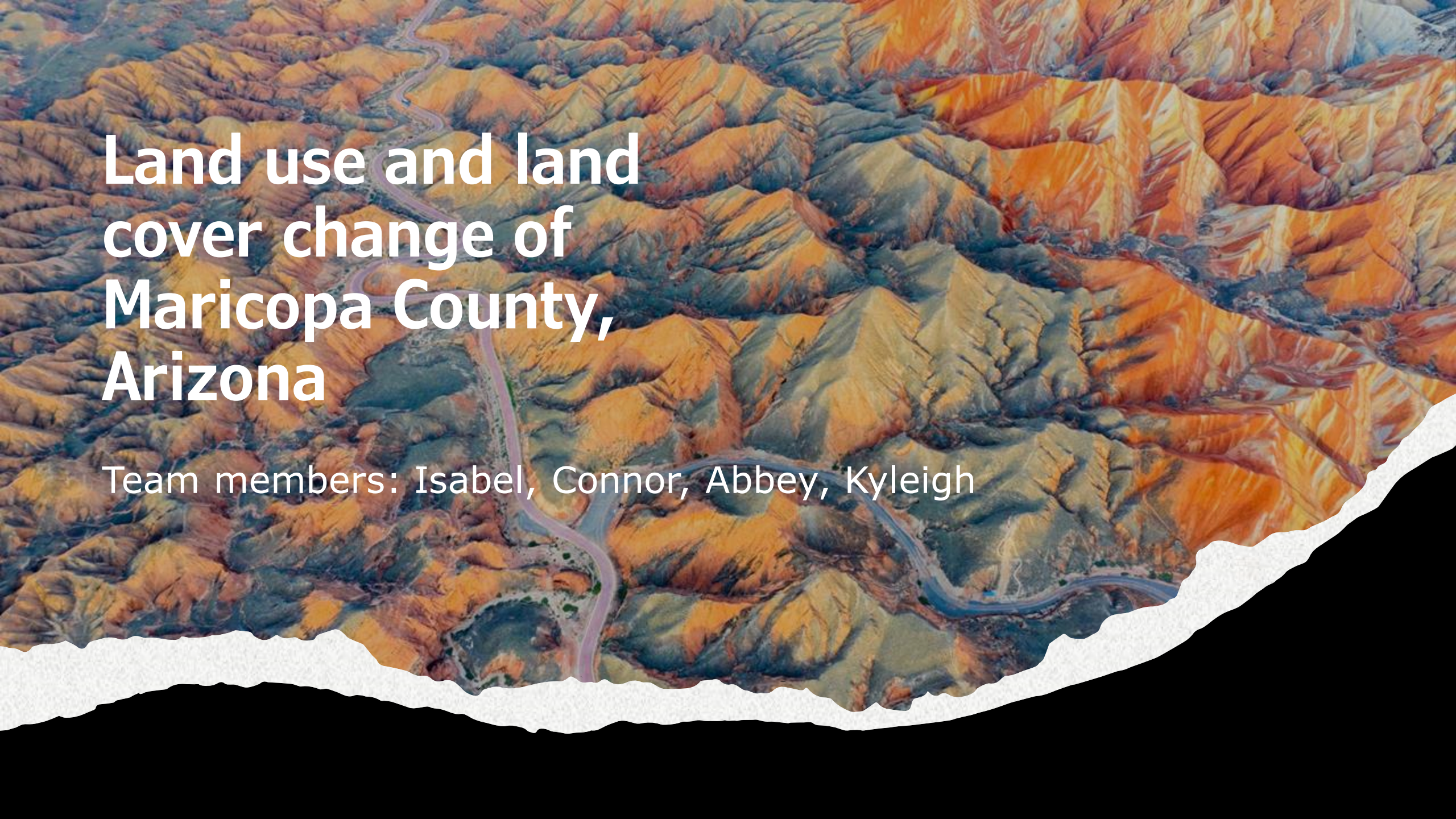


Land use and land cover change of Maricopa County, Arizona

Team members: Isabel, Connor, Abbey, Kyleigh

Workflow

1. Gather Data
    - Maricopa County boundary
    - 2001 Land Cover
    - 2021 Land Cover
2. Clip Maricopa County out of Land Cover Raster
3. Complete Change Detection
    - Change Detection Wizard Tool: categorical change detection method
4. End Result (3 maps)
    - 2001 Land Cover
    - 2021 Land Cover
    - 2001-2021 Urbanization Change Detection

