

# The Impact of Urbanization on Goodyear's Local Water Supply

Michael Jacobson – DCDC Intern, Gretchen Erwin – City of Goodyear Public Works/Water Resources, Ruby Upreti – DCDC & the School of Sustainable Engineering and the Built Environment | DCDC Internship for Science-Practice Integration

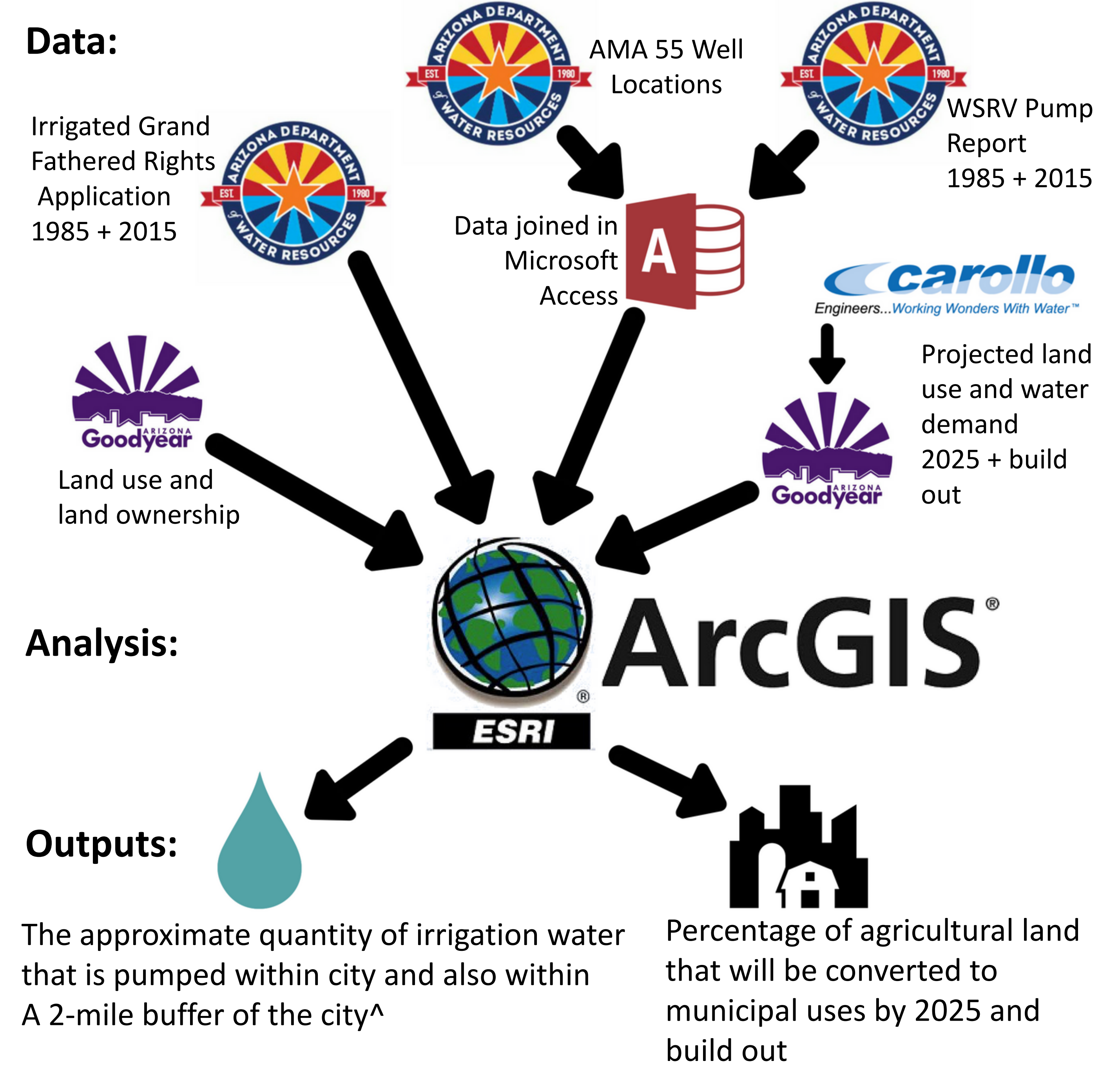
## Introduction

Goodyear is a rapidly growing city located on the western side of the Phoenix metropolitan area. The city was established due to the large-scale agricultural operations that were taking place in the early 1900s. As the city's population has grown over time, these agricultural parcels of land have been developed into municipal land. This urbanization causes the water source for historically agricultural land parcels to switch from potentially external sources (i.e. delivered water from irrigation districts) to local sources (i.e. local groundwater), which may strain Goodyear's local water supply. Additionally, the local irrigation districts are entitled to continue pumping groundwater even after the city retires all of its agricultural land. Goodyear currently relies, almost entirely, on non-renewable groundwater to supply municipal demand. Without proper management the city will be at risk for groundwater depletion in the future.

## Research Question

How does the conversion from agricultural to municipal land uses affect Goodyear's local water supply?

