

Scenario Planning: Water Findings

Land Use Advisory Committee



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Overview

Water resource policy and system plan update

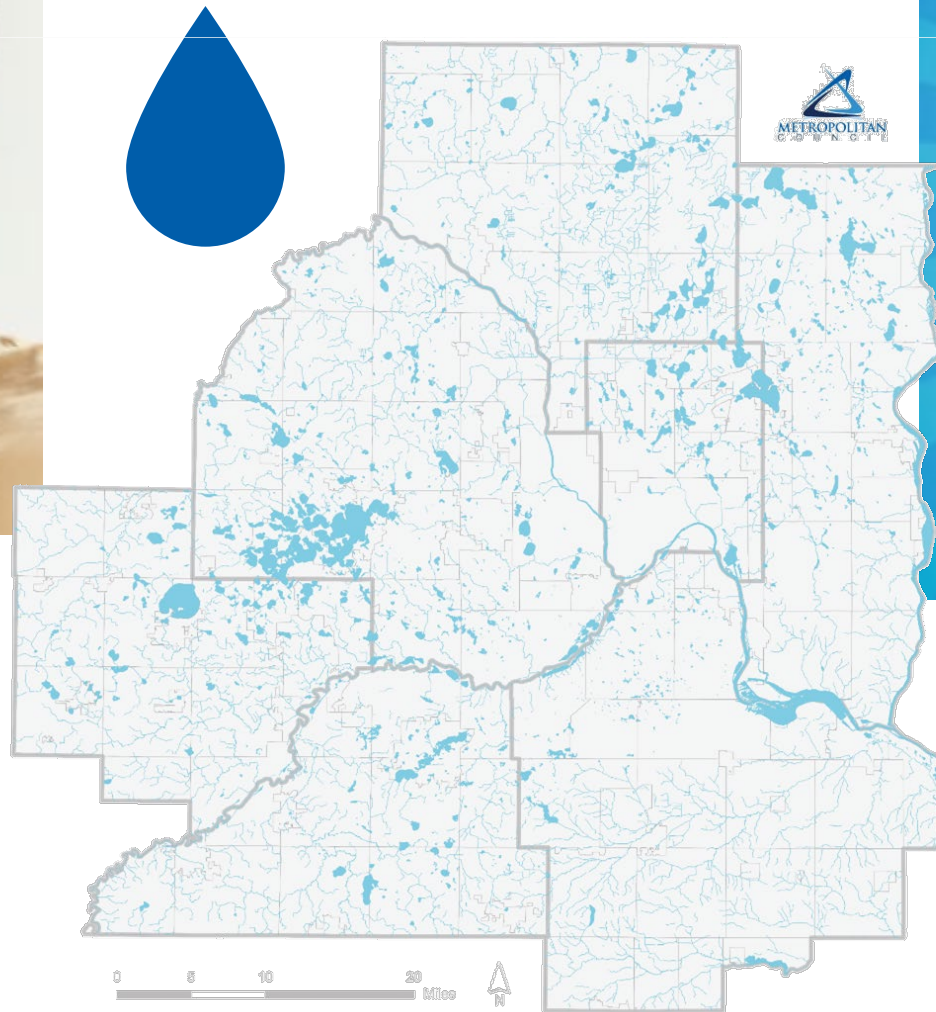
Scenario planning recap

Surface water findings

Water supply findings

Wastewater system findings

Water, water everywhere...



Separated Systems – Connected Water



Serving the region



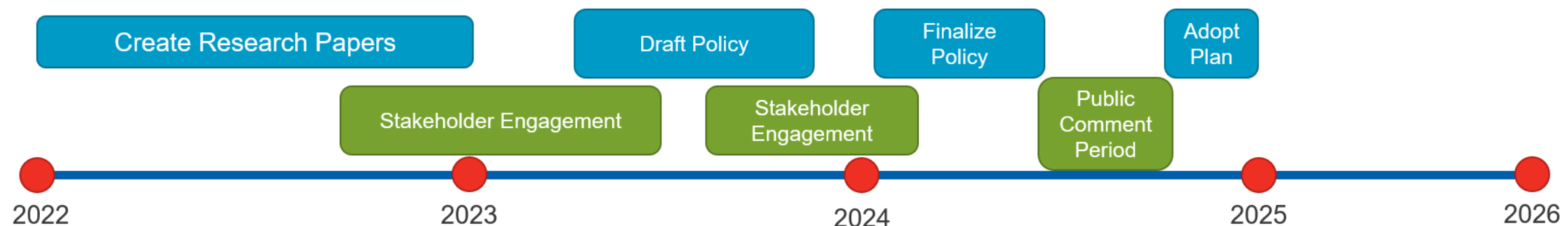
Water has no
boundaries
All water is
connected

- Wastewater collection and treatment
- Wastewater planning
- Water quality
 - Surface water monitoring
 - Watershed planning
- Water supply planning
 - Efficiency grants

Water Resource Policy Plan (WRPP)

Plan Purpose

- Met Council is developing the 2050 Water Resources Policy Plan, which **focuses on ensuring sustainable water resources in the region**. It is a part of and informed by the Regional Development Guide.
- The WRPP provides a **framework for integrative water planning** (wastewater, water supply, and water resources) the Metro Area Water Supply Plan, and the Wastewater System Plan.
- It contains water **policies, strategies, and actions** for both the Met Council and our 180+ local governments within the seven-county region.
- WRPP policies **will commit the Council** to take action in the areas of long-range visioning and planning, regional system investments, facility management, technical assistance, research and assessment, and partnerships.



Key Considerations

Collaboration

Integrated water planning (thinking about water resources, water supply, and wastewater) with land use planning is the best way to see the big picture for regional waters.

Infrastructure

Infrastructure requires maintenance. As we build out further into the region, we will have to support the larger system.

Climate

The climate is forcing us to develop with resiliency in mind – for both abundant and scarce water.

Equity

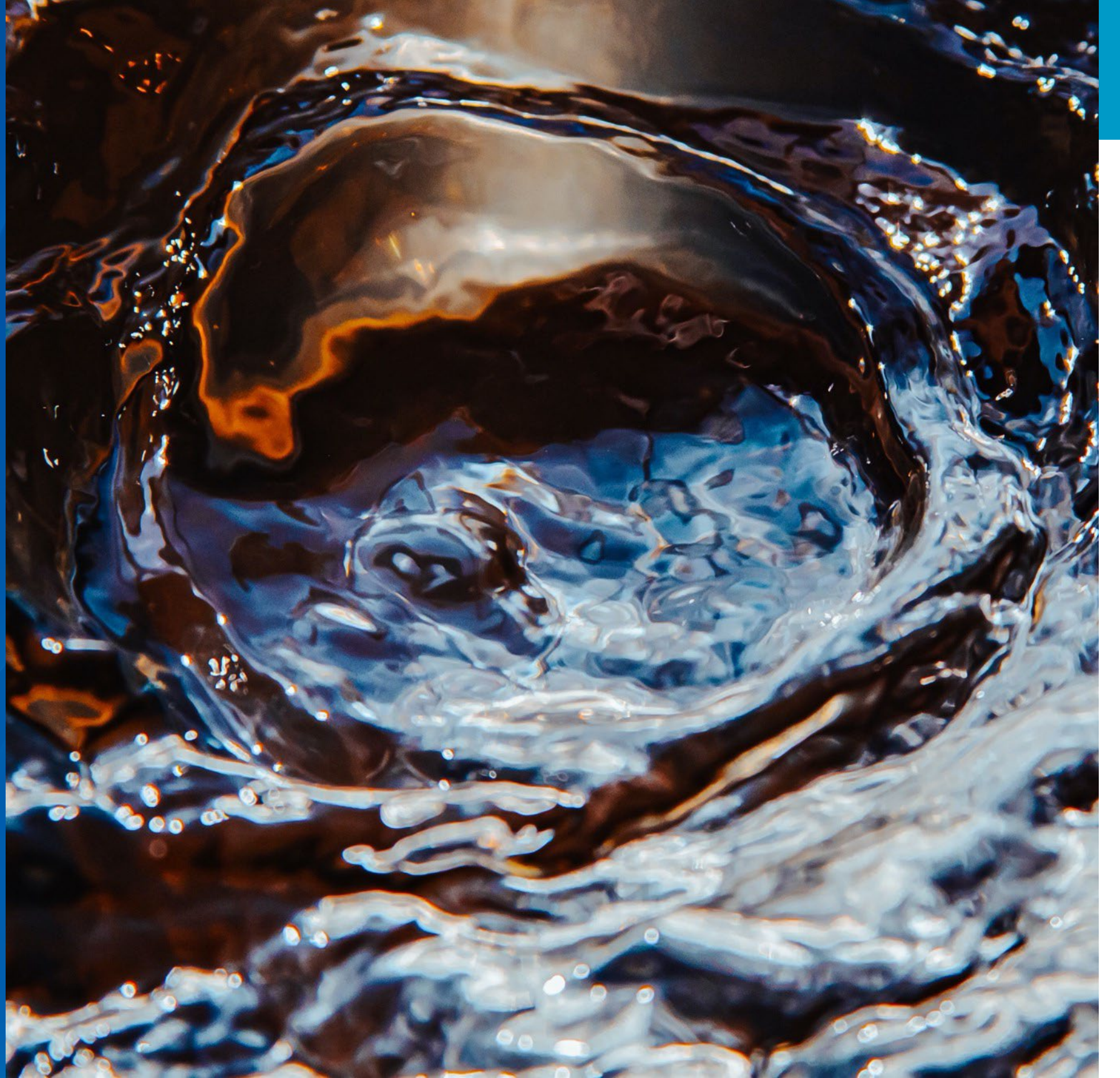
We must learn from previous land use/water decisions that have negatively impacted vulnerable communities. Let's not repeat history and, instead, repair it.