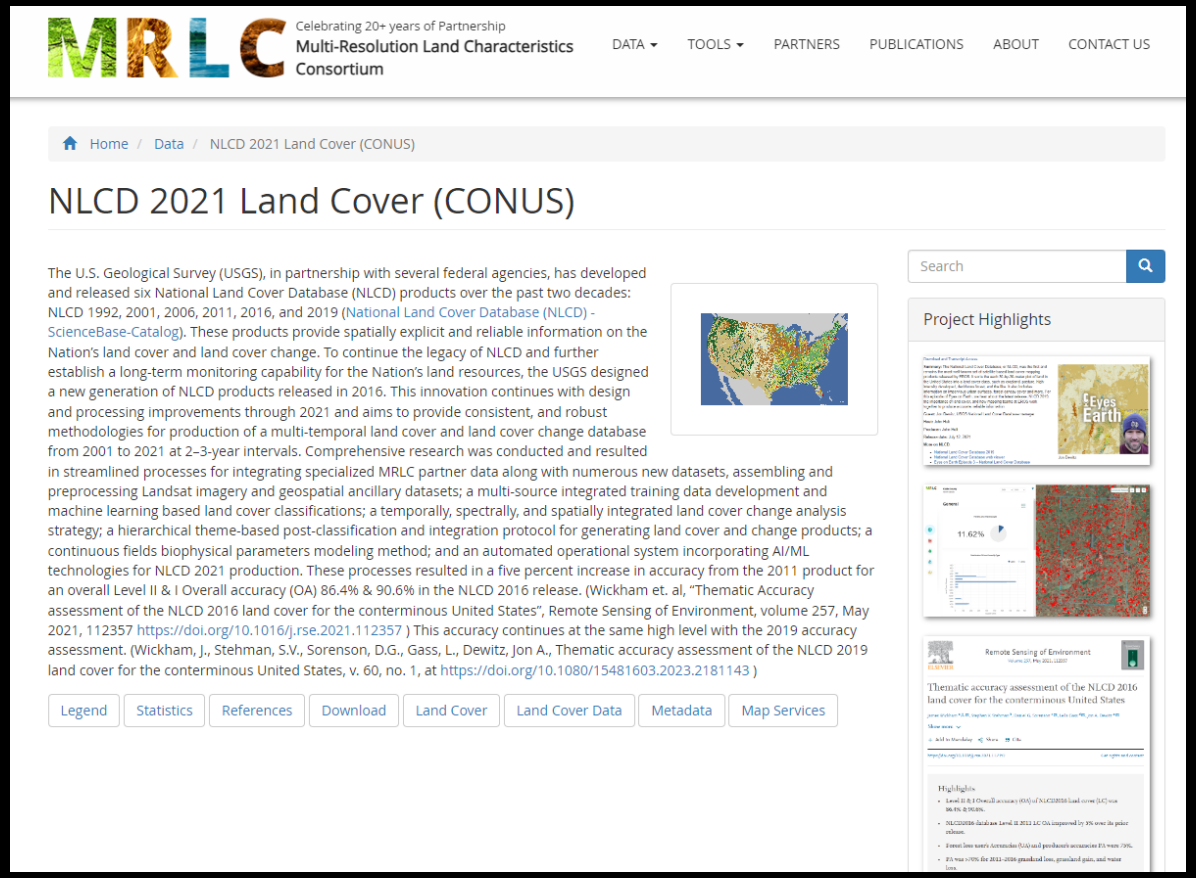
Why Maricopa?

