

INTRODUCTION

The effects of a growing population on the landcover composition are concerning to many Cache County residents. Cache County has grown by 18% in the past ten years, and growth is expected to continue. The residents of Cache County value the small-town feel, scenic beauty, recreation opportunities, open space, and the presence of agriculture in the valley. With continued growth, the current composition of Cache County changes, threatening many of these values. The purpose of this study is to analyze the landcover composition changes in the past twenty years to determine how growth is affecting the composition of the valley, and provide recommendations for the future.

METHODS

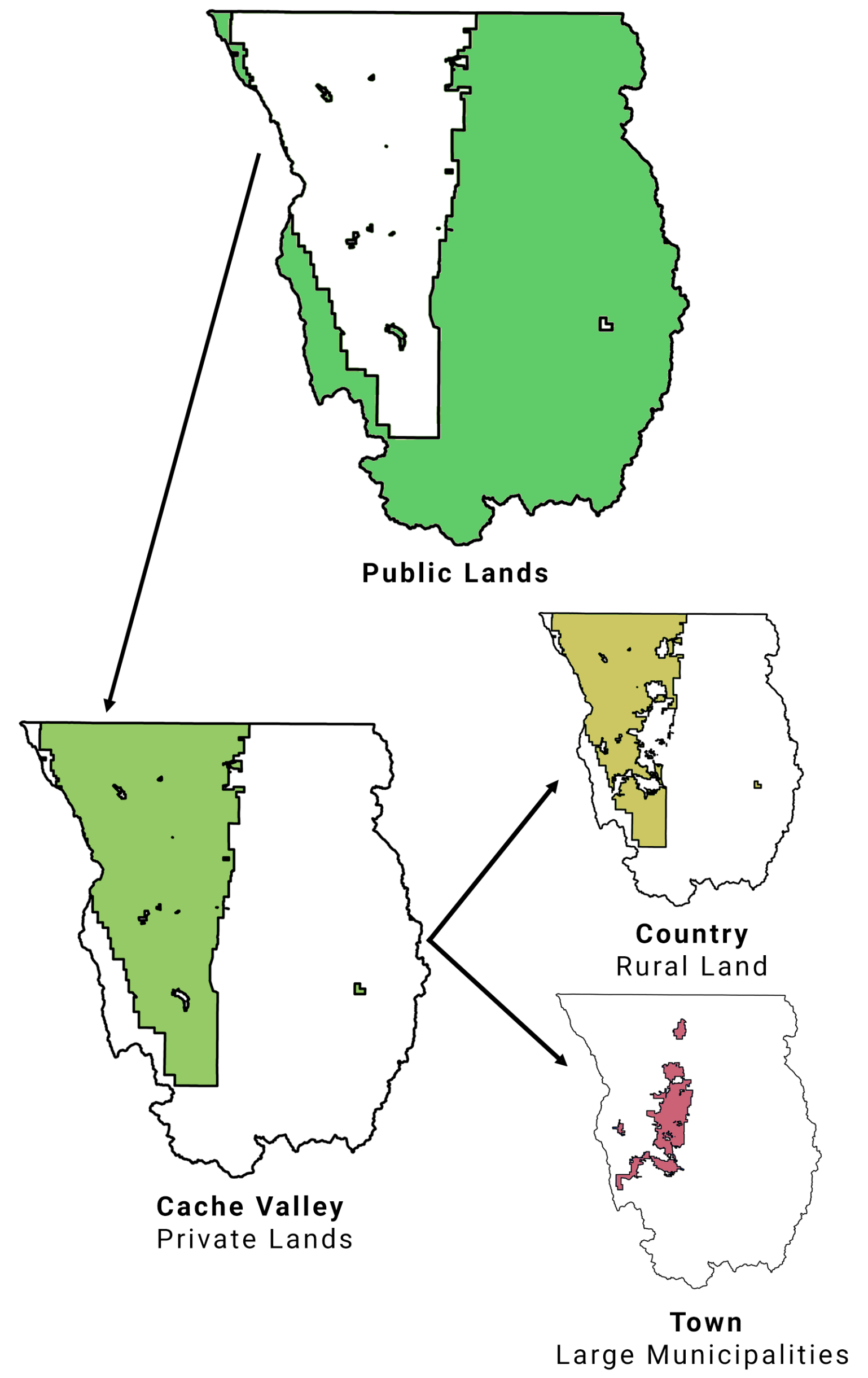
For this analysis, data was compiled from the National Landcover Database from the years 2001 and 2019. In order to focus on developable areas, public lands, specifically land owned by the federal and state government, were removed. The remaining data was exported as a county-wide data set, and measures of land composition were obtained using Fragstats. After analysis of the county-wide data, the data was further split into Country and Town. The country data set included all unincorporated county land, and rural municipalities with a population under 1,000, or densities under 100 people per square mile. Town data included all large municipalities over these amounts.