Water measures: Connection to regional goals



Measure	Working Regional Goals				
	Equitable Inclusive Region	Healthy Safe Communities	Dynamic Resilient Economy	Mitigated Adapted Resilient Climate	Natural Systems Protected Restored
Pollutant loading to waterbodies	✓	✓		✓	✓
Potential contaminants in vulnerable areas	✓	✓	✓		✓
Water demand		✓	✓	✓	✓
Wastewater system capacity		✓		✓	✓

Surface water scenario findings



Key surface water concepts

Land use change

Surface water runoff for scenarios is driven by land use change.

Primarily agricultural and undeveloped land (rural and urban) converting to single family residential.

Nitrate load

Pollutant that enters local lakes and streams as well as traveling down the Mississippi River to pollute the Gulf of Mexico

Contributes to excess algae growth in local waters and the dead zone in the Gulf of Mexico

Chloride load

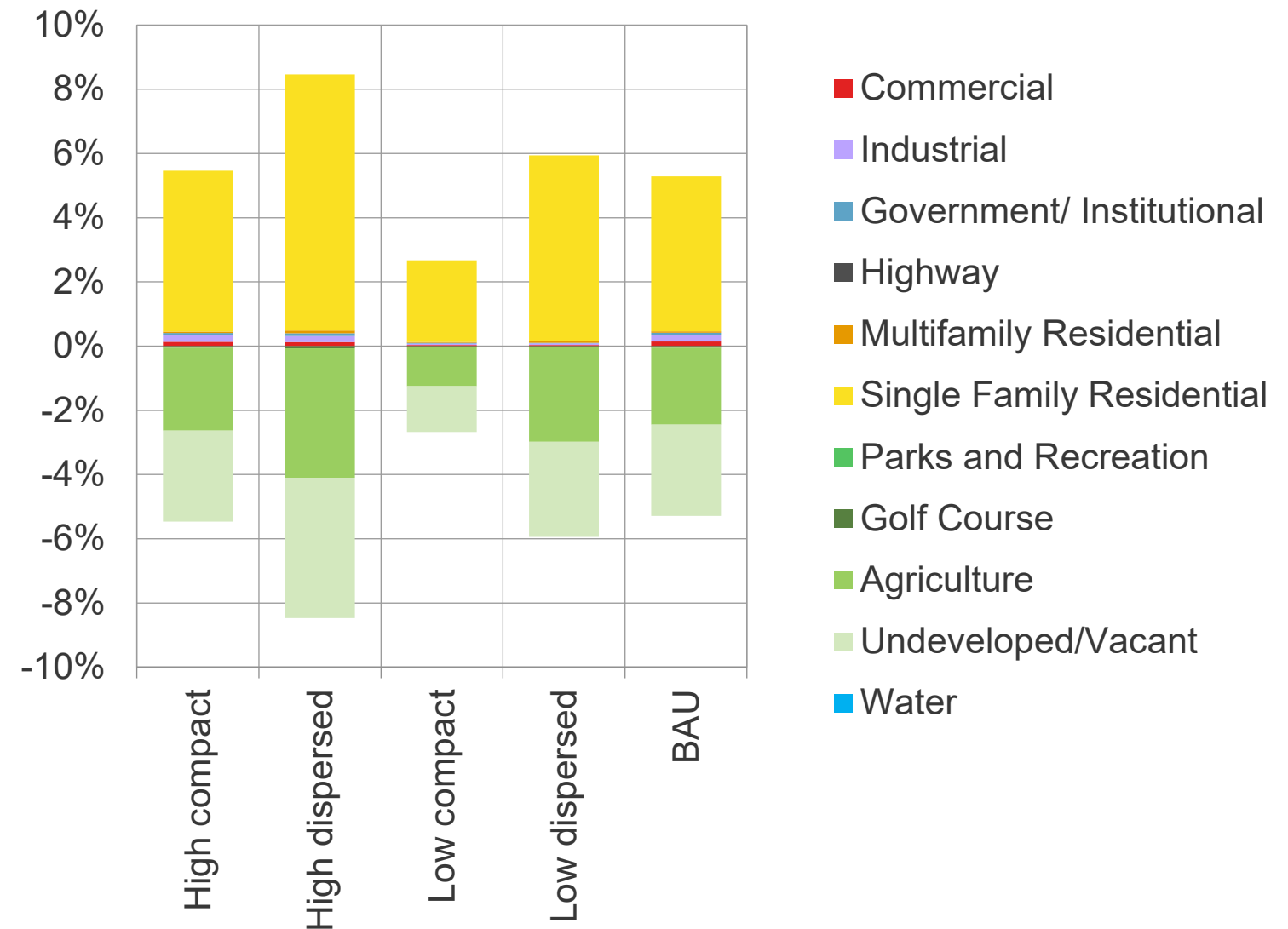
Toxic to aquatic life at high concentrations in local waterbodies.

Primary source of chloride in the region is road salt.