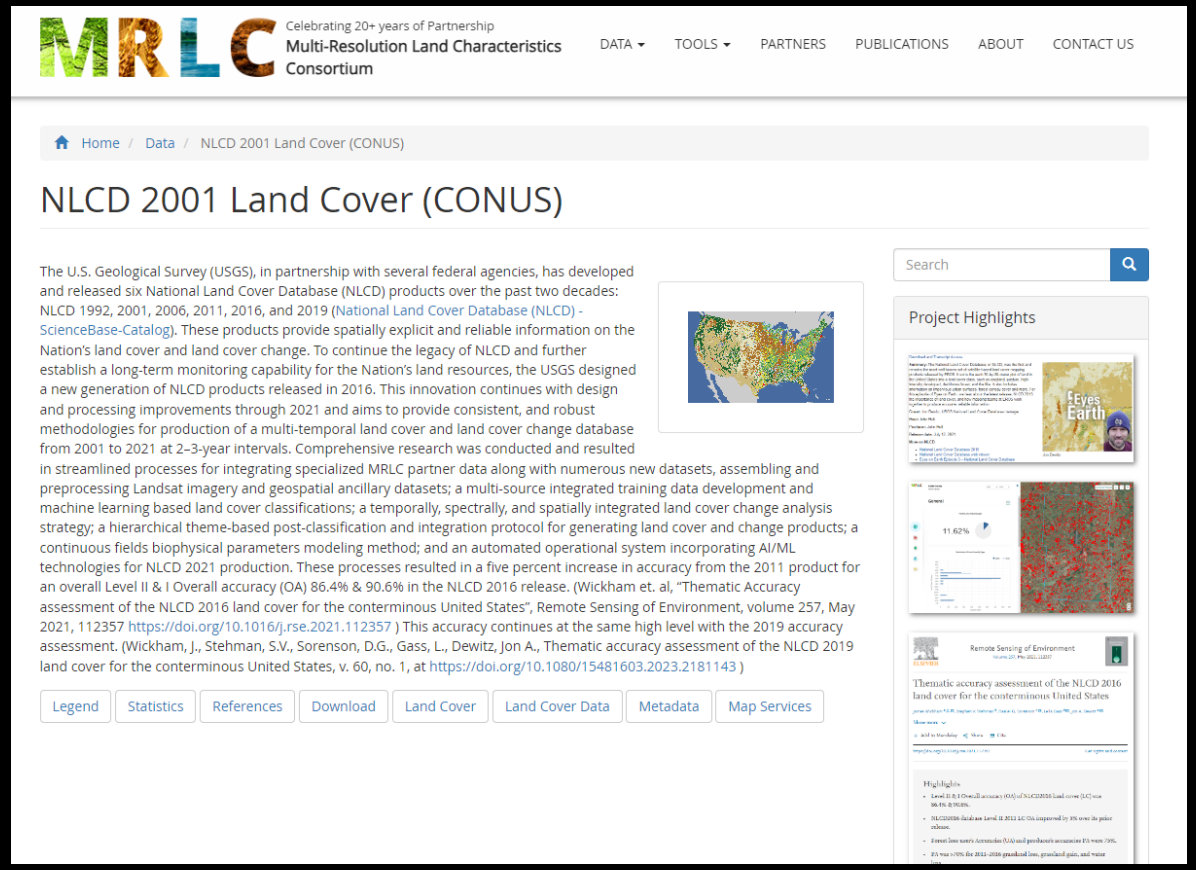
- Est. 1871
- One of the oldest counties in Arizona
- In the middle of the Sonoran Desert
- Home to Phoenix, the capital
- The fastest growing county in the US
  - 3.17 million (2001)
  - 4.49 million (2021)

Research Question

How did land cover change in Maricopa County, Arizona from 2001 to 2021, specifically looking at urbanization change?