To facilitate better visualization of the data, the data from the National Landcover Database was recategorized to merge similar categorizations into larger groups. These five groups include:

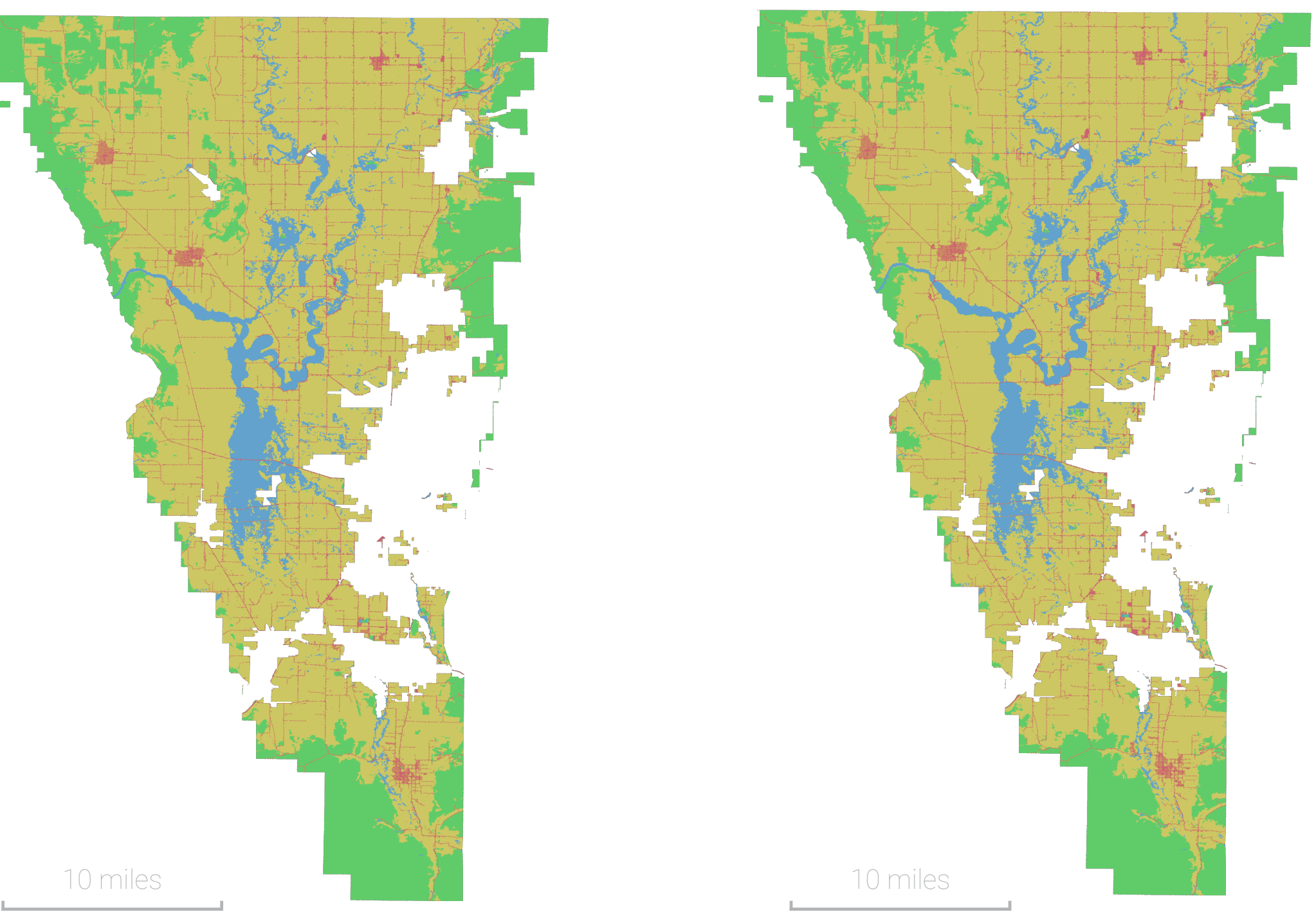
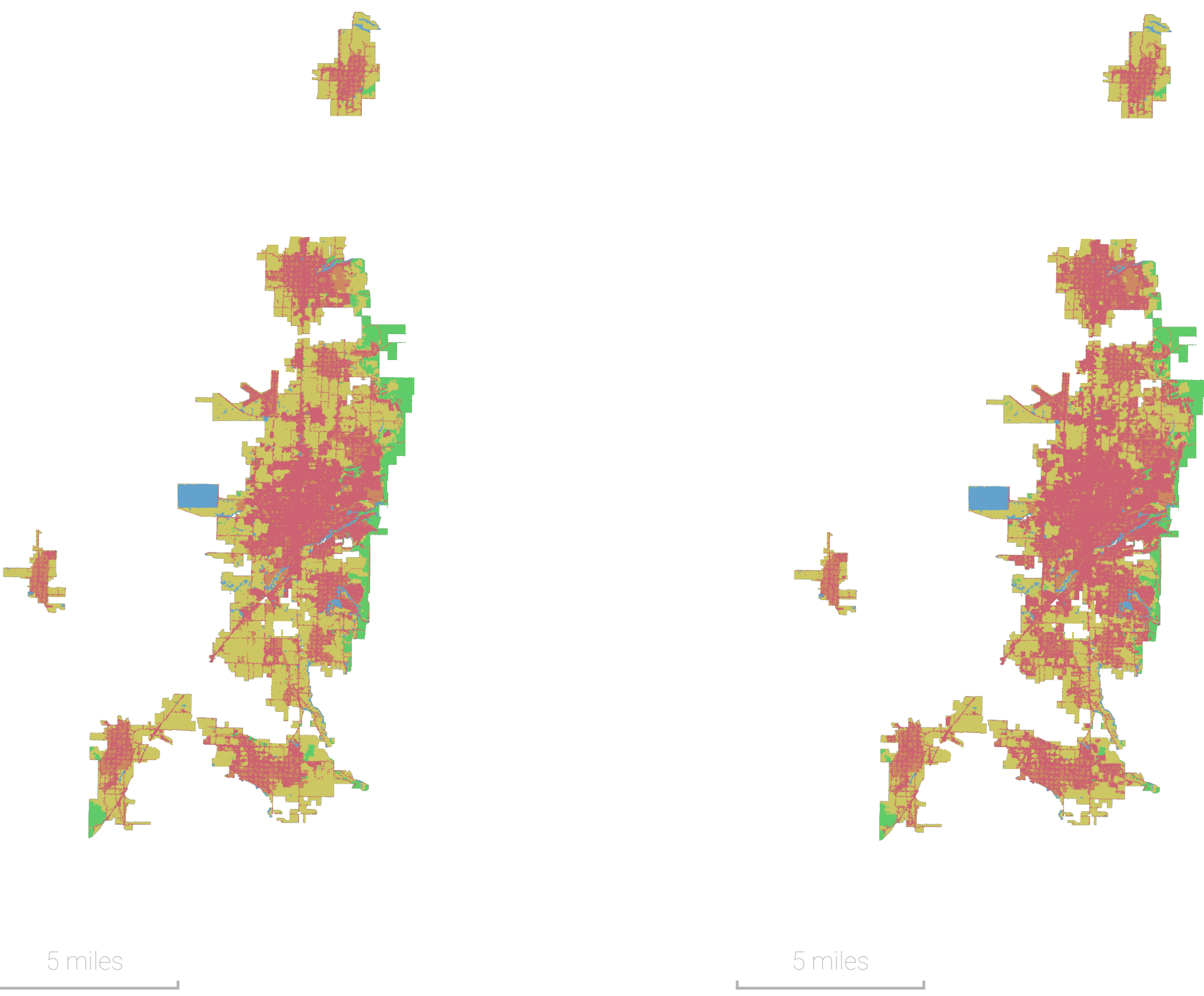
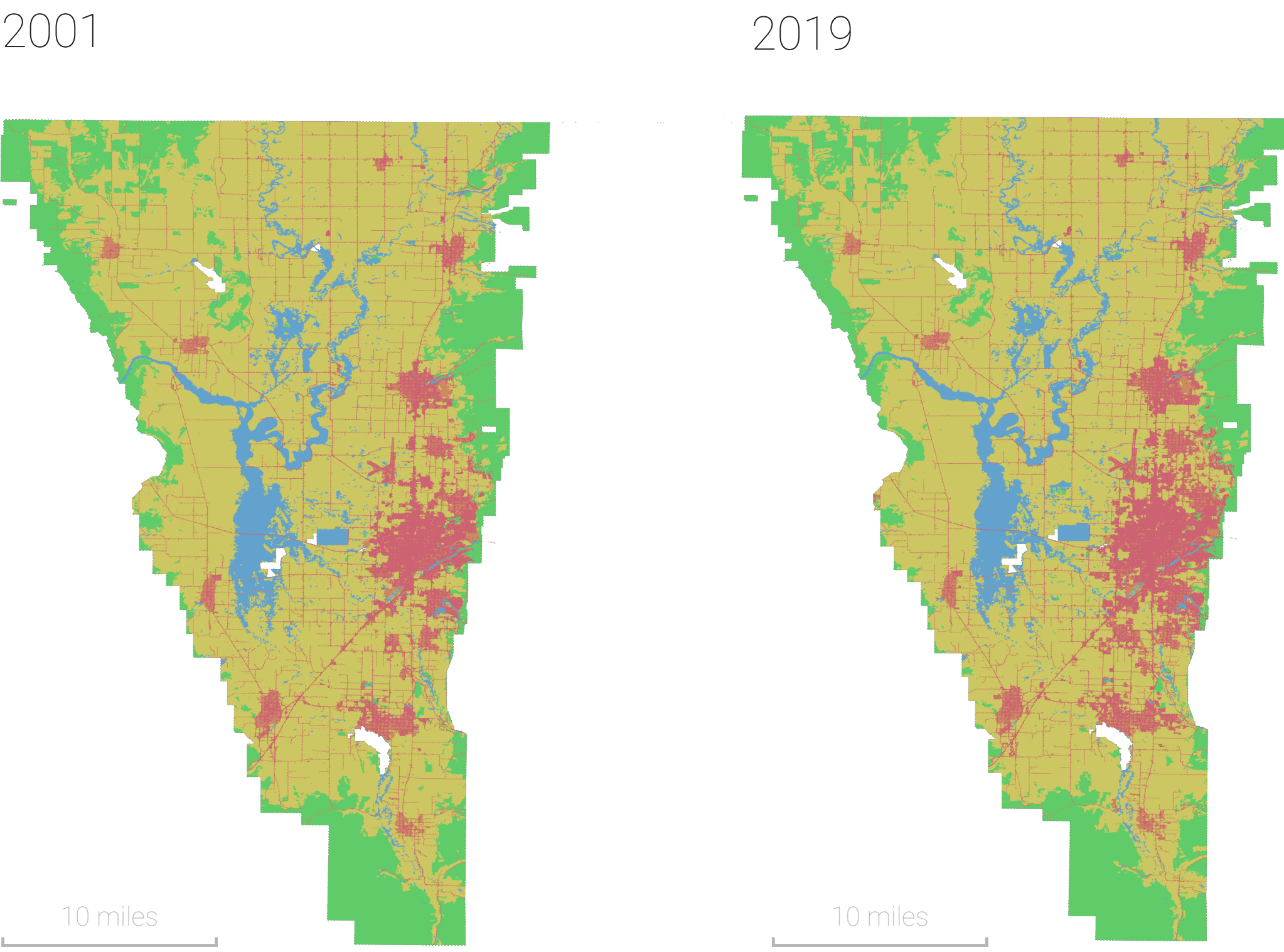
- Agriculture
- Development
- Developed open space
- Plant communities
- Wetlands & open water