## Methodology

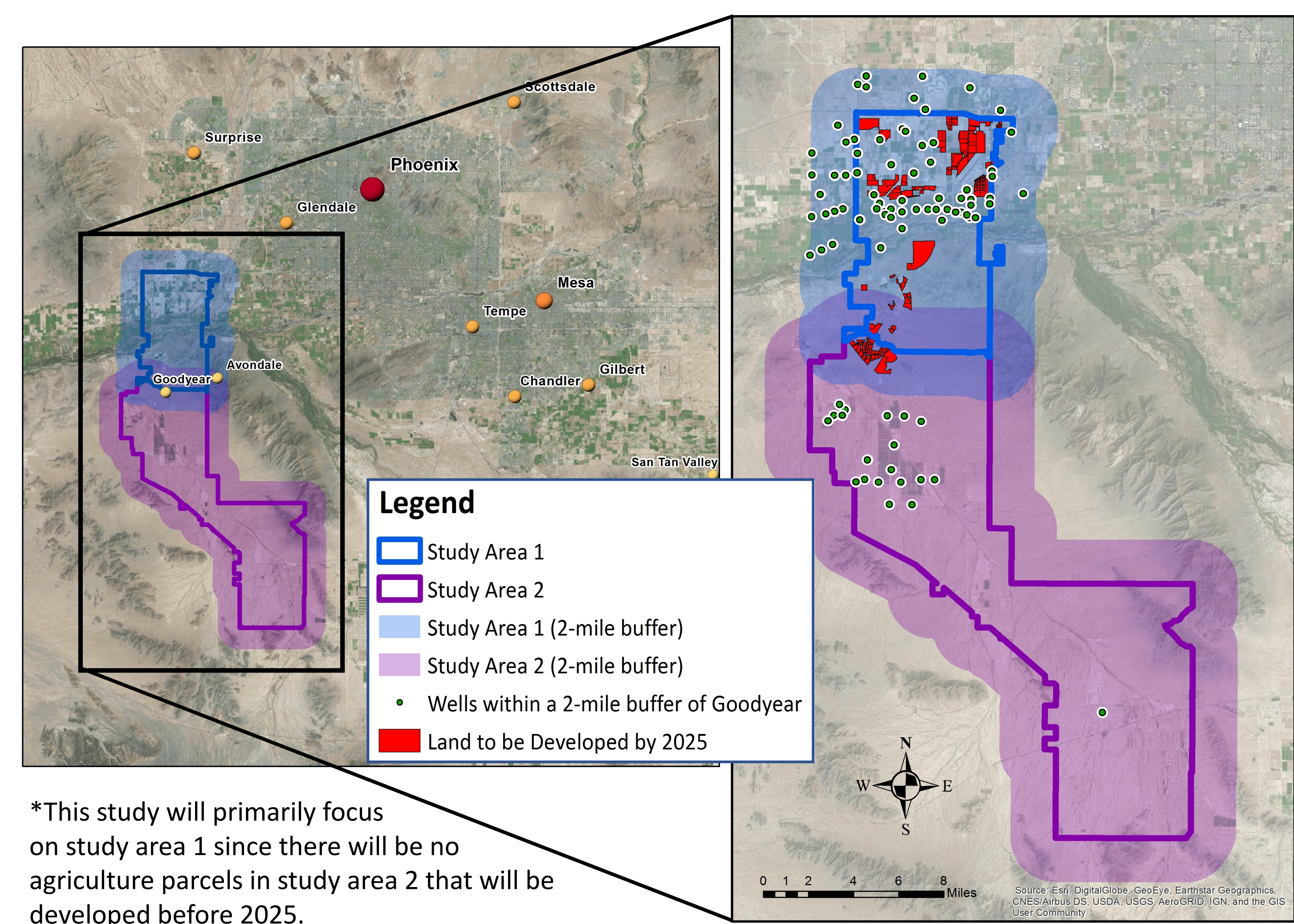


The quantity of agricultural water withdrawn in Goodyear for the years 1985 and 2015 were compared to the quantities of water that were supplied to agriculture within the city. This showed the quantity of water that was either imported or exported for agricultural uses for the study years.

2015 municipal + agricultural consumption was also compared to the projected water consumption for 2025 and