Land Cover Data from MRLC





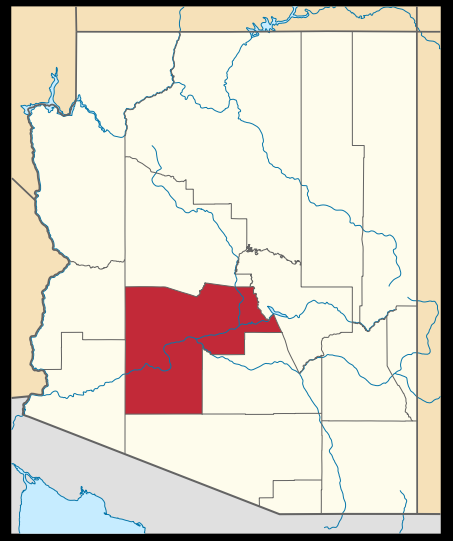
Classification Descriptions

Class\ Value	Classification Description
Water	
11	**Open Water**- areas of open water, generally with less than 25% cover of vegetation or soil.
12	**Perennial Ice/Snow**- areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.
Developed	
21	**Developed, Open Space**- areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
22	**Developed, Low Intensity**- areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.
23	**Developed, Medium Intensity** -areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.
24	**Developed High Intensity**-highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
Barren	
31	**Barren Land (Rock/Sand/Clay)** - areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.

Forest	
41	**Deciduous Forest**- areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.
42	**Evergreen Forest**- areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.
43	**Mixed Forest**- areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.
Shrubland	
51	**Dwarf Scrub**- Alaska only areas dominated by shrubs less than 20 centimeters tall with shrub canopy typically greater than 20% of total vegetation. This type is often co-associated with grasses, sedges, herbs, and non-vascular vegetation.
52	**Shrub/Scrub**- areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
Herbaceous	
71	**Grassland/Herbaceous**- areas dominated by gramanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
72	**Sedge/Herbaceous**- Alaska only areas dominated by sedges and forbs, generally greater than 80% of total vegetation. This type can occur with significant other grasses or other grass like plants, and includes sedge tundra, and sedge tussock tundra.
73	**Lichens**- Alaska only areas dominated by fruticose or foliose lichens generally greater than 80% of total vegetation.
74	**Moss**- Alaska only areas dominated by mosses, generally greater than 80% of total vegetation.

Data Preparation

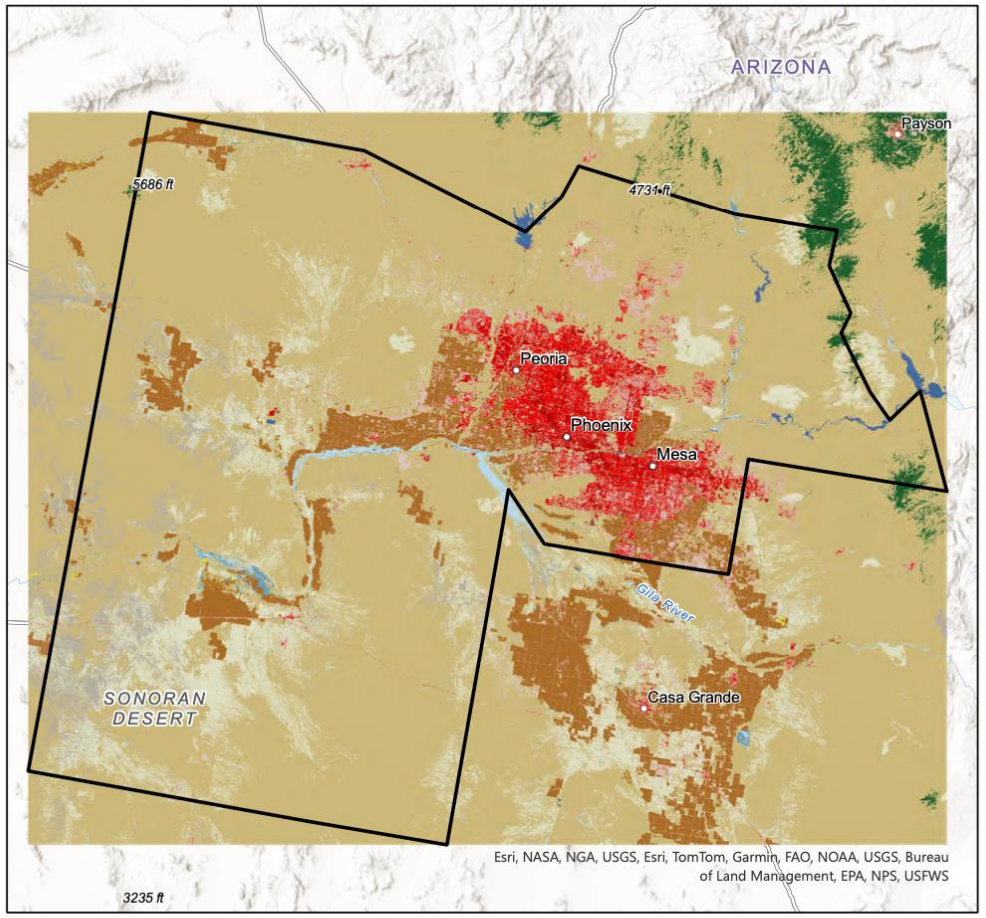
1. A vector layer was added with the outline of Maricopa County.
2. The land use raster data and the Maricopa county boundary data were both projected on to the same coordinate plane (Albers Equal Area).
3. The national land use raster data was clipped using the boundaries of Maricopa County for easier processing.