Primary analysis focused on landscape composition in these subcategories for each of these areas from 2001 and 2019. In addition, a projection was made for 2070 by utilizing the linear trend from 2001 to 2019.

Additional analysis was made for fragmentation, land consumption, and density. Fragmentation measures used include patch density, average patch size, and contagion. These measurements were obtained using the original categorization of the National Landcover Database. To compare land consumption and density, the total developed land was determined by combining developed, low, medium, and high-intensity land. Populations for each year were obtained from the U.S. Census Bureau.



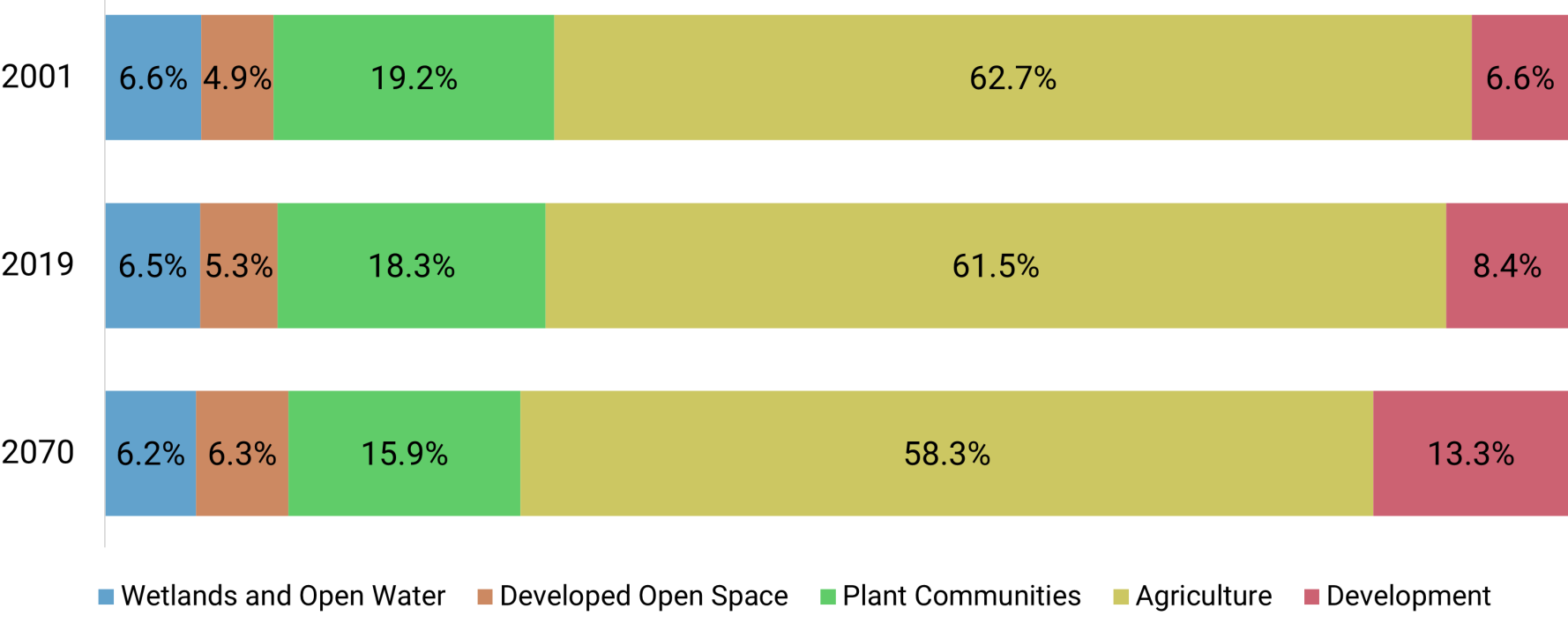
RESULTS



Wetlands & Open Water	Plant Communities	Agriculture	Development	Developed Open Space
Included National Land Cover Database Categorizations				
Woody Wetlands Herbaceous Wetlands Open Water	Barren Land Deciduous Forest Evergreen Forest Mixed Forest Shrub/Scrub Grassland/Herbaceous	Pasture/Hay Cultivated Crops Cultivated Crops	Developed, Low Intensity Developed, Med Intensity Developed High Intensity	Developed, Open Space

