making
 - Enhanced collaboration among stakeholders
 - Meeting state water conservation goals



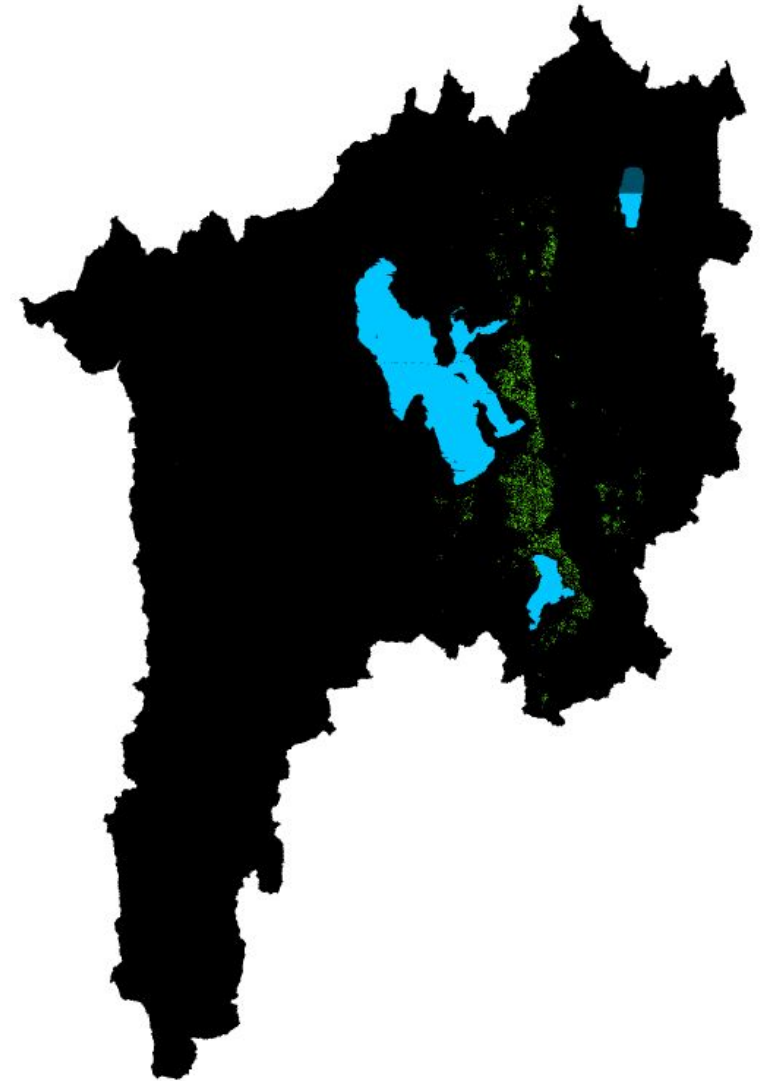
Davis County



Results

Great Salt Lake Basin:
~135,000 acres of Turf
(+/- 15,000)

Statewide:
~165,000 acres of Turf
(+/- 20,000)