Methods

1. Once both the 2001 and 2021 data sets were clipped into the Maricopa County region, the change detection wizard was used to select for all areas that were considered undeveloped in 2001 and developed in 2021.
2. Once the changed areas were identified, they were exported to a separate table for analysis.

Maricopa County Land Cover, 2001
NLCD Land Cover Categories



Maricopa County Boundary

NLCD Land Cover 2001

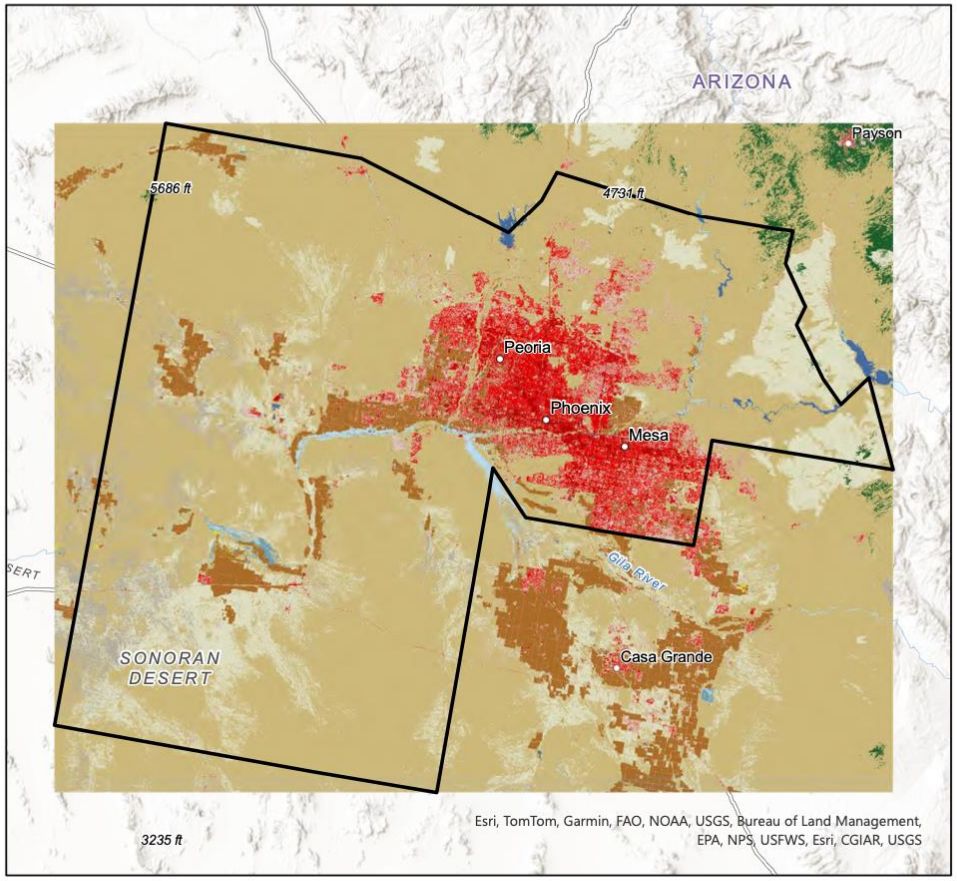
- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Herbaceous
- Hay/Pasture
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands

Miles

0 5 10 20 30 40

N

Maricopa County Land Cover, 2021
NLCD Land Cover Categories



Maricopa County Boundary

NLCD Land Cover 2021

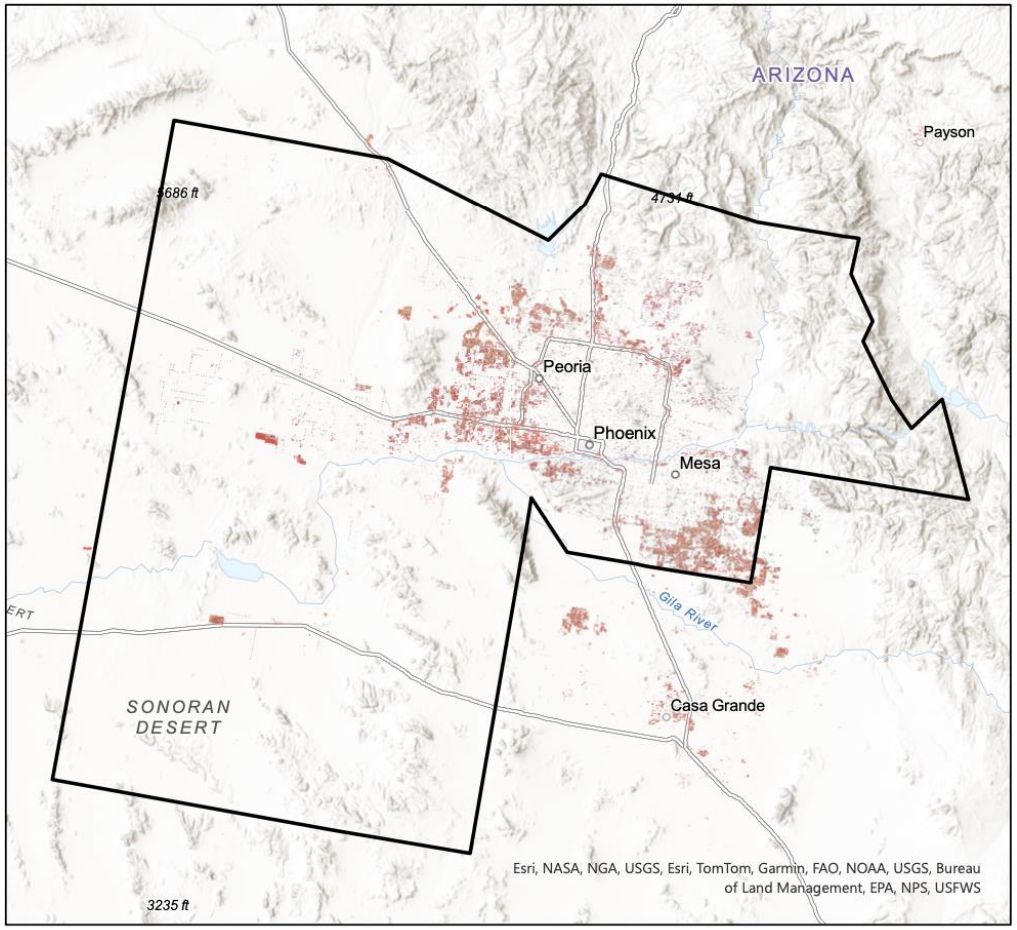
- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Herbaceous
- Hay/Pasture
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands

