

Anticipated Groundwater Demand & Future Use Projections



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Williams & Works

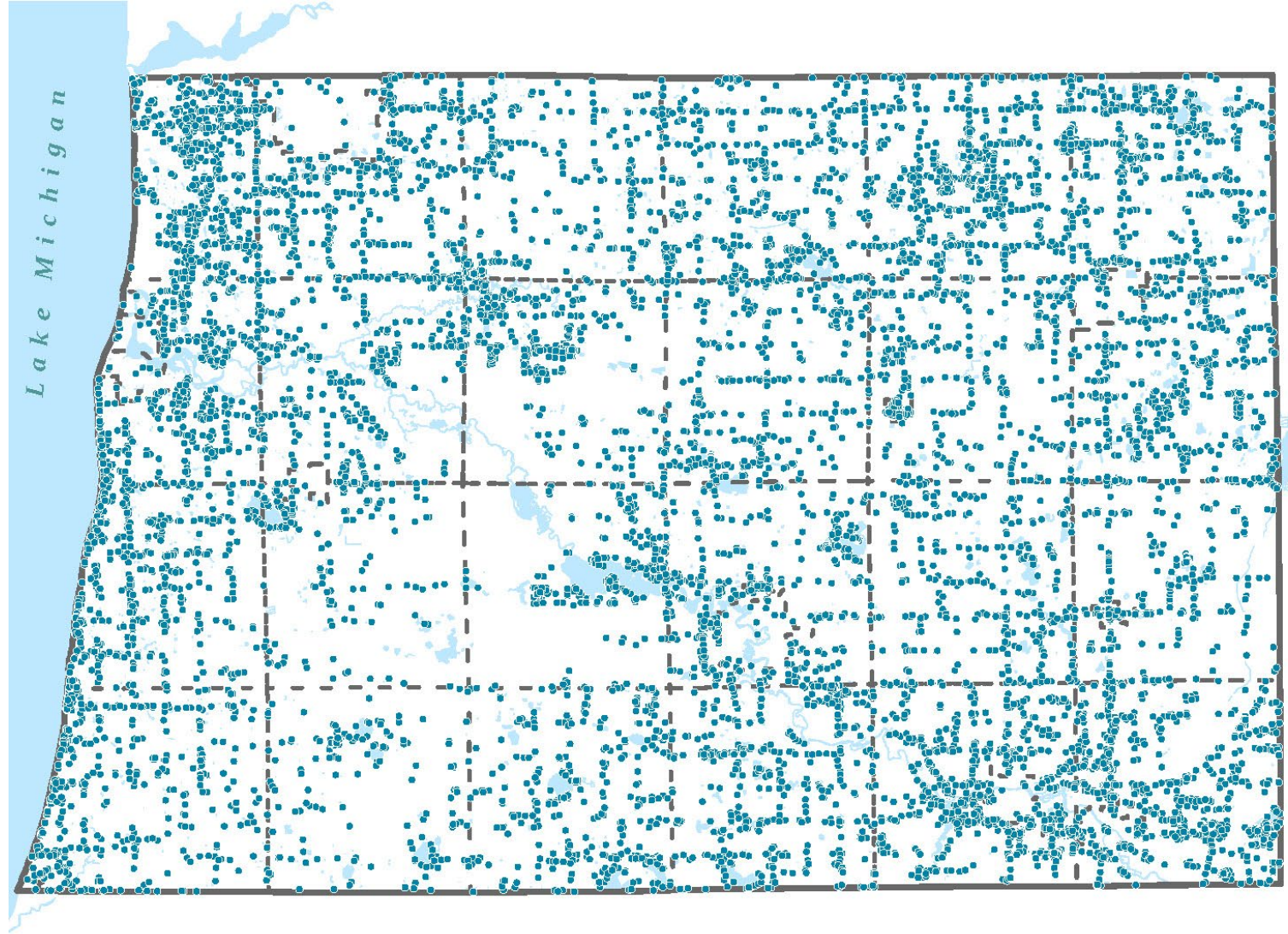
**Groundwater
use across
Allegan County
has experienced
a significant
increase in
recent decades.**