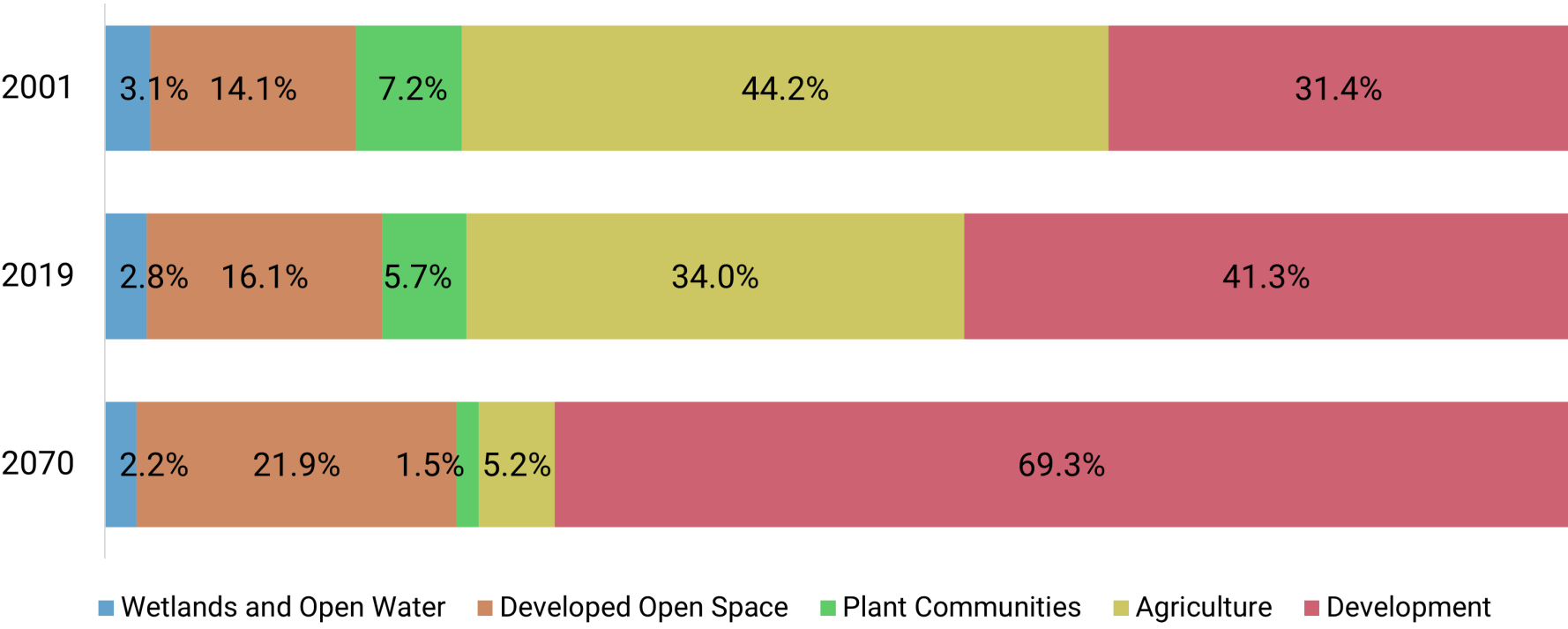
Cache Valley

Cache Valley Wide 18-year change
Water/Wetlands: Net Loss (-98 acres)
Plant Communities: Net Loss (-905 acres)
Ag Land: Net Loss (-1212 acres)
Developed Space: Net Gain (+1844 acres)
Developed Open Space: Net Gain (+371 acres)
Projection: By 2070 if current trends prevail we expect Cache Valley to gain 14,000 acres of development, 6600 acres of open spaces, primarily near or in existing towns.