Land Use Change

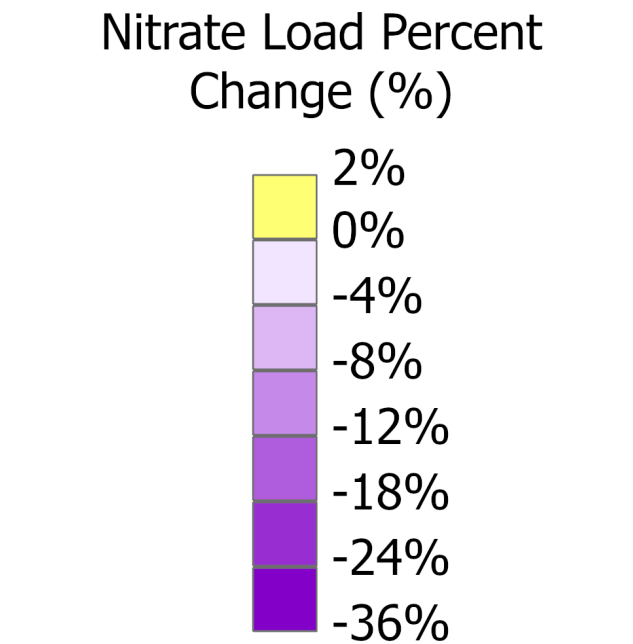
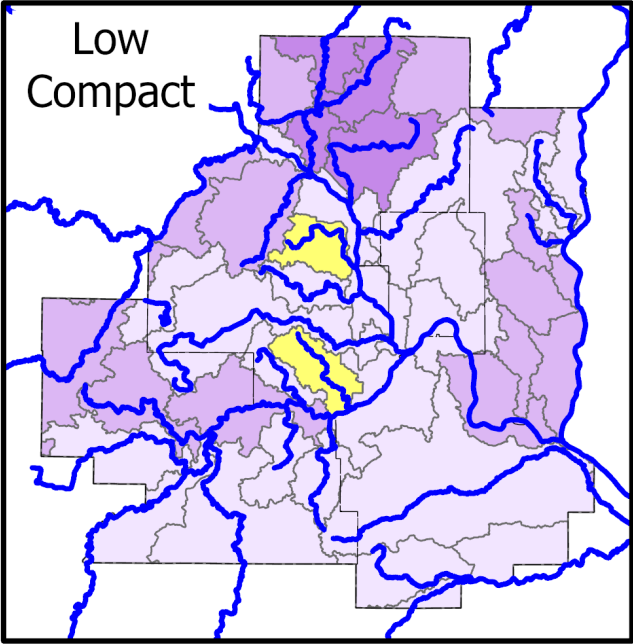
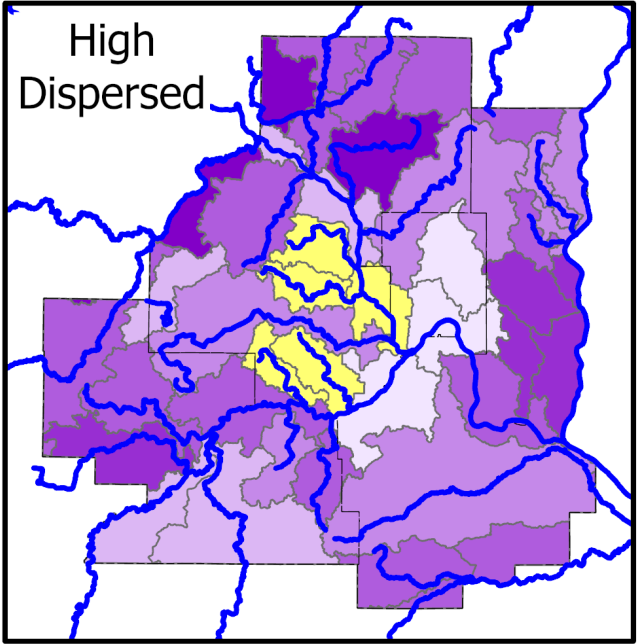
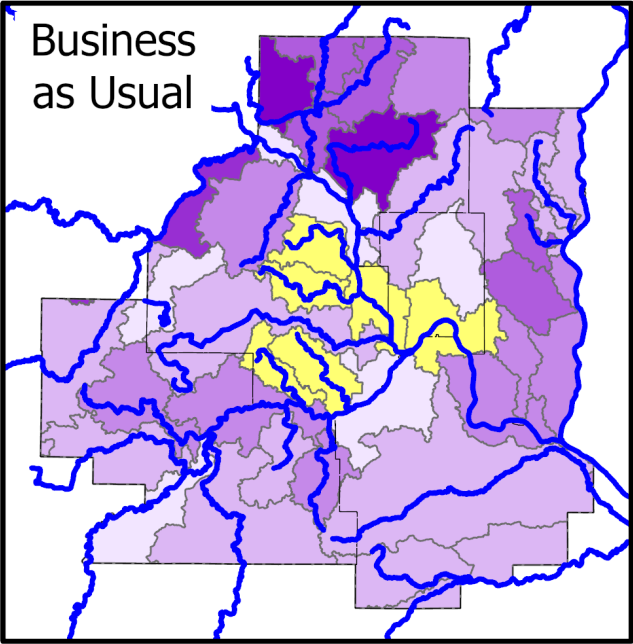
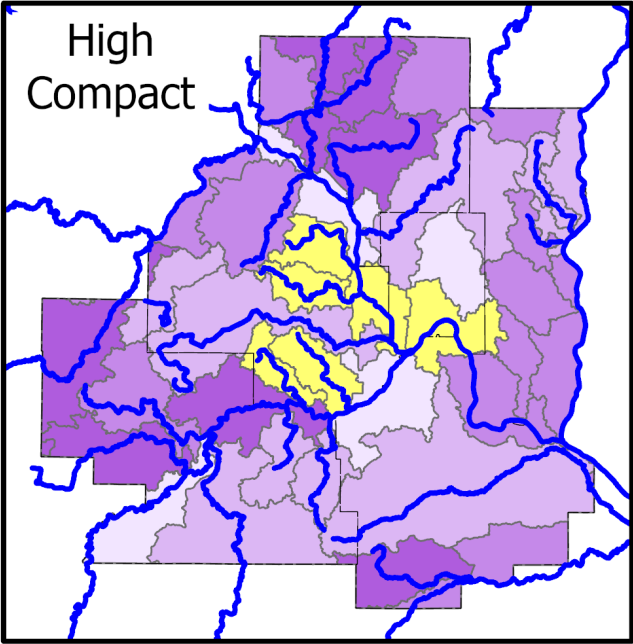
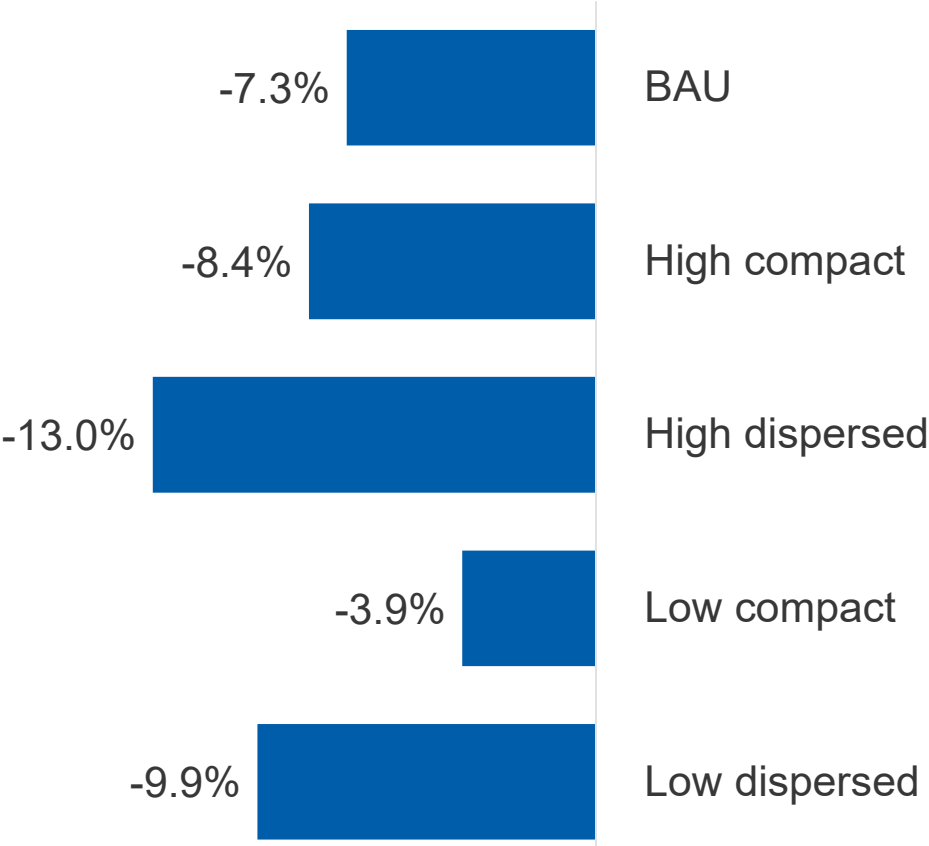
- No scenario brings dramatic land use change.
- Almost all land use change is single family residential converted from undeveloped and agricultural.
- *High compact* and *Low dispersed* show very similar land use change to *Business as usual (BAU)*.
- *High dispersed* and *Low compact* are the most different from *BAU*.