Miles

0 5 10 20 30 40

N

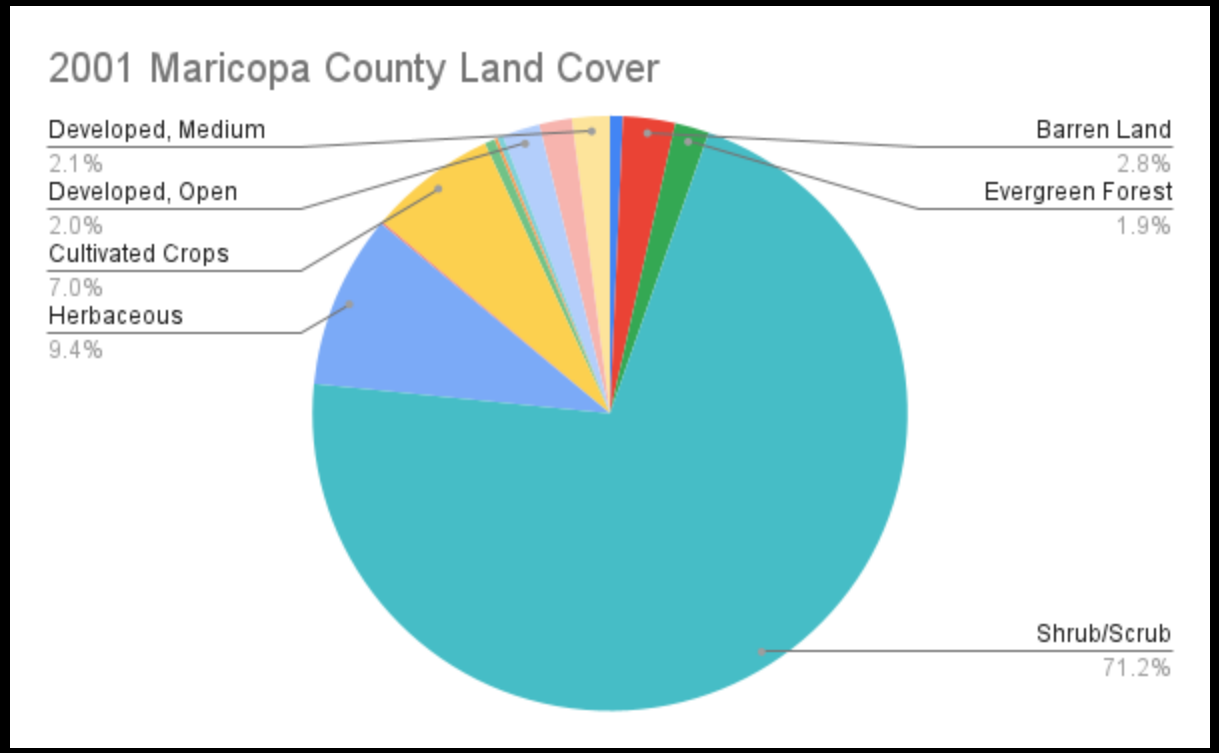
Maricopa County Land Cover Change 2001-2021, NLCD Land Use Categories