build out. This comparison shows if the conversion from agricultural to municipal land uses will reduce groundwater consumption in the case of Goodyear.

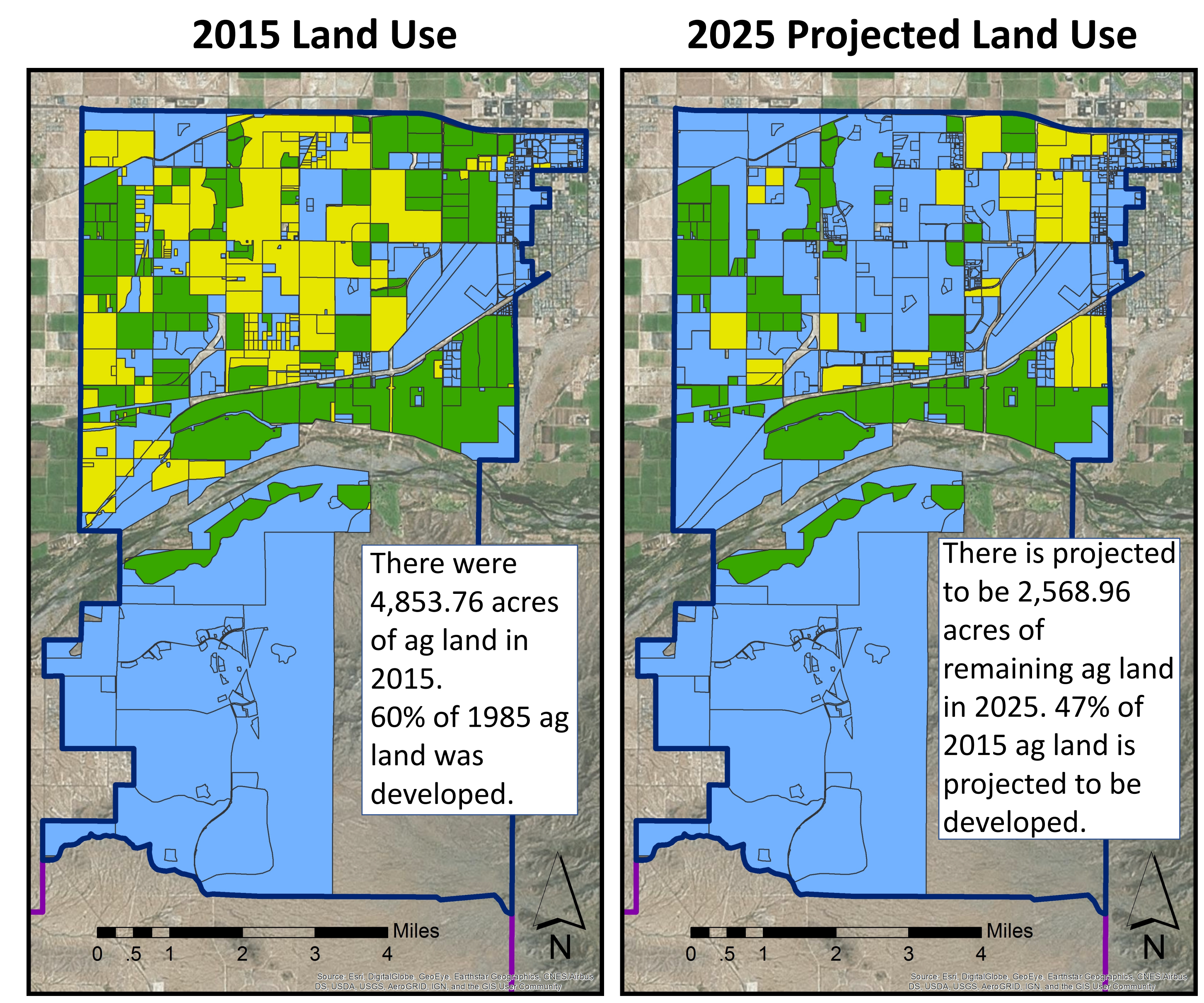
<sup>^</sup>2 miles has been selected as the buffer distance based on analytic groundwater modeling done by the City of Goodyear to determine a well's area of influence. A true numeric groundwater model would be needed to determine an individual well's impact