2020-2050 Regional Land Use Change

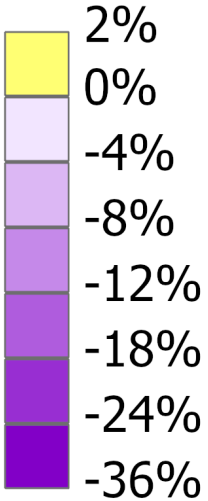


Nitrate runoff

Overall nitrate percent difference from 2020

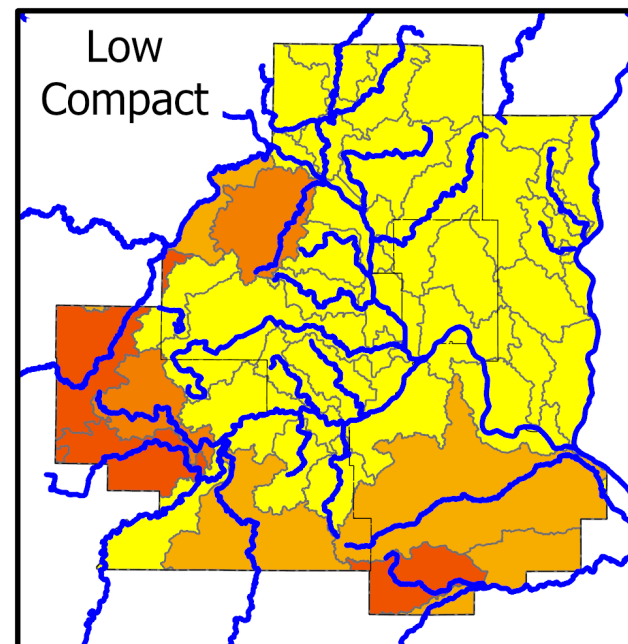
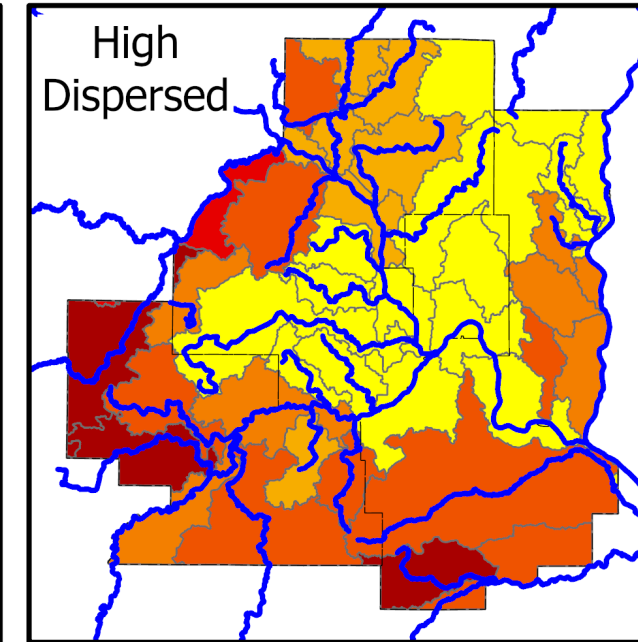
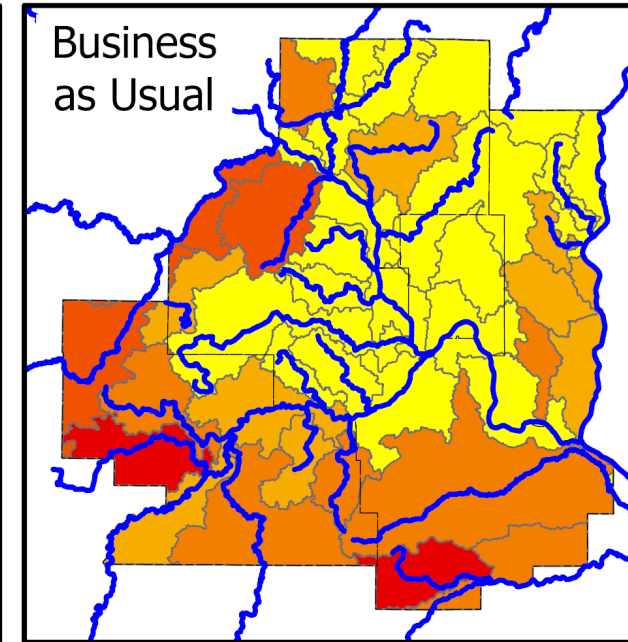
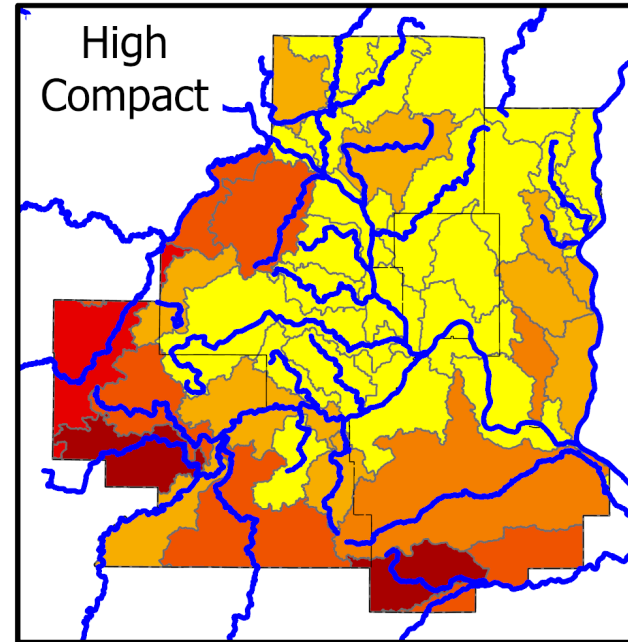
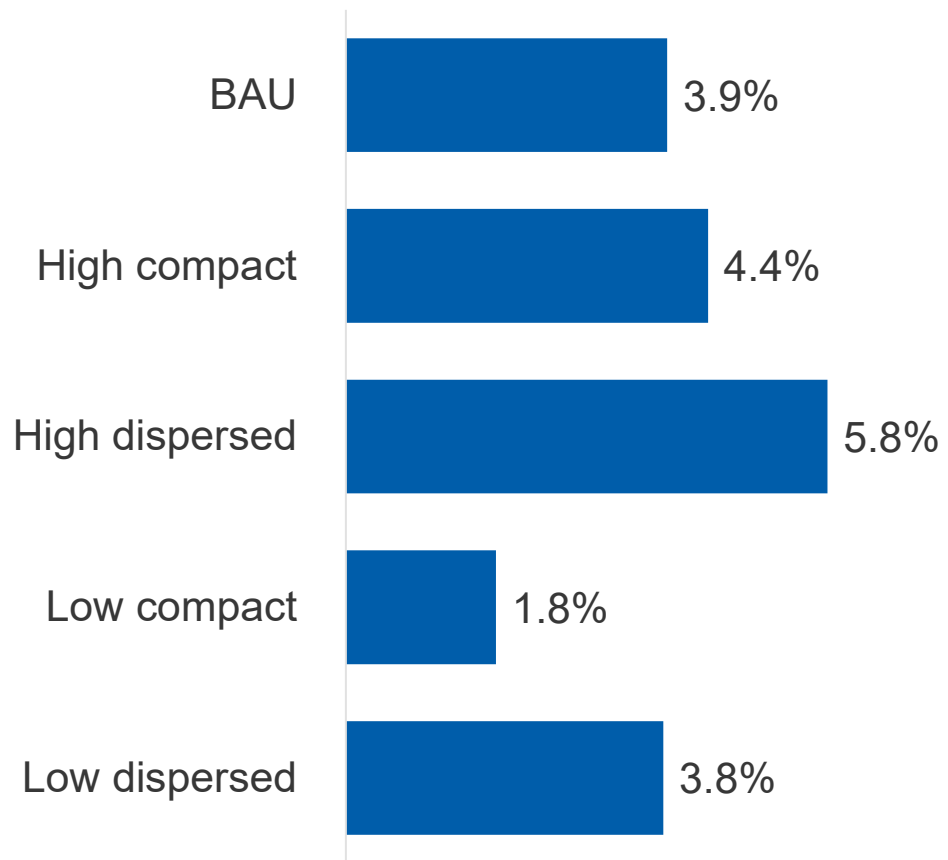


Nitrate Load Percent Change (%)

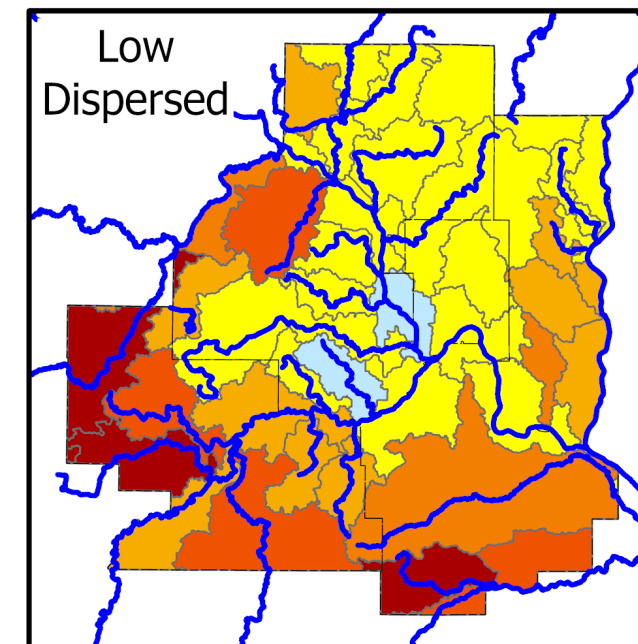
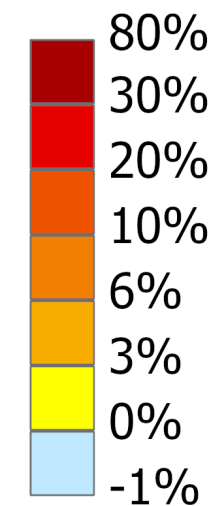


Chloride runoff

Overall chloride percent difference from 2020



Chloride Load Percent Change (%)



Surface water findings



- One scenario is not universally “better” for surface water runoff. It depends on the pollutant of concern.
- Surface water impacts occur locally on small streams and lakes. Overall differences in scenario results at the metro scale don’t tell the whole story.
- Climate is likely to drive much bigger differences in surface water runoff than different land use scenarios will.

Connections to land use

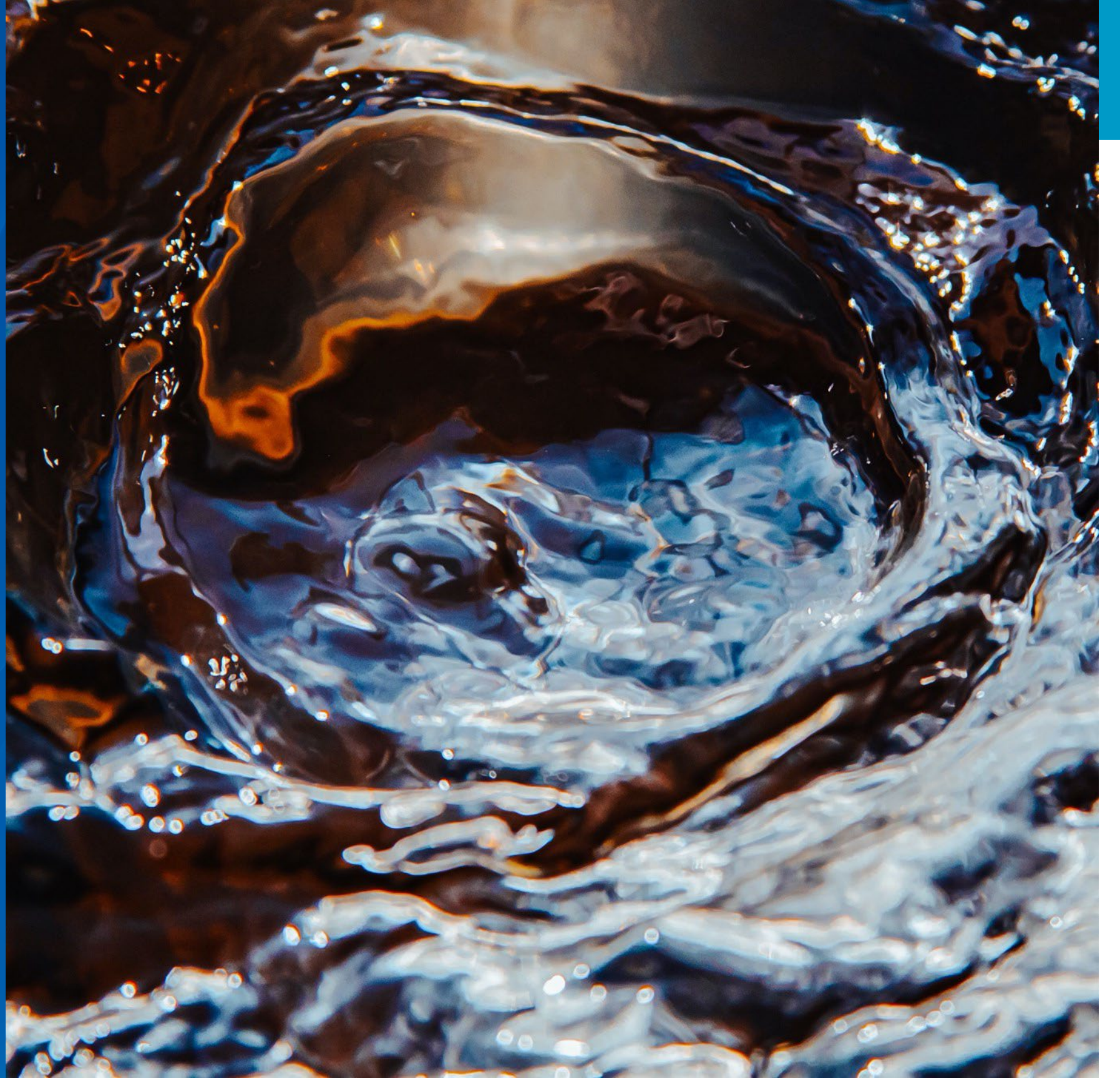


Single family residential (SFR) takes the most acres of new development.