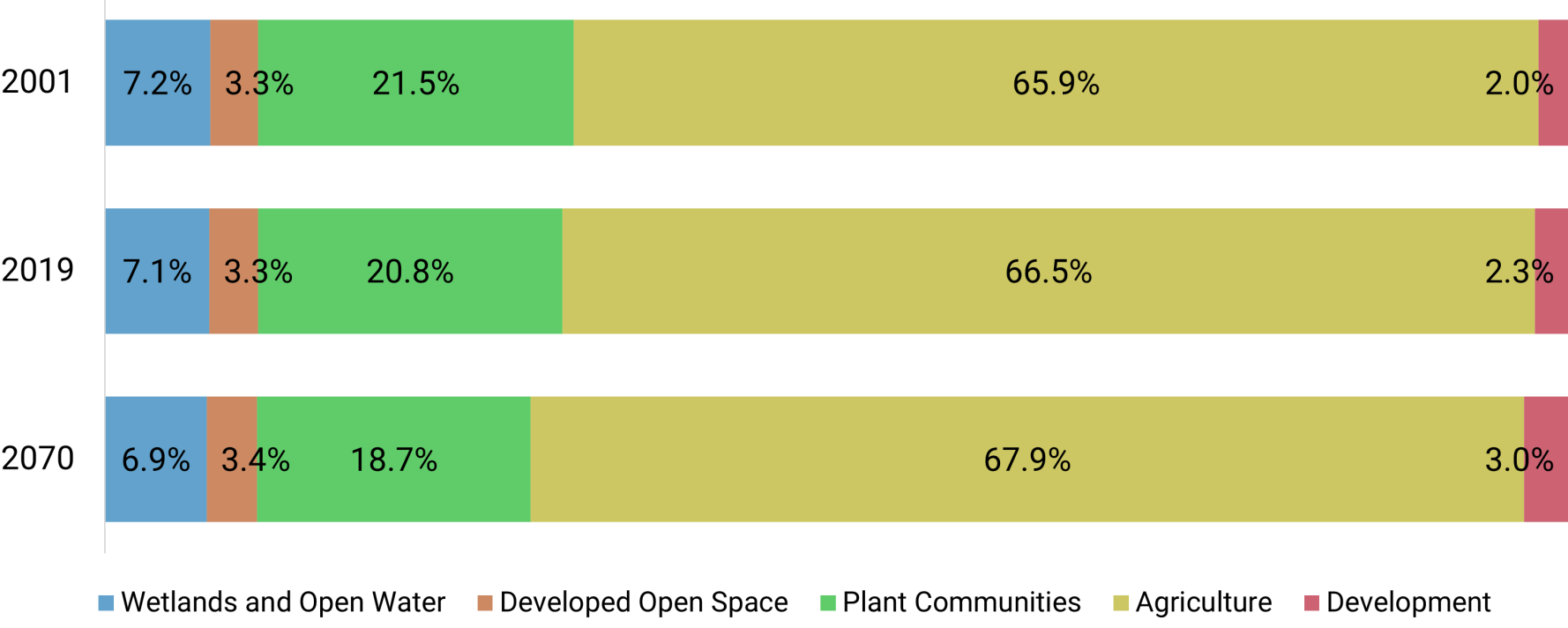
Town

Towns 18-year change
Water/Wetlands: Net Loss (-40 acres)
Plant Communities: Net Loss (-246 acres)
Ag Land: Net Loss (-1681 acres)
Developed Space: Net Gain (+1681 acres)
Developed Open Space: Net Gain (+336 acres)
Projection: The towns will hold most of the new development and residents, leaving only 5% of land within towns for agricultural use, and 70% developed land.