## Study Area



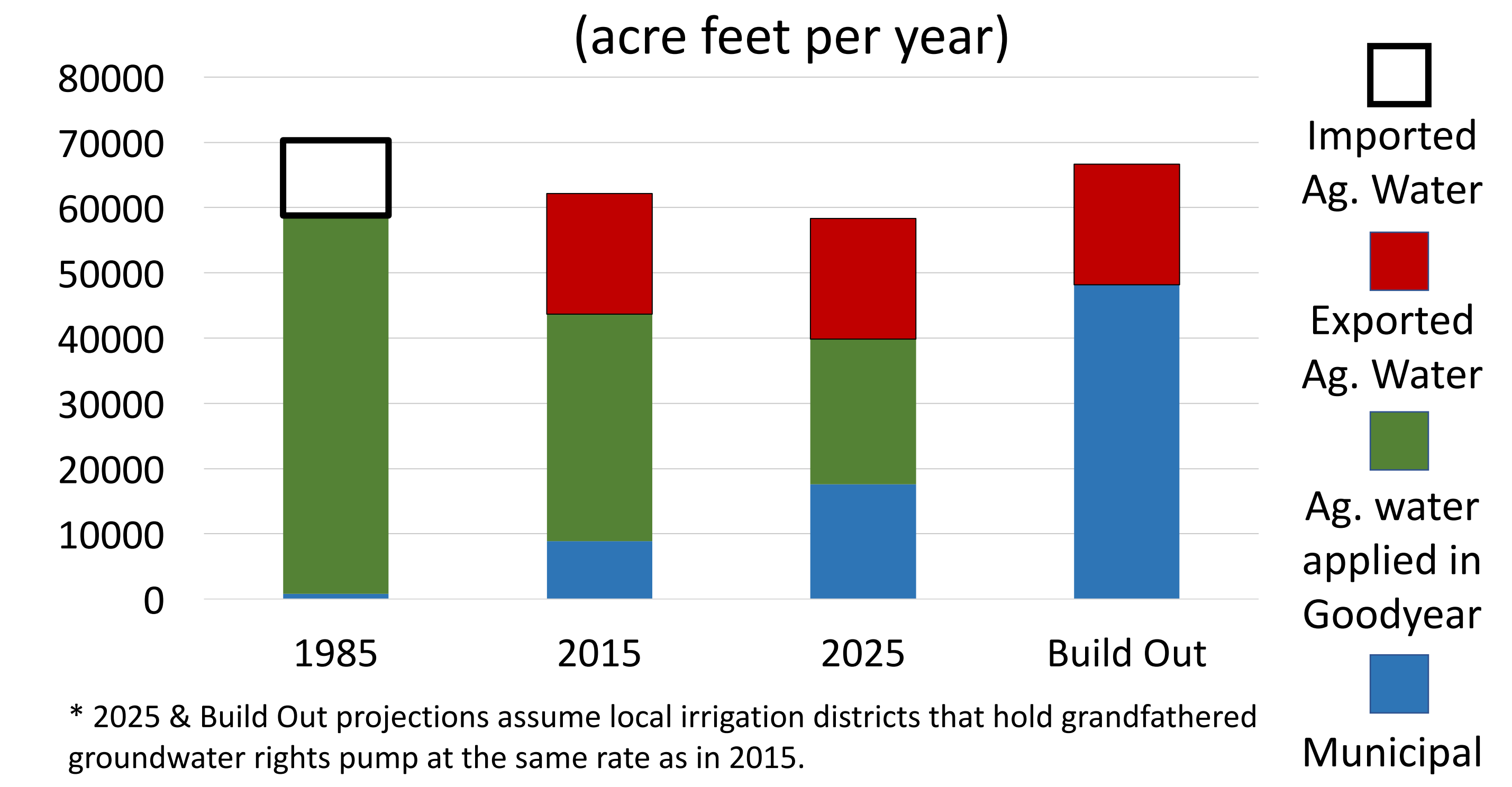
\*This study will primarily focus on study area 1 since there will be no agriculture parcels in study area 2 that will be developed before 2025.