Guidance should focus on ensuring new SFR is constructed to minimize water impacts.

Best management practices (BMPs) are key to offsetting impacts from development overall, regardless of scenario.

Water supply scenario findings



Key water supply concepts

Potential contaminants in vulnerable drinking water supply areas

Different land use types are associated with different potential contaminants, [as reported by the Minnesota Department of Health](#). Planning scenarios project different land use patterns in DWSMAs.

Acres of different land use types in areas designated by communities and MDH as vulnerable [DWSMAs](#)

Water demand

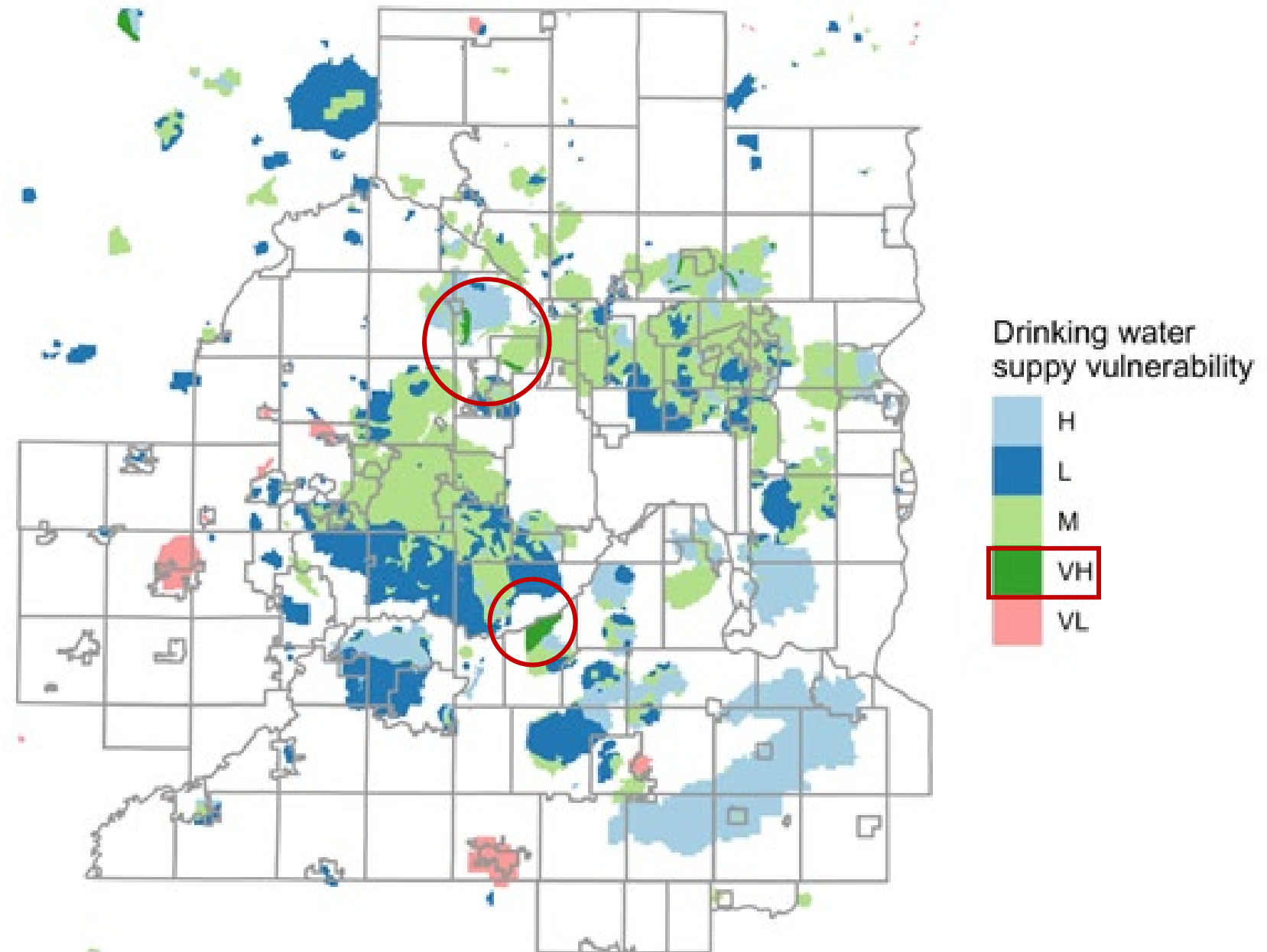
Changing population is related to changing water demand. Demand can be estimated based on population data and past assumptions of per person water use using the [method published in the 2015 Twin Cities metropolitan area master water supply plan](#).

Population x Gallons/Person = Total Gallons

Drinking Water Supply Management Area Vulnerability

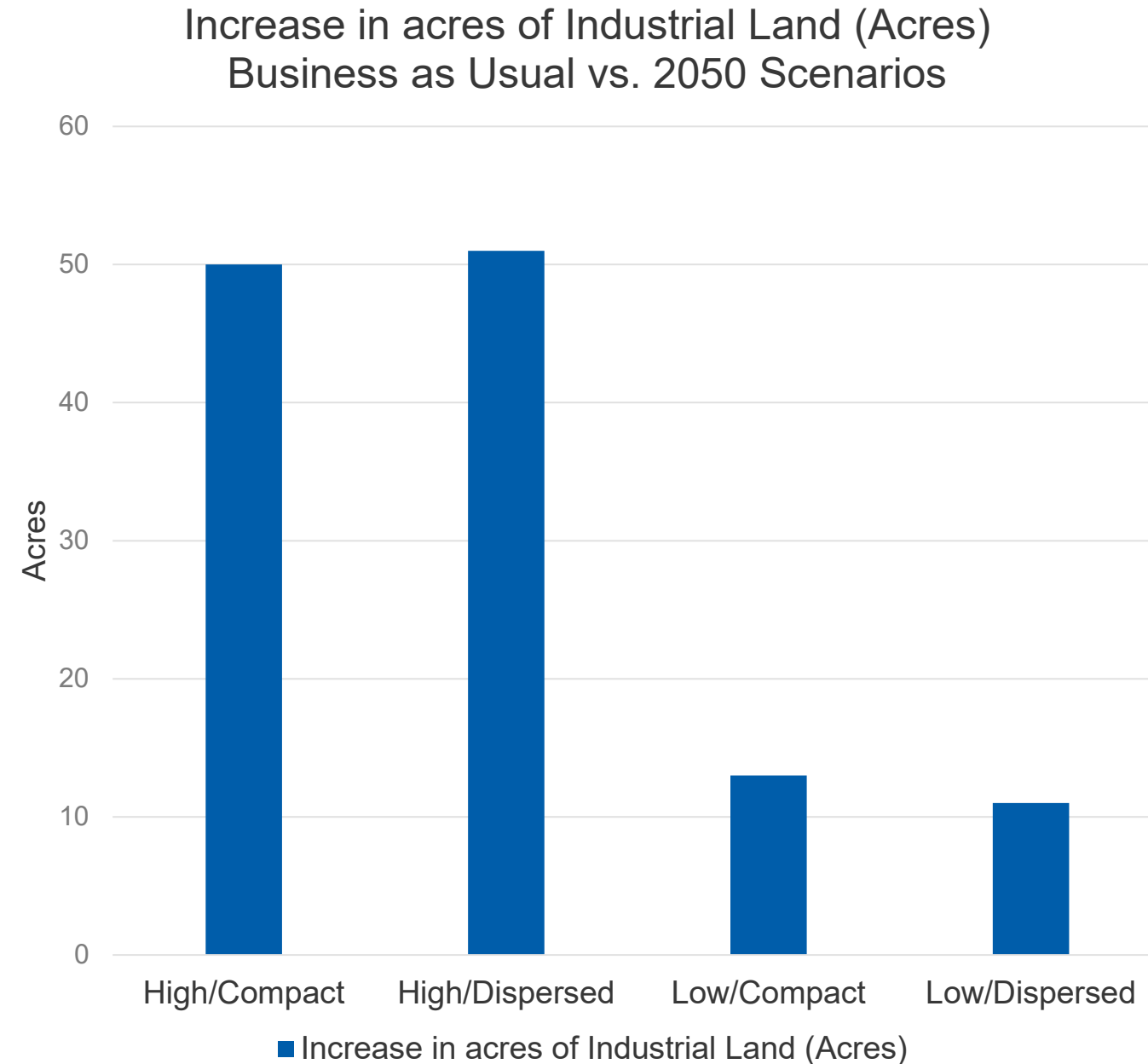
90% of the population drinks groundwater moving through drinking water supply management areas

- 1% (4,500 acres) of those areas are very highly vulnerable to contamination
- 11% (188,000 acres) are highly vulnerable to contamination
- 12% (217,000 acres) are moderately vulnerable
- 13% (223,000 acres) have either low or very low vulnerability



Change in industrial land in very highly vulnerable drinking water source areas

- In all scenarios, industrial development increases in very highly vulnerable drinking water supply management areas
- More industrial development occurs in high growth scenarios