Year 2000

11,510*

Number of Wells



Water Well Network Growth

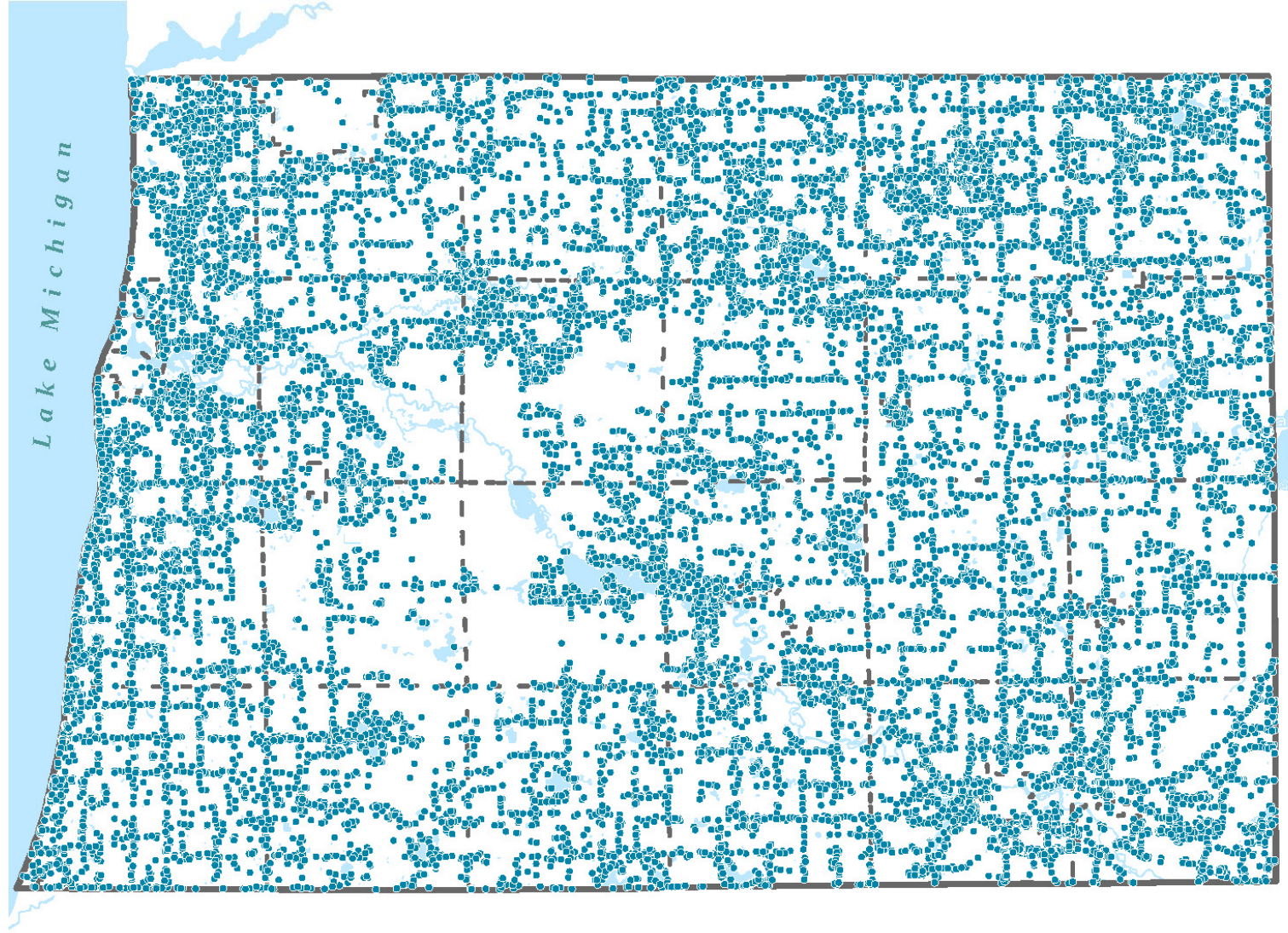
* Well logic data prior to 2000 is still being added. As a result, the number of wells may grow over time.