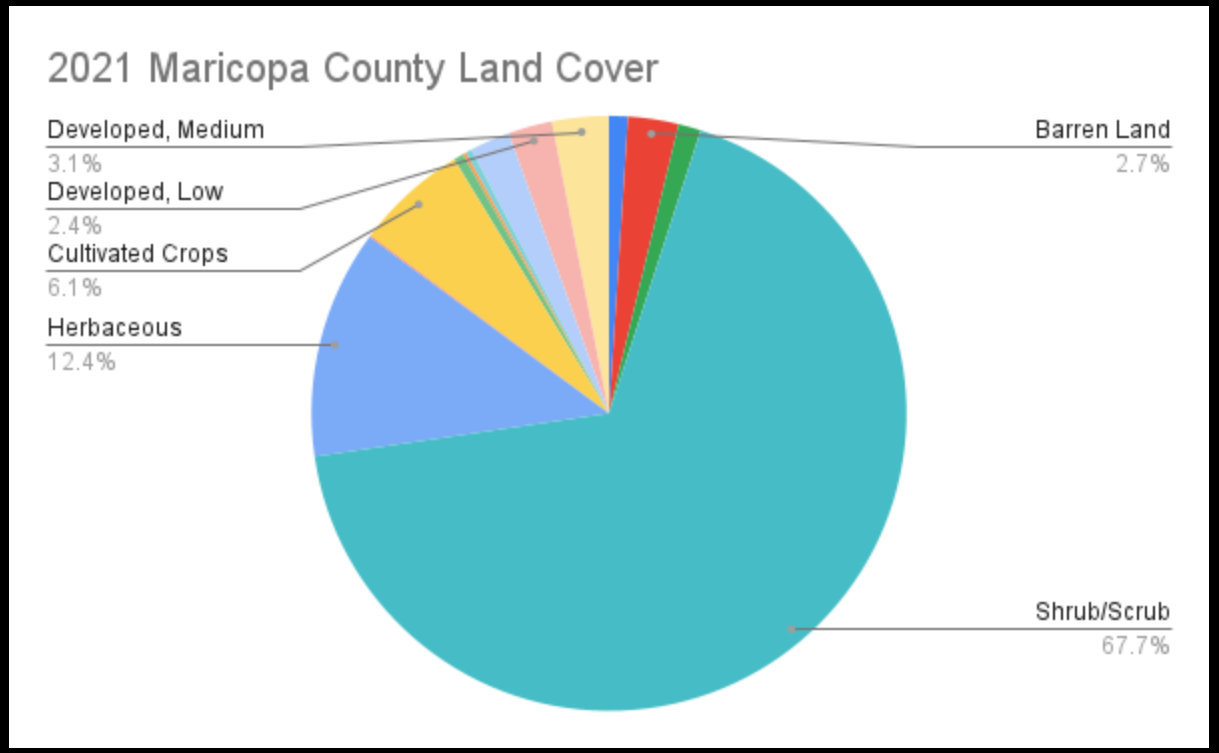


Analysis

- Land cover changes around Phoenix, Mesa, & Peoria
- Some regions already significantly developed in 2001 saw more development in 2021
- Changes mostly observed on the outskirts of the cities
- Development near natural wetlands

Analysis





- Much developed land transitioned from a lower intensity to higher intensity of development
  - Most of the land area changed from shrub/cropland to developed land

Discussion

- According to the 2020 census
  - Phoenix – 1st populous (1.68 million)
  - Mesa – 2nd populous (518,800)
  - Peoria – 9th populous (203,650)
- Advantages of living in the suburbs and Peoria
  - More space yet still close to the city
  - Lower housing & resource prices

Peoria, AZ via Google Map Images

Results

- Maricopa County Land Cover 2001:
  - Highly populated areas show significant development.
  - Surrounding areas mainly consist of cultivated crops.
  - Developed open space observed in Phoenix, Peoria, and Mesa areas.
- Maricopa County Land Cover 2021:
  - Increased development is evident around the three cities.
  - Reflects Maricopa's status as one of the fastest-growing counties in the U.S.
- Land Use Change Map:
  - Urbanization primarily observed around the most populated cities.
  - Indicates the need for increased developed land to accommodate population growth.

Conclusion

- Increased developed land observed around the most populated cities in 2021.
- Indicates a shift in landscape due to population growth.
- Understanding urbanization and land cover change essential for assessing environmental impacts.
- Crucial for comprehending the implications of population growth in Maricopa County.