Estimating Water Demand

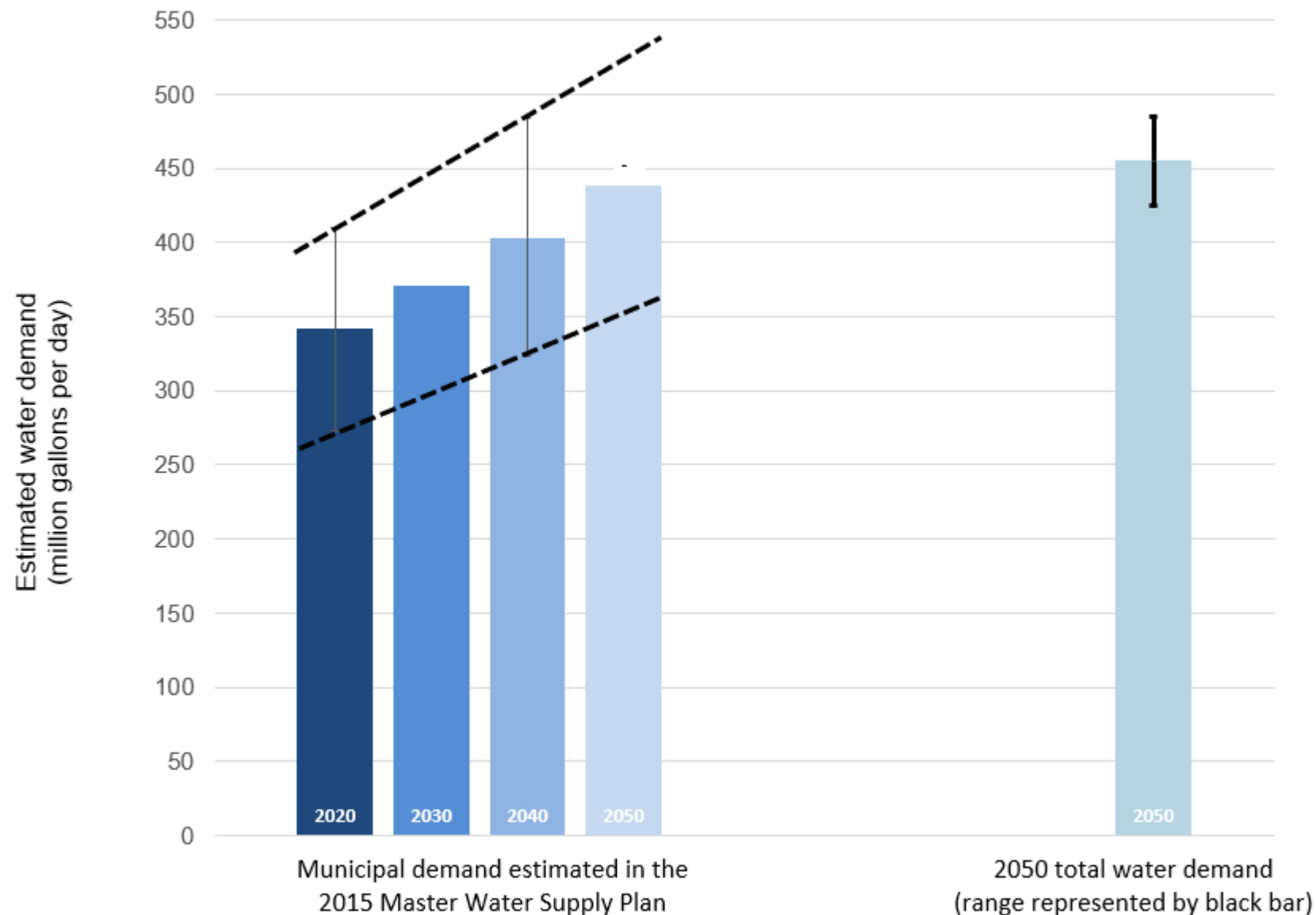


Different growth patterns impact water demand differently



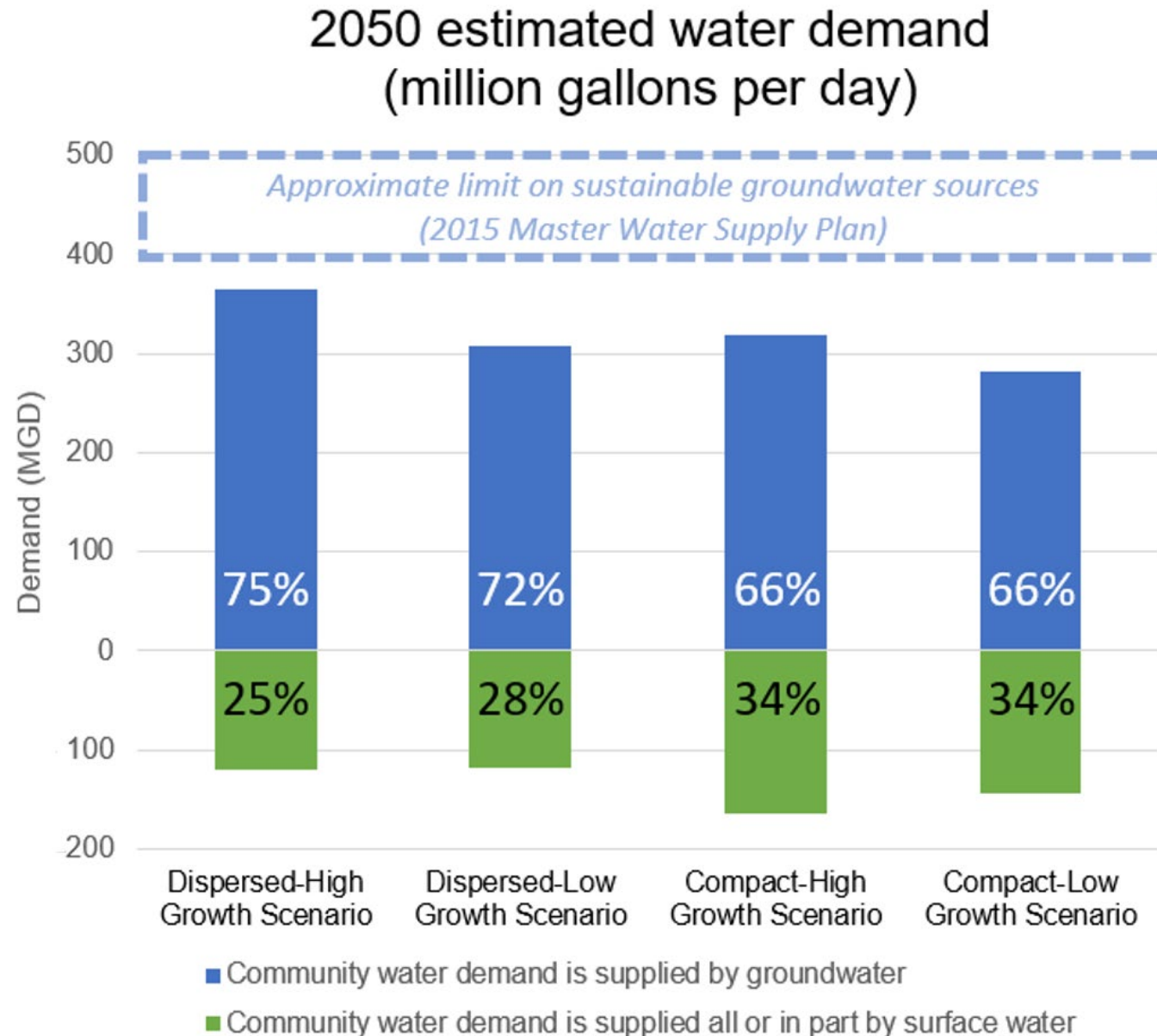
All communities' water demand was summed to estimate a regional total.

Regional Results: Overall Water Demand



- The range of 2050 water demand estimated for all four scenarios is within the 20% range of uncertainty built into the current approach to water demand projection (dotted lines).
- Growth is one of multiple drivers of water demand, including climate and others.

Regional Results: Water Demand by Source



Dispersed growth scenarios:

- More groundwater than surface water use, bringing us closer to limits of groundwater sustainably
- More pressure to provide water through additional private wells in areas not served by municipal systems

Compact growth scenarios:

- Increased use of existing surface water systems (Mississippi River), which currently has higher monitoring requirements, treatment, and costs.
- Higher risk of impact from sudden drought.

High growth versus low growth scenarios:

- More pressure to expand or create new public and private water supply systems

Water supply findings



- In all scenarios, industrial development increases in very highly vulnerable drinking water supply management areas. More industrial development occurs in high growth scenarios.
- Growth patterns impact future water demand. In all scenarios, regional water demand increases. However, other factors such as climate are also significant.
- Dispersed scenarios rely more on groundwater than surface water, compared to compact scenarios.