Year 2020

26,700

Number of Wells

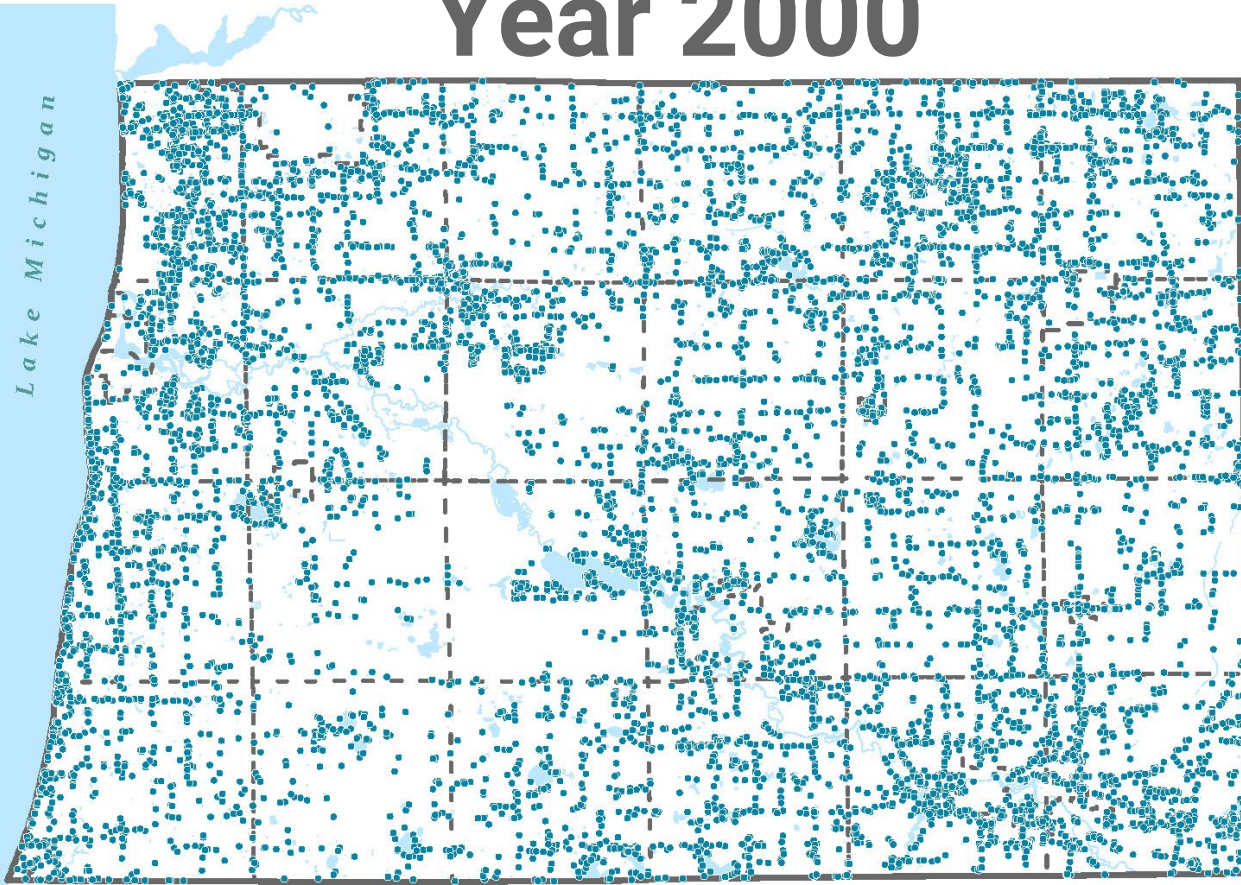
132%*
Increase in
10 years



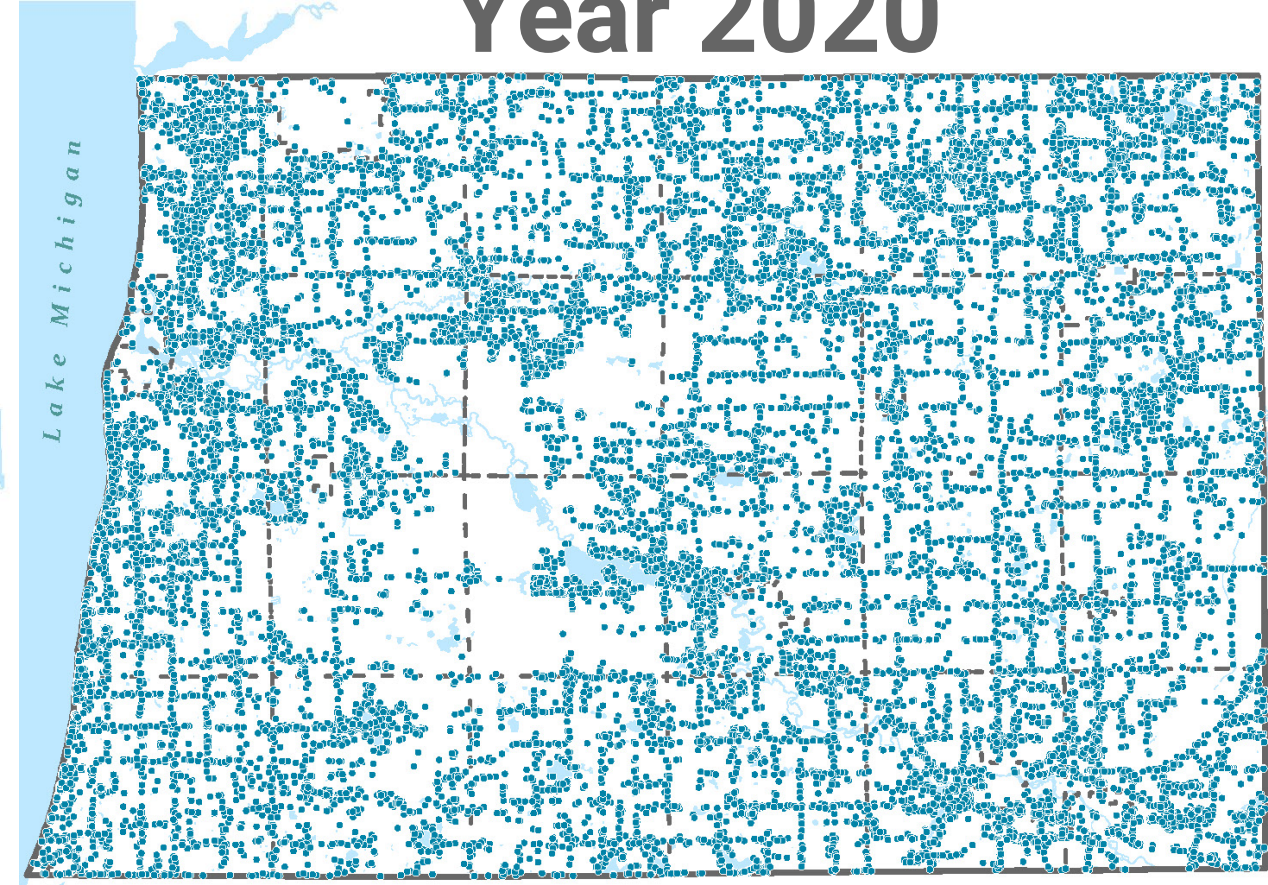
Water Well Network Growth

* Well logic data prior to 2000 is still being added. As a result, this percentage may decrease over time.

Year 2000



Year 2020



Water Well Network Growth

* Well logic data prior to 2000 is still being added. As a result, this percentage may decrease over time.

To determine future groundwater use, current demand must first be identified.

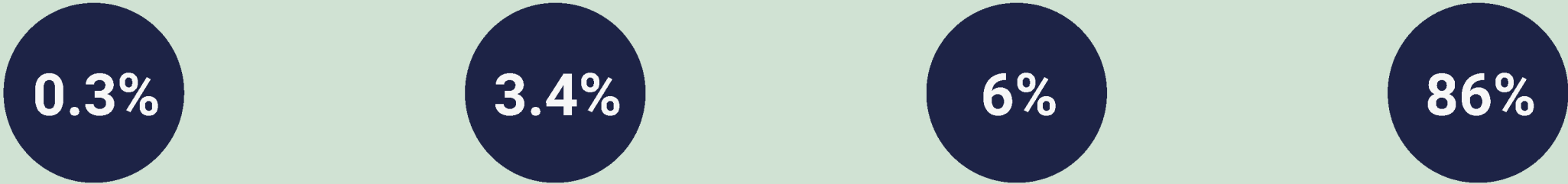


Well Types Studied



- Private Water Wells
- Type I Community and MHC Water Wells
- Irrigation Water Wells