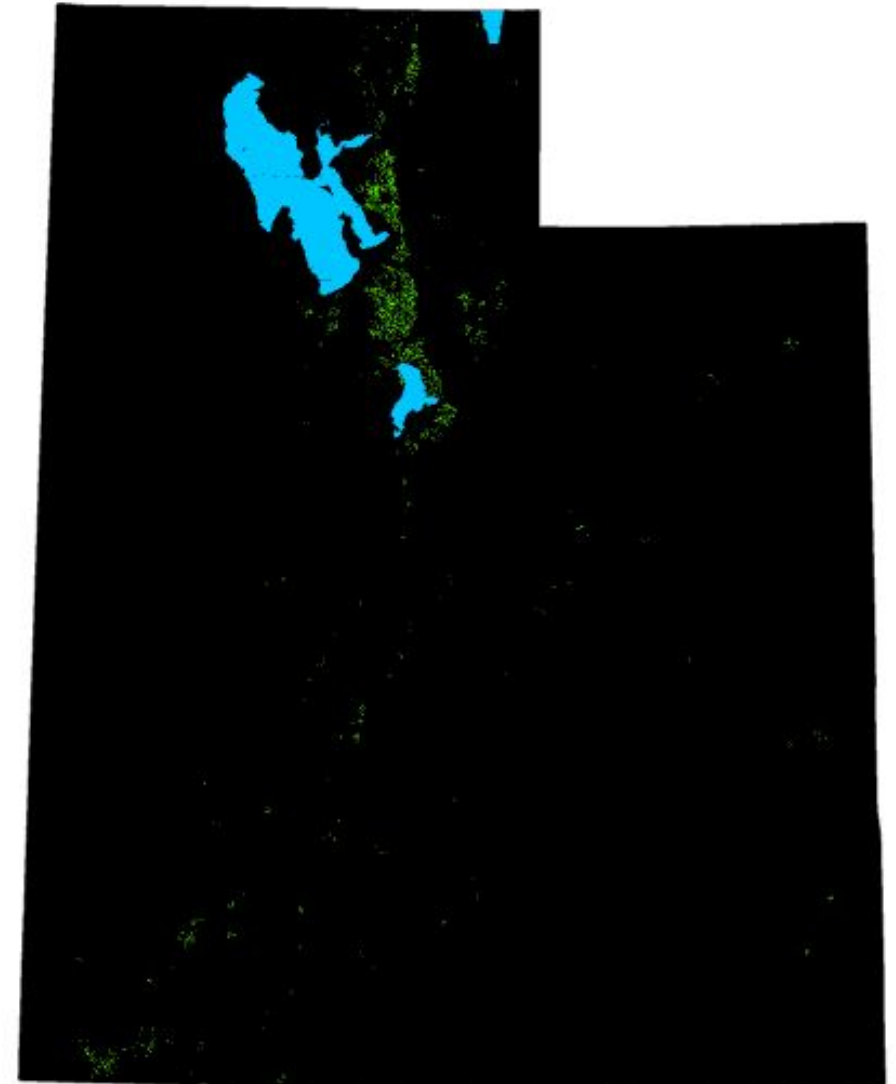
Great Salt Lake Basin



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Utah



Future Conservation Analysis

Non-functional Turf Analysis

- Extrapolation potential Water Savings
 - Complete Removal
 - Replacement to Water Wise Landscaping

Water to Turf Need

- Utahns over water
 - How much? 0.5-1ft?
~ 65,000-135,000 acft





Jordan River, June 2024

Thank you.

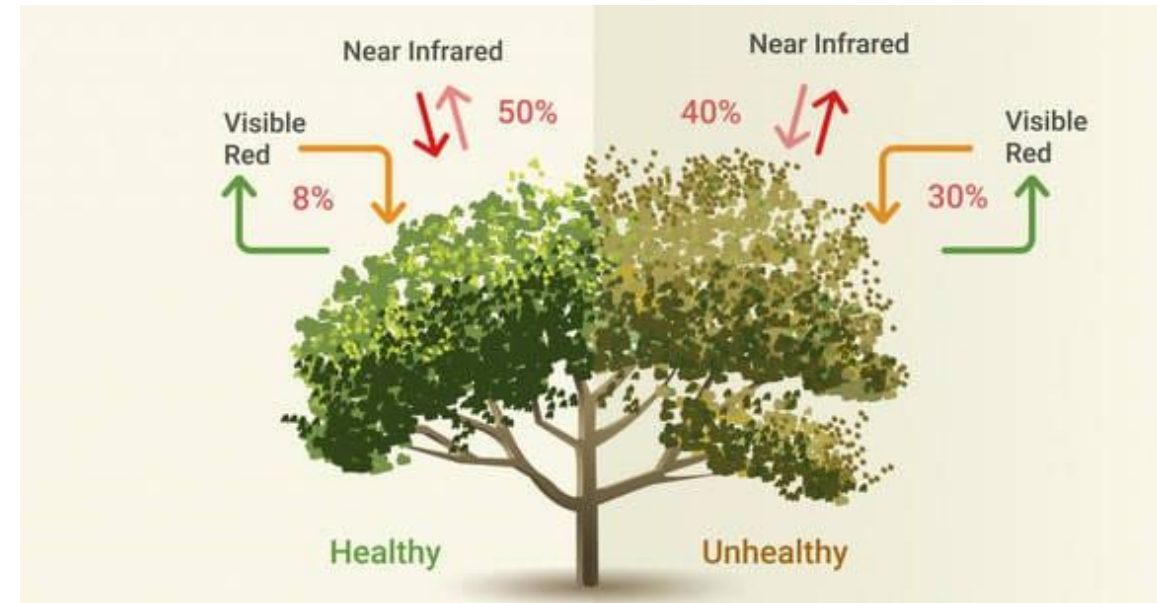
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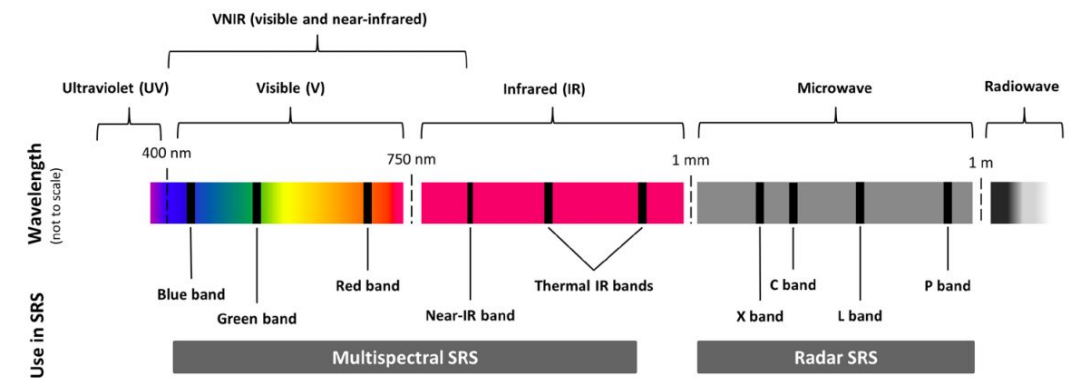
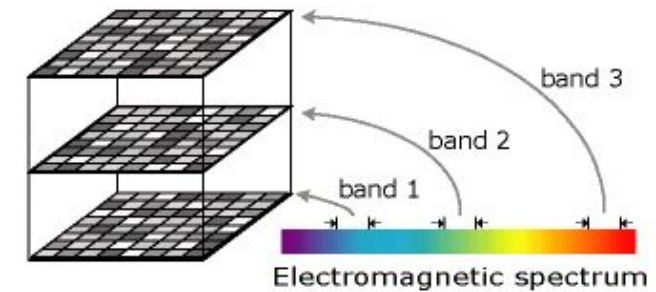
Vegetation Indices