Implications on land use policy

Water supply findings

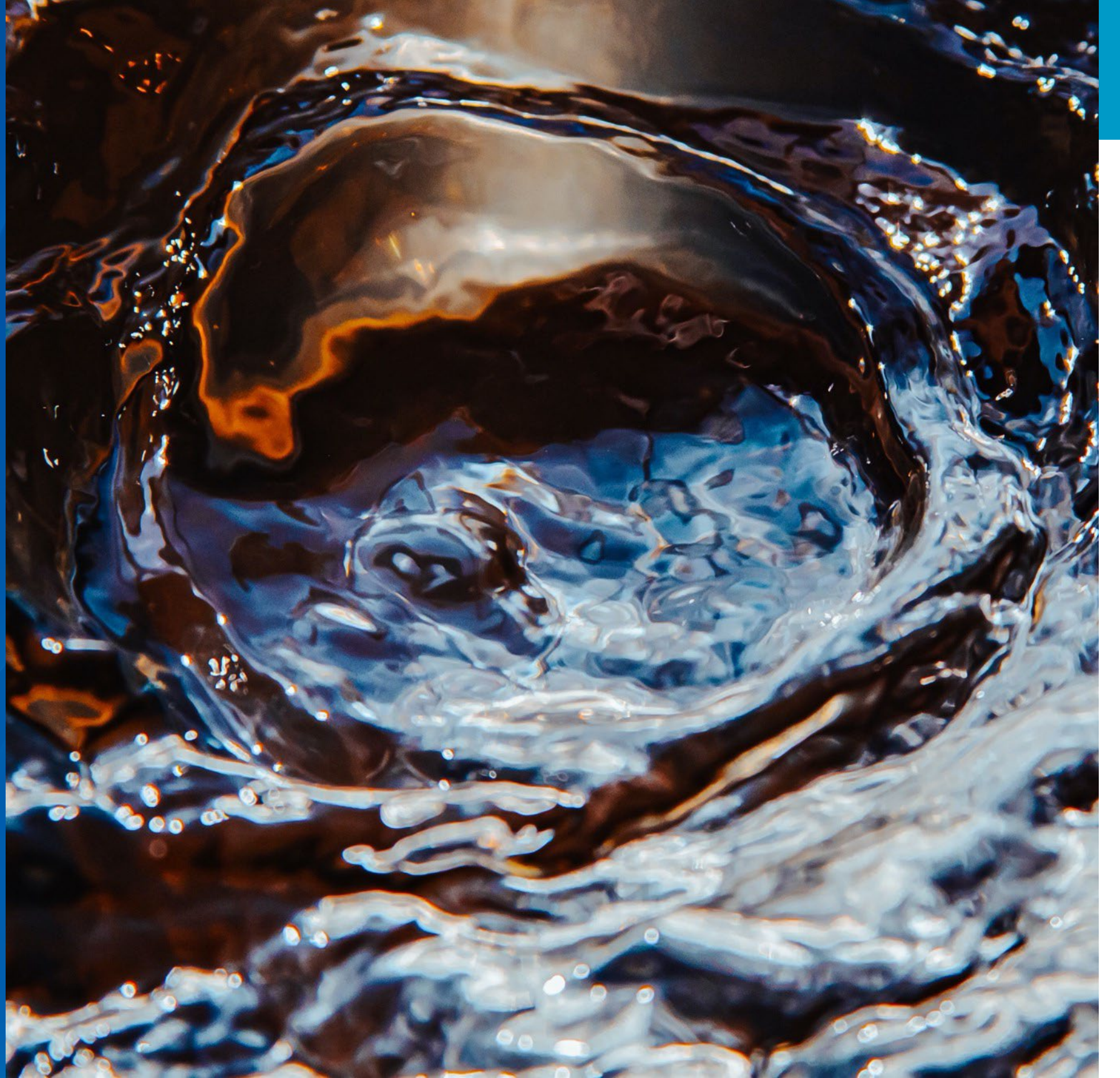
Compact development uses a larger percentage of surface water to meet future growth versus dispersed development.

Consider managing growth in ways that balance communities' use of surface water and groundwater.

Industrial development takes the most acres of new development in highly vulnerable drinking water supply management areas.

Consider ways to ensure new industrial – and all other development – is constructed to minimize water impacts.

Wastewater scenario findings



Key wastewater concepts

Regional Service Area (RSA)

Growth within the RSA is planned to be served by the regional wastewater system.

Growth outside the RSA is assumed to be served by ISTSs and local, rural WWTPs.

The amount of growth served in the RSA changes by scenario.

Regional System Capacity

Capacity utilized is impacted by the amount of growth as well as where that growth is occurring.

Capital investments are tailored to regional system capacity needs.

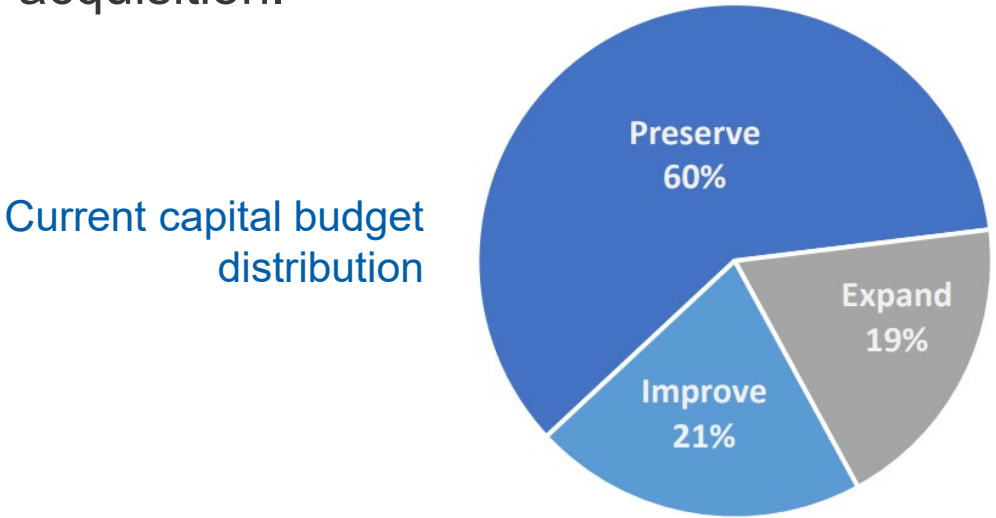
Other Facilities

Demand for, location, and composition of regional facilities and services will change by scenario.

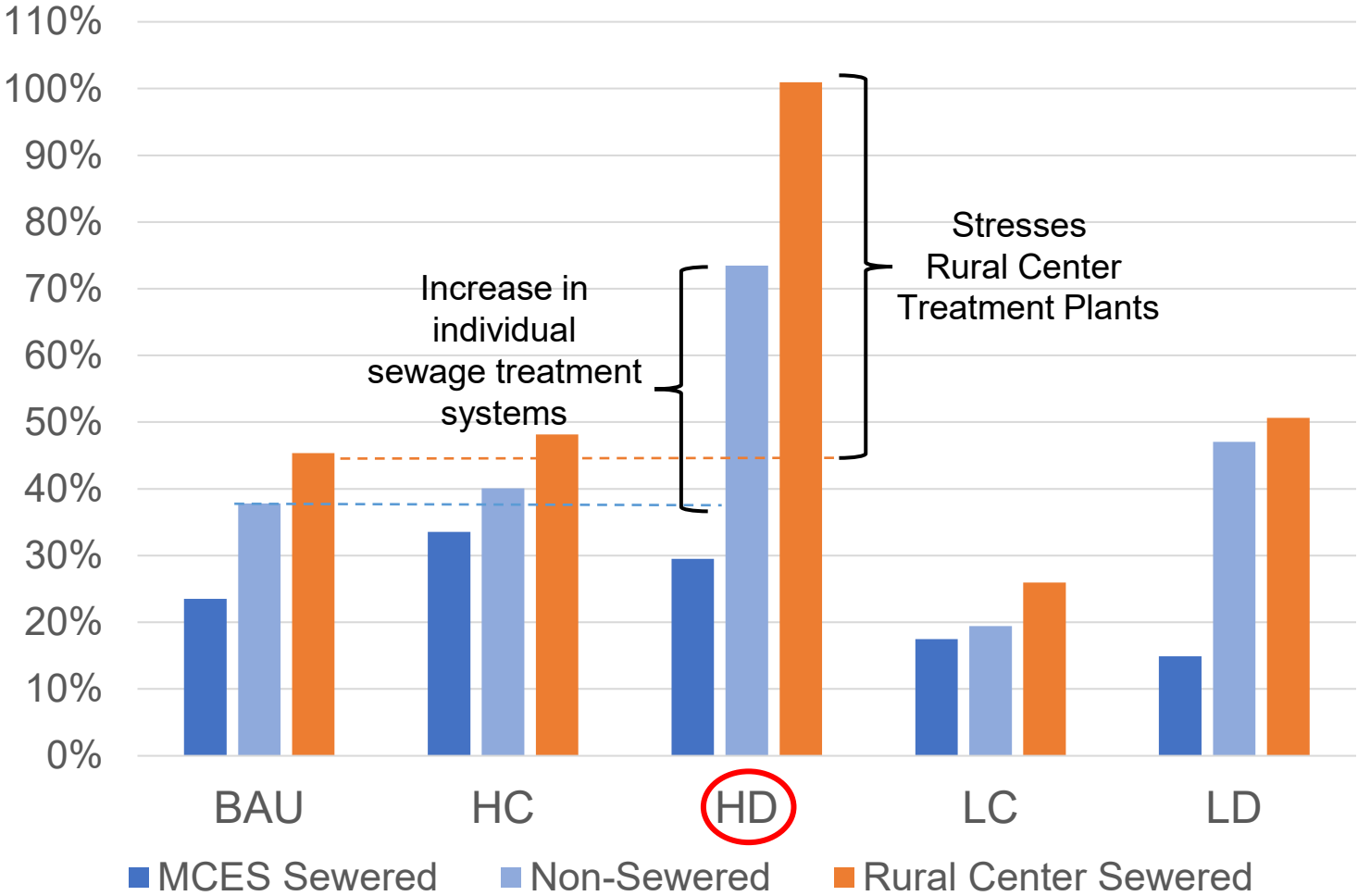
- Liquid waste receiving facilities
- Vector waste facilities
- Solids processing