Number of Water Wells by User Type



Industrial Wells



Irrigation Wells



Public Wells



Private Wells

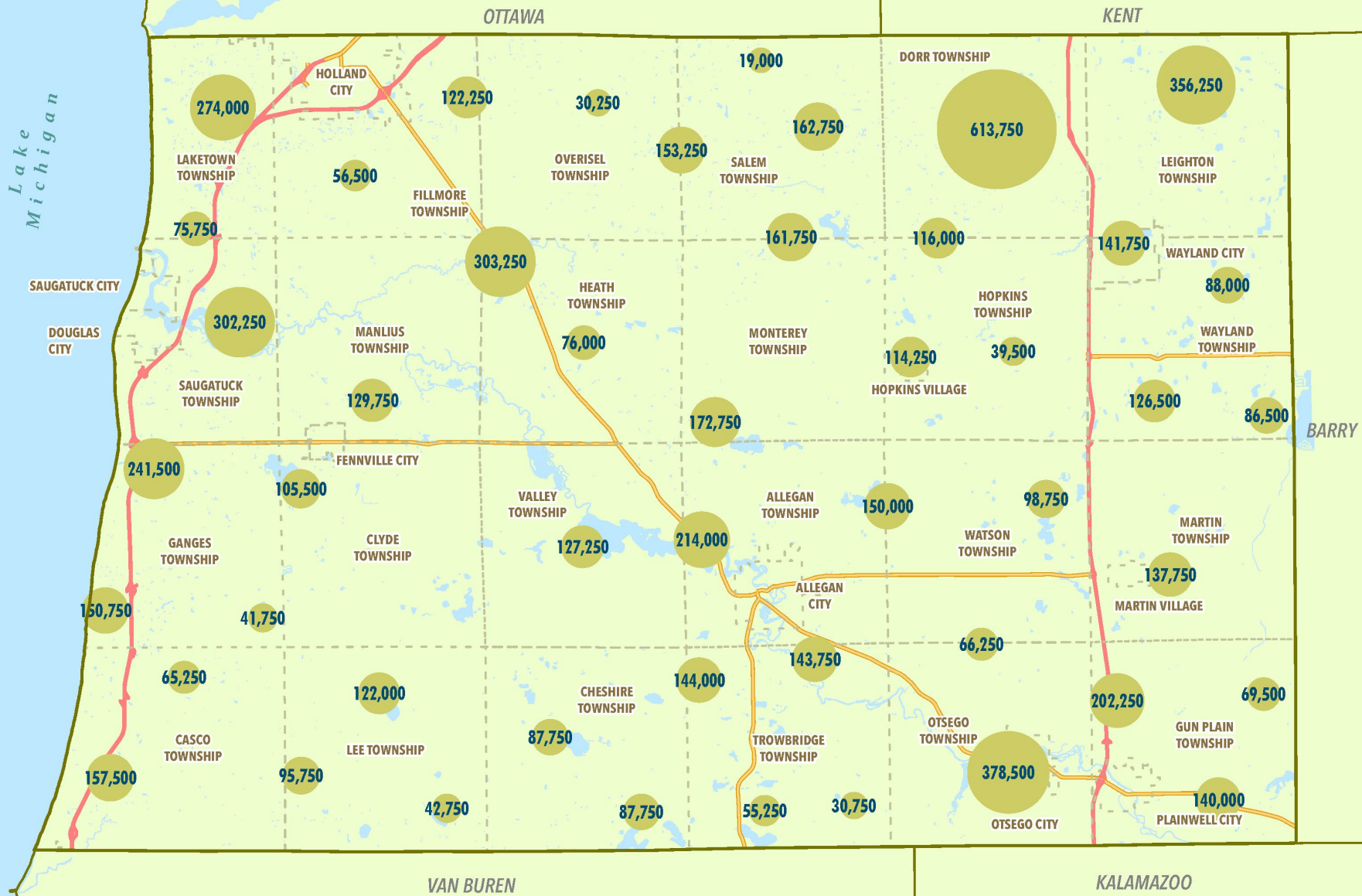


Different user types have different water needs

Private Water Wells



- Largest number of wells by class in Allegan County.
- Cumulatively, comprise the bulk of groundwater withdrawals.
- Generally, distributed somewhat uniformly and singularly and do not have a negative bulk effect on aquifer capacity.
 - Except when they are concentrated in a small area.
- Fastest growing segment of water well type construction.