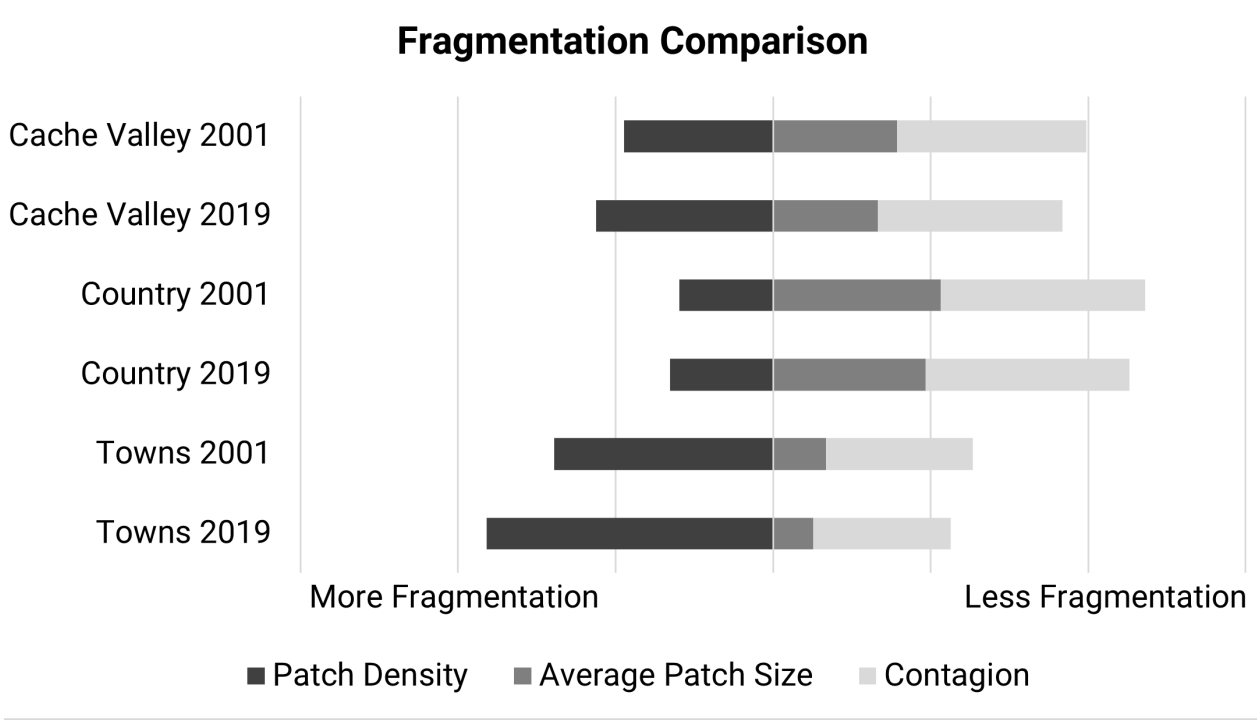
Country

Country lands 18-year change
Water/Wetlands: Net Loss (-58 acres)
Plant Communities: Net Loss (-664 acres)
Ag Land: Net Gain (+449 acres)
Developed Space: Net Gain (+233 acres)
Developed Open Space: Net Gain (+40 acres)
Projection: A slight increase in agricultural land, but ultimately little change. The country is staying country currently.



FRAGMENTATION

Fragmentation across the county has increased by a small measure between 2001 and 2019. Comparing the data from the country and towns, it is apparent that the most significant fragmentation occurs in the towns. The country is relatively unfragmented, and fragmentation has not increased significantly in this area over time. Patch density has increased significantly in the town area, indicating more fragmentation as the number of patches increases. The presence of more fragmentation in the town area is unsurprising but the trends for increasing fragmentation are undesirable.