Regional Service Area

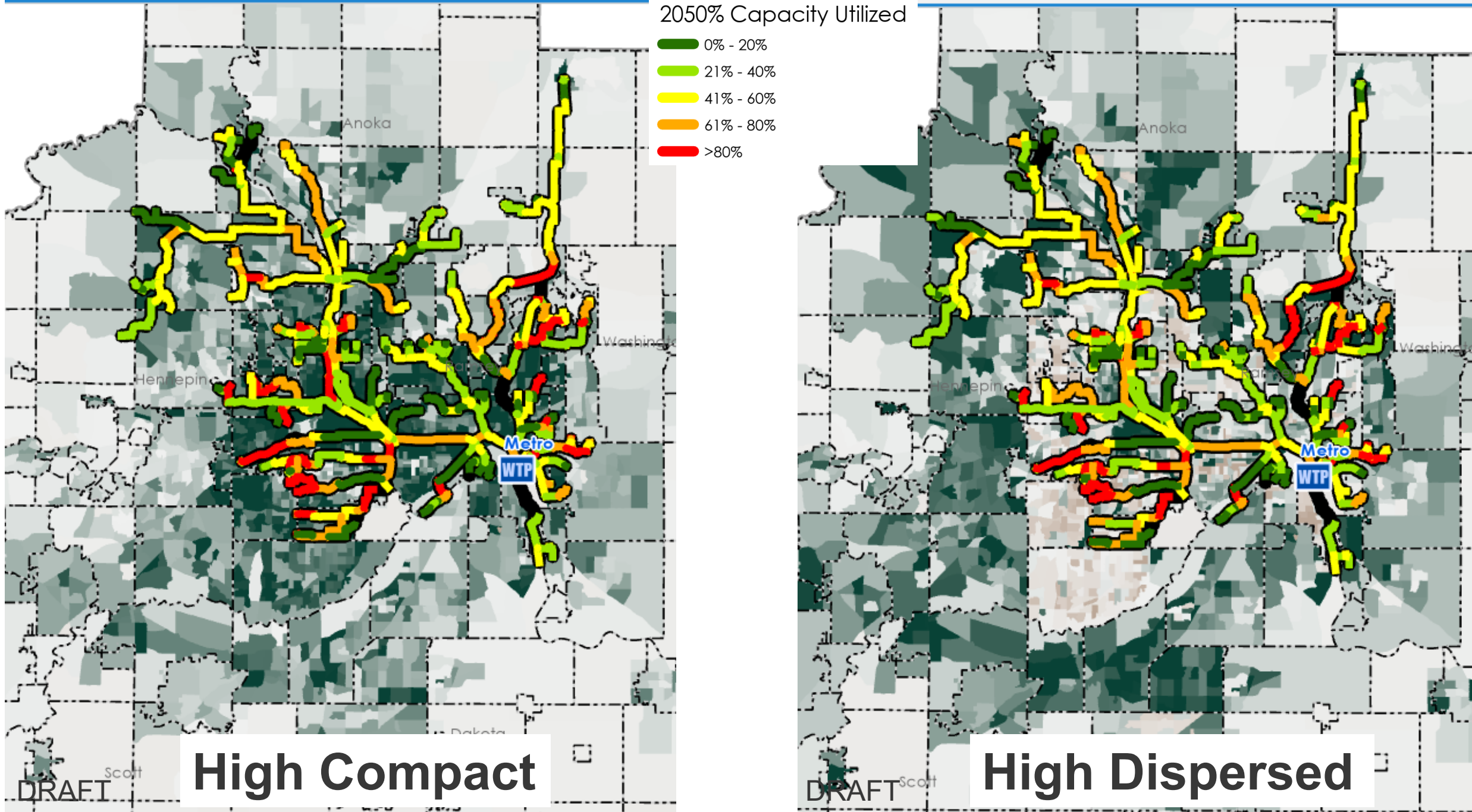
- High/Dispersed scenario increases growth in areas served by ISTSs and rural, local WWTPs.
- Increased ISTS growth can potentially lead to environmental degradation and necessitate extension of regional service.
- Growth pressure on rural WWTPs and changes in permit limits can necessitate (or push up the timing of) extension or acquisition.



Percent increase in population (2020 to 2050)

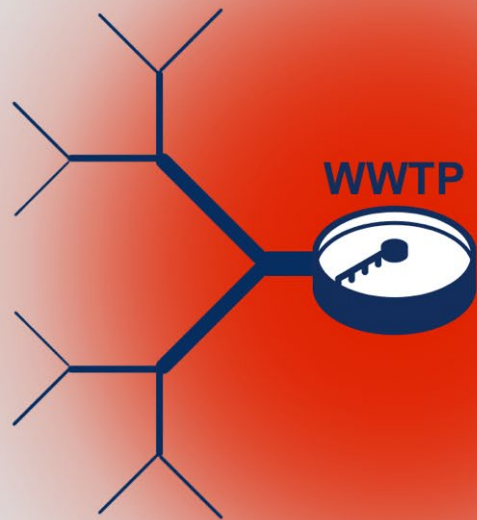


Regional System Capacity



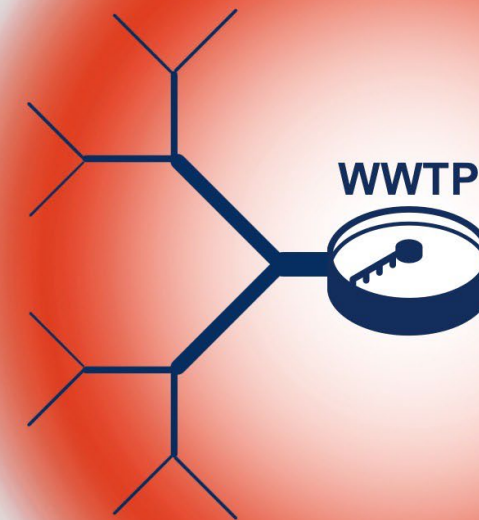
Regional System Capacity

Increasing Growth →



High Compact

Increasing Growth →



High Dispersed

Other Facilities

High/Dispersed scenario

- Could increase demand for regional facilities further out in the system
- Pressure on smaller regional WWTPs, upstream interceptors, and lift stations
 - Waste characteristics and volume challenging to smaller WWTPs
 - Potential risk of illicit discharges, solid/grit buildup
 - Expansion of solids processing/handling at smaller regional WWTPs



Wastewater analyses results

Regional Service Area (RSA)

- Within the RSA, High-Dispersed scenario focuses growth in outlying parts of the regional system.
- Outside the RSA, this scenario increases ISTS growth and puts pressure on rural, local WWTPs.
- High-Dispersed scenario could necessitate infrastructure expansion or acquisition (or influence the timing of).

Regional System Capacity

- High-Compact scenario puts pressure on regional infrastructure in the urban center.
- High/Dispersed scenario puts pressure on upstream infrastructure in outlying parts of the regional system.

Other Facilities

- High-Dispersed scenario could increase demand for regional facilities and services further out in the region and at smaller WWTPs, which may need investments to be able to accommodate them.

Connections to land use policy

Within the Regional Service Area

Compact development uses existing wastewater infrastructure more efficiently.

High/Dispersed puts pressure on outlying areas of the RSA

- Infrastructure expansion
- Timing of extension or acquisition of infrastructure

Outside the Regional Service Area

High/Dispersed puts pressure outside the RSA

- Significant growth in ISTS
- Rural WWTP pressures
- Induced growth
- Incentivizing large lots

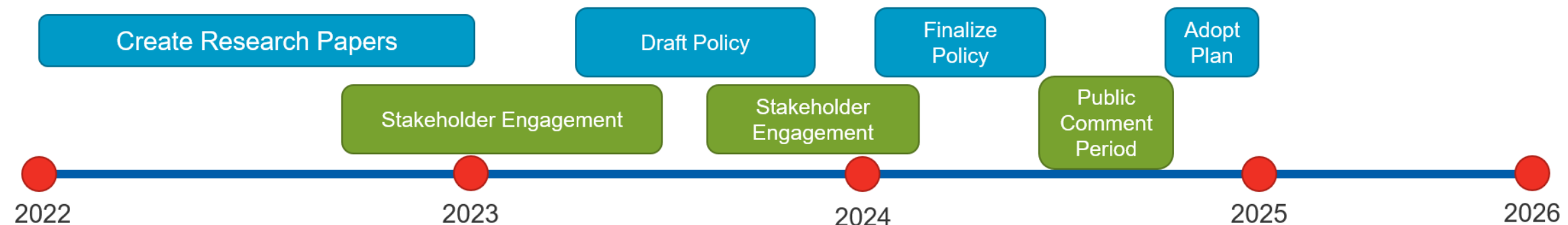
Land use and water are linked



- Water is foundational to land use.
- We need to balance our regional growth while limiting impacts to regional waters.
- Council land use and water policies are our best tool to connect water and land use planning for the region.
- If you have any additional questions after today, please consider us a resource.

Next steps for water planning

- Currently drafting policy for the 2050 Water Resources Policy Plan
- Current stakeholder engagement: biweekly presentations to the Environment Committee
- Adopt the next Water Resources Policy Plan by the end of 2024





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