Current Demand = 250 gallons per day per private well

● Lower Demand
● Higher Demand
 } Groundwater Demand in Gallons Per Day

Private Water Wells Demand

Type I Community & MHC Water Wells

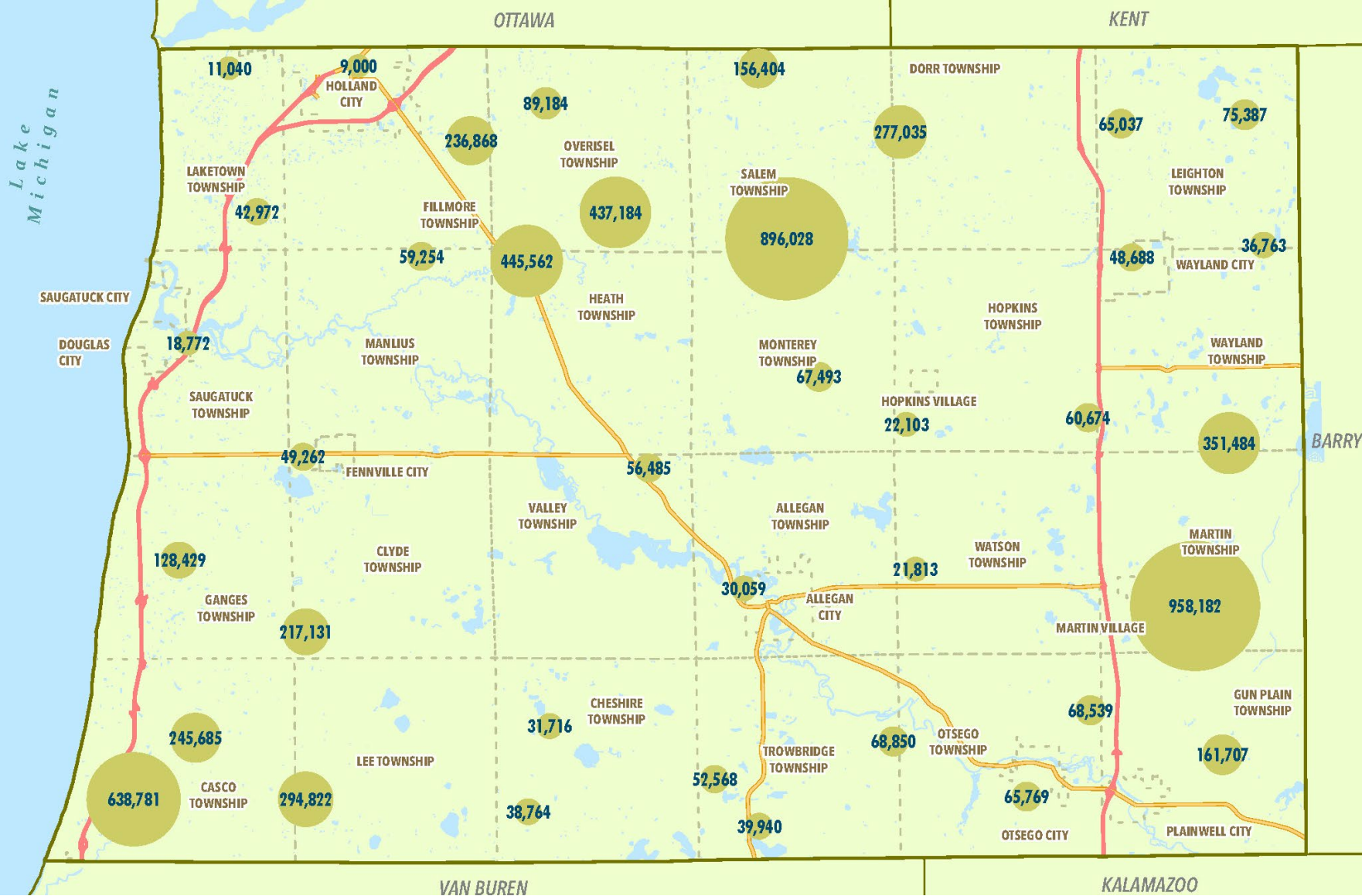


- Type I community wells are the 2nd largest number of wells by class.
- Type I wells are distributed somewhat uniformly, with the largest withdrawals occurring in population centers.
- MHC wells tend to be small and don't have the same water use characteristics as larger community water systems.

Irrigation Water Wells



- Smallest number of wells by class in Allegan County.
- Clustered in areas of the county where aquifers are conducive to larger withdrawals.
- Withdrawals are the most difficult to determine:
 - Water use is not publicly available.
 - Often operated seasonally and weather dependent.
 - Under regulated.



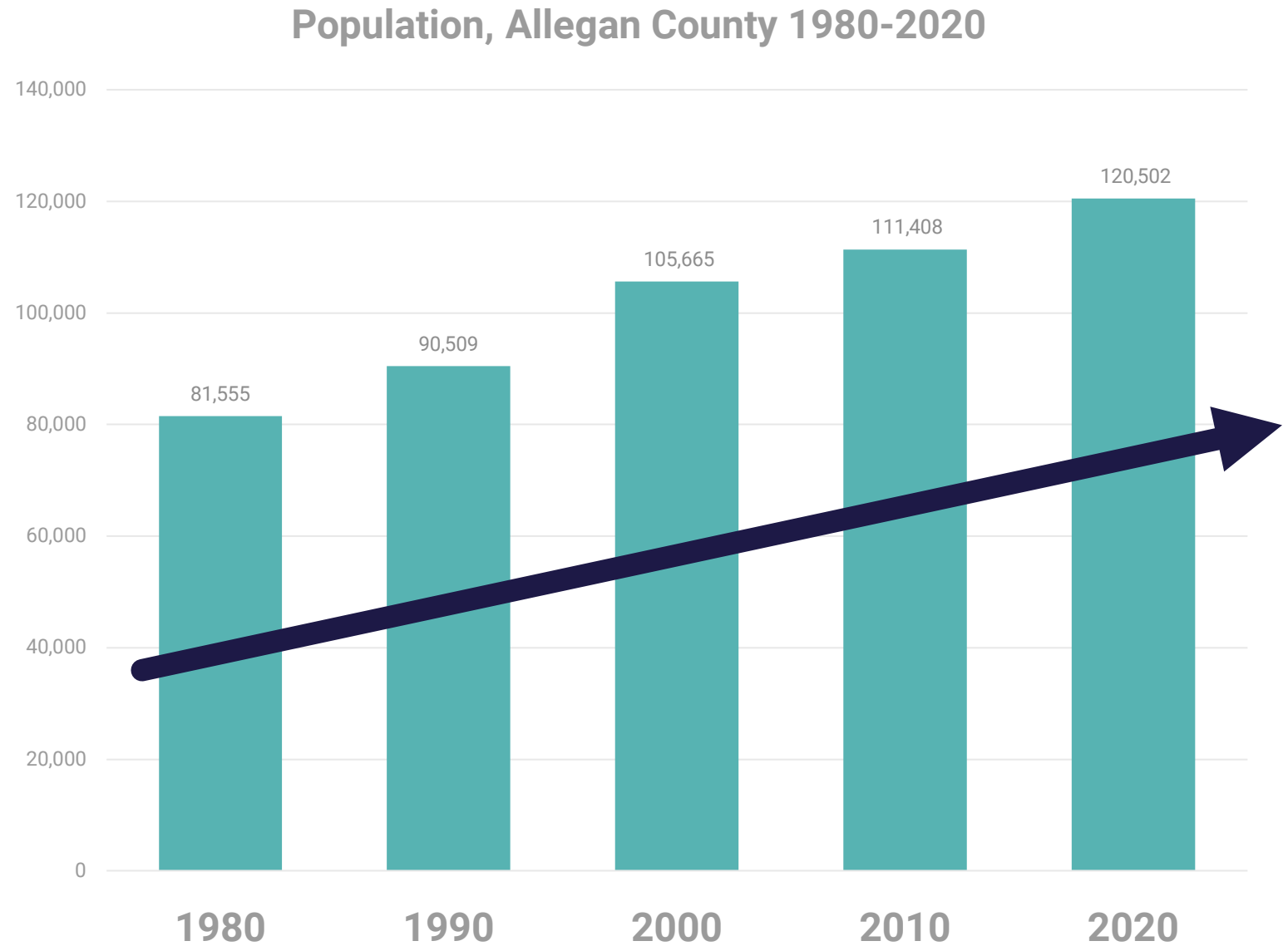
Irrigation withdrawals are reported annually by township.