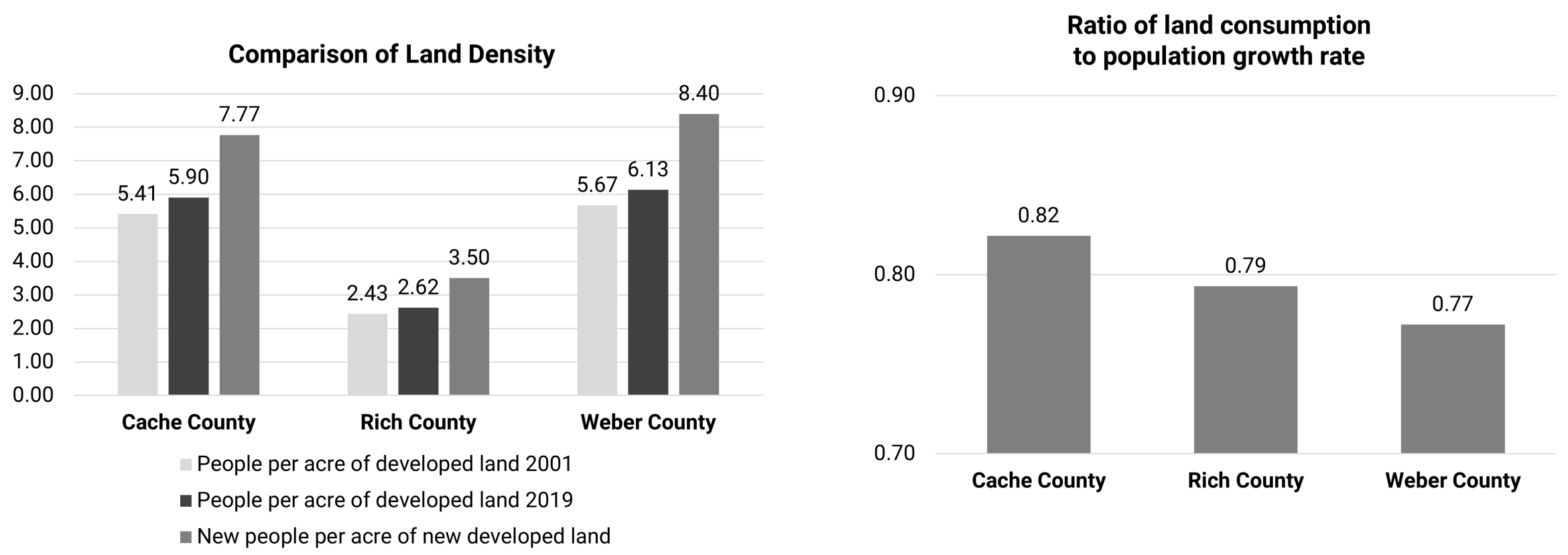


	Patch Density	Average Patch Size	Contagion
Cache County 2001	4.73	3.94	59.99
Cache County 2019	5.62	3.32	58.74
Country 2001	2.98	5.32	64.78
Country 2019	3.27	4.85	64.64
Towns 2001	6.95	1.68	46.59
Towns 2019	9.09	1.28	43.59

LAND DENSITY AND CONSUMPTION

As a measure of density, the population divided by total acres of developed land was analyzed from 2001 and 2019. To compare this data, the same analysis was made from the neighboring counties of Rich and Weber. Cache County is densifying its development, with a small increase in the number of people per acre between 2001 and 2019. In comparison to other counties, Cache County is much denser than the rural neighboring county of Rich, and only slightly less dense than the more urban county Weber.

Land consumption was analyzed using the ratio of land consumption to the population growth rate (LCRPGR). If the LCRPGR is below 1, this indicates that the land consumption rate is below the population growth rate. At 0.82, the Cache County LCRPGR shows a positive trend toward less land consumption. In comparison to other counties, this value is slightly higher, indicating that progress can still be made to limit land consumption.



CONCLUSION

Cache Valley's citizens continually rank the agricultural character and connection to rural and natural places as one of the best qualities of Cache Valley and wish to preserve these aspects. However, many have noticed a recent influx of growth and development, turning farmland into developed areas further separating urban areas from their beloved rural character. Seeing these trends and responses, we analyzed actual growth from 2001 to 2019. Through this process we found that:

- The loss of plant communities is concerning across the study area.
- Agriculture loss has occurred primarily in the land within municipalities.
- Agriculture land outside the towns has actually increased from 2001 to 2019.
- As far as land density, the towns have been growing responsibly, increasing their density.
- Fragmentation has increased throughout the county but mostly lies within the city.

The clustering of growth around existing towns both follows the popular planning adage of keeping the town town and the country country, but further removes urban centers from the local character that is held dear by residents. Our projections show that Cache Valley can likely keep the country country, but that will require further densification and possible continuing separation of urban and rural areas.

For future planning measures, it is important to maintain the positive trends shown in this research, including the increase in density, growth near existing cities, and the maintenance of the agriculture traditional in the valley. Concerning trends such as the loss of plant communities, and the disappearance of agricultural land next to the town, show a direction for additional conservation methods that are desirable to preserve the character of the valley.

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