## Results



- Municipal/Developed land includes commercial, industrial and residential land uses
- Agricultural land includes all land that used groundwater for the irrigation of crops
- Developed Agriculture includes all agricultural land that has been developed since the previous study year
- There are no development plans within Study Area 2 before the year 2025
- There is projected to be no remaining agricultural land at full build out
- Complete 1985 land use data unavailable

## Total Groundwater Pumped Within Study Area 1



Initially it was predicted that a portion of the agricultural water supply was imported into Goodyear via irrigation district canals. This was in fact the case in 1985, approximately 20% was being imported. However in 2015, 34% of the groundwater being withdrawn for agricultural uses was exported outside of the City. It should also be noted that the wells located between Study Area 1 and the 2-mile buffer have increased their withdrawal rate by over 300% between 1985 and 2015. Even though these wells are technically located outside of Goodyear, they should still be monitored heavily by the city since their area of influence will have a direct impact on the city's local groundwater supply.

## Groundwater Consumption by Use Type for Study Area 1

(acre feet per year)

	1985	2015	2025	Build Out
Water Withdrawn for Agricultural Use	46,435	53,301	40,747*	18,487*
Water Withdrawn for Municipal Use	830	8,856	17,586	48,169
Total Water Withdrawn Within Study Area 1	47,265	62,157	58,33*	66,616*
Total Water Withdrawn Between Study Area 1 and 2-Mile Buffer	8,190	25,733	unknown	unknown
Total Water Supplied to Agriculture in Goodyear	57,960	34,814	22,260	0
Water Imported or Exported to Goodyear for Agricultural Use	+ 11,525	- 18,487	- 18,487*	- 18,487*

## Conclusion & Recommendations

Urbanization and the conversion of agricultural land to municipal land will reduce water consumption in Goodyear by 2025, but not completely. Even with 2,285 acres of agricultural land transformed to municipal land by 2025, there will still be 23,260 acre feet of water per year being used for irrigation (assuming the remaining ag parcels consume at the same rate as in 2015). Presently, only 66% of the groundwater pumped within Goodyear is actually used within the City. The other 33% of this irrigation water is pumped and transported via irrigation district canals to the farmland located to the west of Goodyear. The City should coordinate with both Roosevelt and Buckeye Irrigation Districts in order to better project the quantity of groundwater that will be pumped by these irrigation districts in 2025 and at build out.

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