Current Demand = 10 year Twp avg ÷ irrigation wells per Twp

● Lower Demand
● Higher Demand
 } Groundwater Demand in Gallons Per Day

Irrigation Water Wells Demand

As the population grows, anticipated groundwater demand grows too.



Source: U.S. Census Bureau

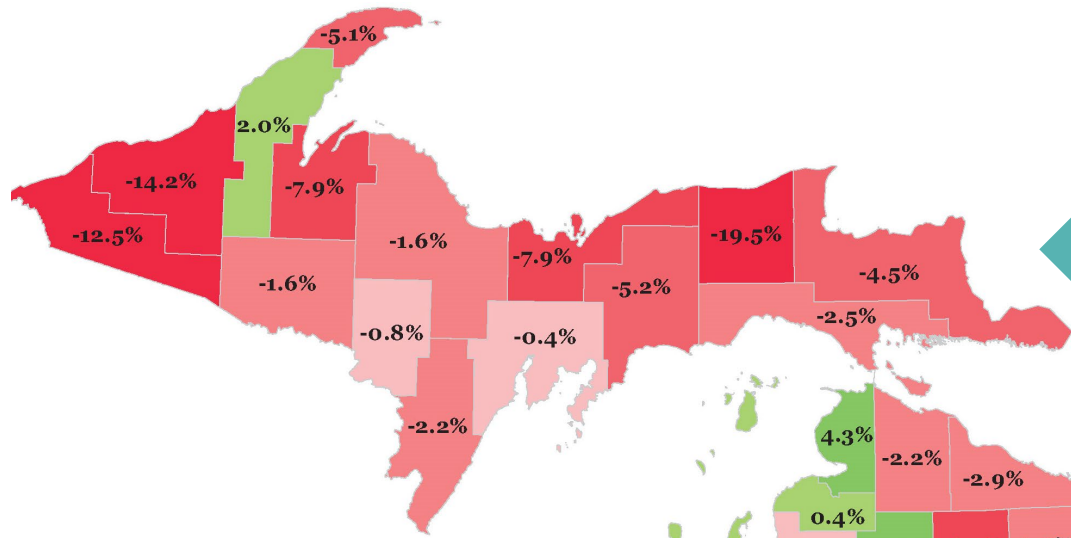
Nationally, population decline is expected over the next 20 years. The USA has an aging population and falling birth rates, meaning that deaths will likely begin to outnumber births.

Source: Population Reference Bureau

Michigan's population declined from 2000 to 2010 and was one of the slowest growing states in the nation from 2010 to 2020.

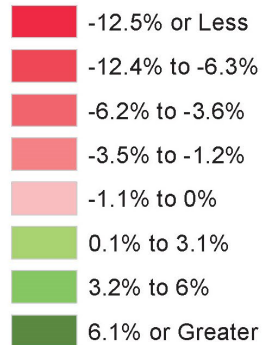
Source: Michigan Center for Data and Analytics





Source: U.S. Census Bureau

Population Change by County



Quick Facts

Statewide Pop. Change: 193,691
 Statewide Percent Change: 2.0%
 Min. Change: -19.5%, Luce County
 Max. Change: 12.3%, Ottawa County

Populations are moving within the state.

From 2010 to 2020, Allegan County experienced some of the highest population growth in Michigan at 8.2%.



Population Projections

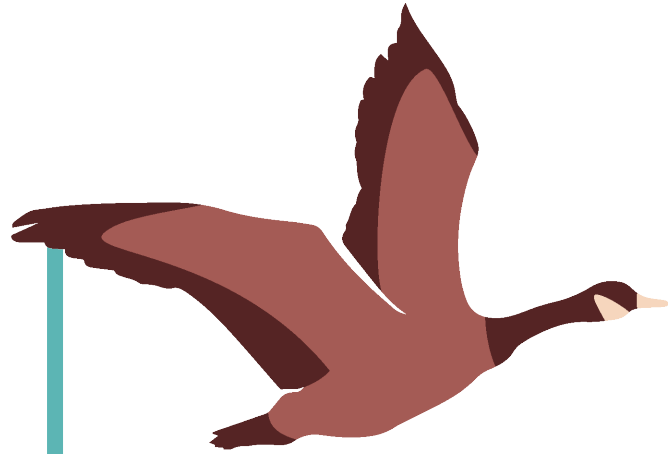
Three standard methods for anticipating population trends were used, including the **Arithmetic Increase**, **Growth Rate**, and **Constant Proportion** methods. Since all three methods appear to show similar trends in population patterns, the average of all three methods was used to provide a single conclusion.

Population growth for Allegan County was projected in ten year intervals to 2050.