- Normalized Difference Vegetation Index (NDVI)
 - widely-used metric for quantifying the health and density of vegetation using sensor data
- Healthy Vegetation absorbs most of the visible red wavelengths, while reflecting a lot of the near infrared wavelengths



Remote Sensing

- The process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance
- provides relatively cheap and quick information on an area of interest



Greenspace Model Overview

- Originally created in 2015
- The model serves as a good starting point to answer much larger questions
- National Agriculture Imagery Program (NAIP) and Google Earth Engine (GEE) is now used in the model
- The model will eventually be posted on the division website.



Limitations

- NAIP is a single snapshot in time
- Shadows due to time of day of capture
- Dead spots in turf due to month of capture
- Not looking for strictly *turf*
 - Healthy plants / foliage



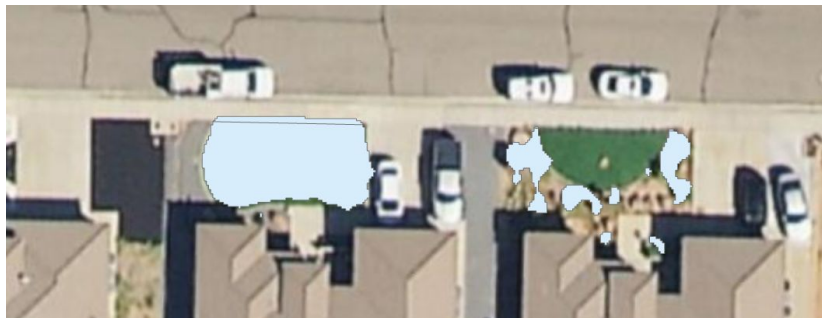
Leveraging this Interaction

- Extract NDVI at a set threshold
- Calculate the area of extraction
- Approximate total area within AOI

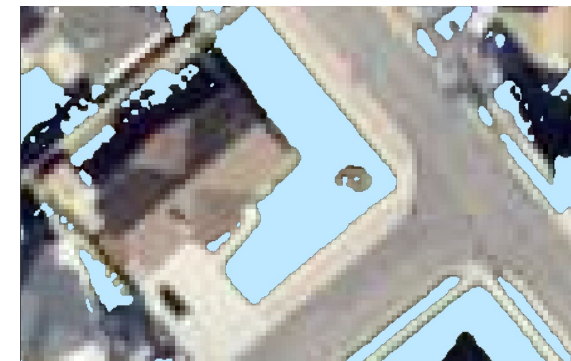
True Color



False Color



Artificial Turf not captured



Extraction



Greenspace

- High Resolution Imagery is required
- Coarser Resolution Imagery would *wash out* turf
 - Sat8 (30m) or Sentinel2 (10m)
- NAIP 60cm Resolution currently used
 - ~2.8TB of imagery for Utah