Translating Growth into Projected Groundwater Demand

(Assumes 100 GPD per capita)

- **Change in GW Demand (2020-2050) =**
Projected Population Change x 100 GPD/capita
- **Total Projected GW Demand (2050) =**
Projected Change in Demand + Present Demand



Projected Groundwater Demand

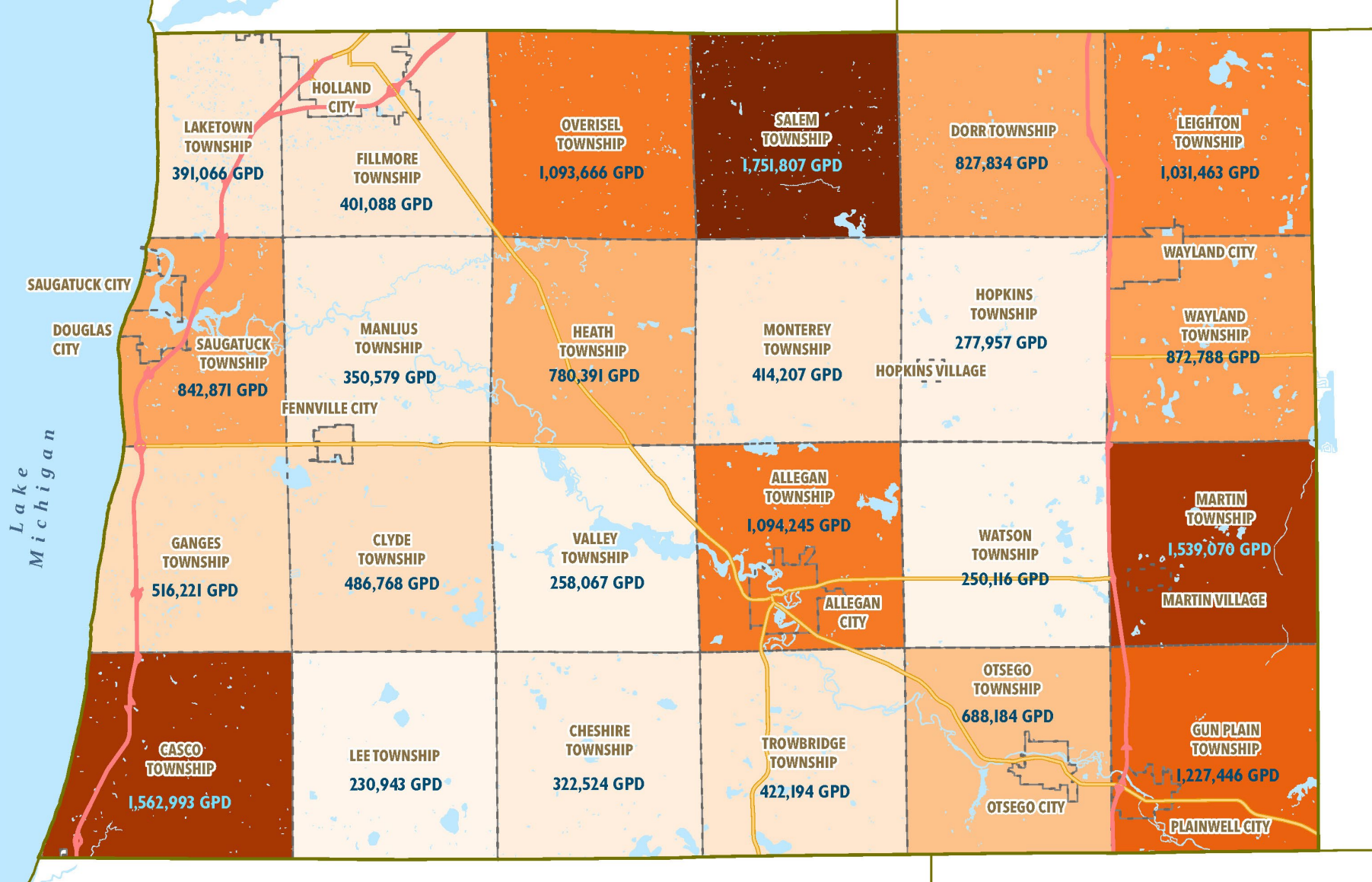
For all of Allegan County (2050)

Existing Population	120,498 People
Existing Demand	16,480,210 GPD
Projected Population Change (2020-2050)	+13,694 People
Projected Additional Demand (2020-2050)	+1,369,389 GPD
TOTAL PROJECTED DEMAND (2050)	17,849,598 GPD

Allegan County is projected to see modest overall growth over the next 30 years.

Most Local Government Units (LGU) in Allegan County are projected to see some population growth, while others in the County are expected to decrease.

Based on projected population growth and anticipated groundwater demand, cumulative groundwater overuse doesn't appear to be an imminent threat.



Note that the demand for cities and villages are included in their respective Township.

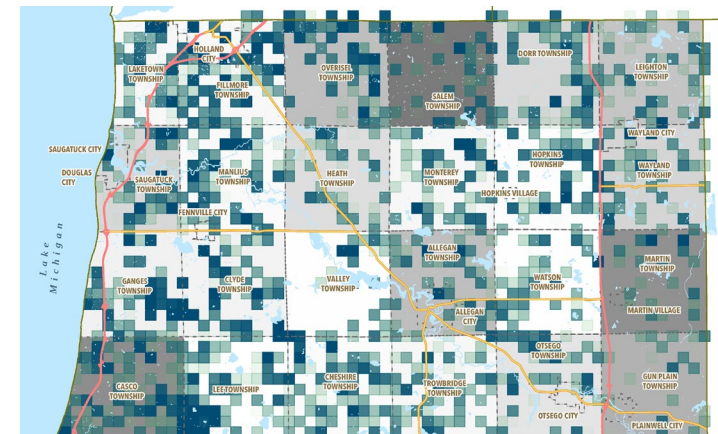
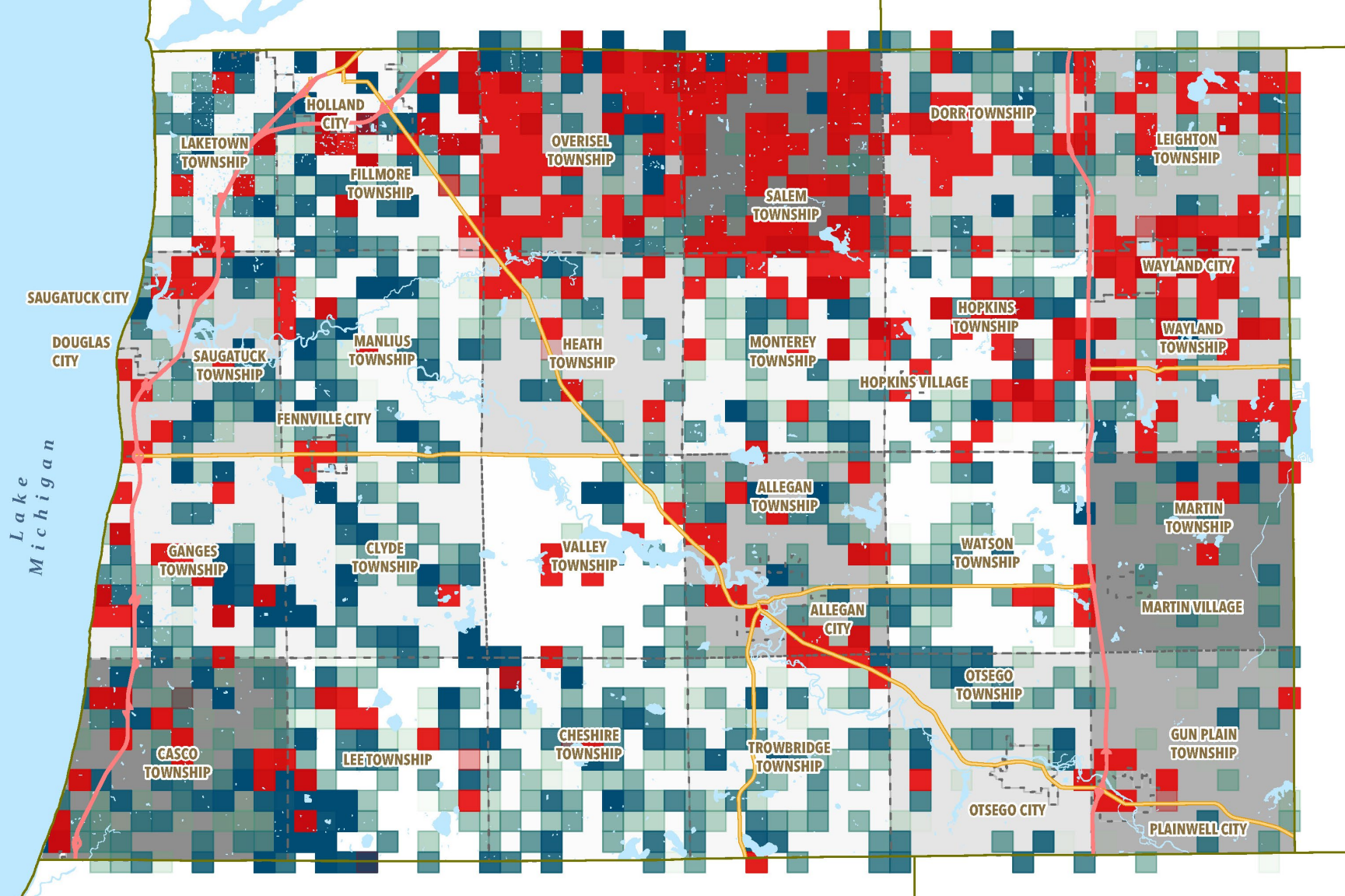


Projected Groundwater Demand

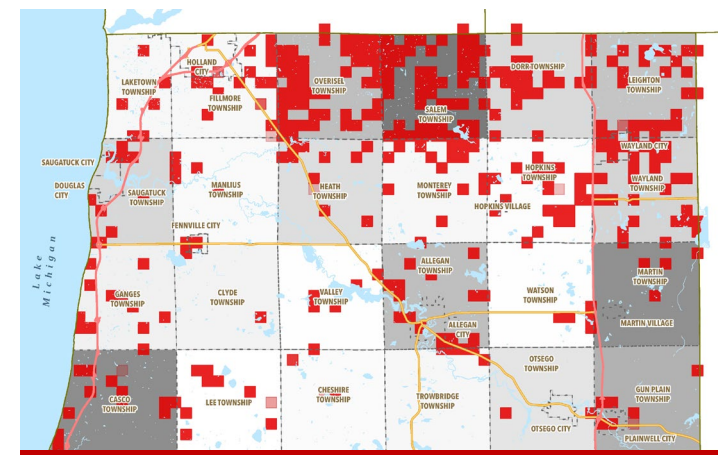
By Local Government Unit (2050)

There are places within the County that are experiencing growth and are expected to continue that trend. This has the potential to put increased demand on limited local groundwater resources.

- **Salem, Martin, and Casco are projected to have the highest groundwater demand 2050.**
- **Leighton Township's increase in water use could be higher than any other Township (+287,297 GPD).**



Poor Glacial Transmissivity



Poor Bedrock Transmissivity

Project GW Demand + Transmissivity

Projected growth in certain areas of the County warrant long term monitoring and planning, particularly in areas with limited groundwater resources.



This will provide local governments with the data needed to better manage and protect their groundwater resources.