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Adams County Water Master Plan

OCTOBER 2025 DRAFT

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ACKNOWLEDGEMENTS

The Adams County Water Master Plan would not have been possible without generous funding from the Colorado Water Conservation Board. In addition, Adams County expresses thanks to the following people who provided data, feedback, time, and expertise to shape the analyses and recommendations of the plan.

ADAMS COUNTY PROJECT TEAM

A dedicated group of Adams County staff provided leadership, guidance, editing, and support throughout the course of the project. Thanks to the following staff members who served on the Adams County project team.

- Bill Aiken, Community and Economic Development Deputy Director
- Brian Staley, Public Works Director
- Byron Fanning, Director of Parks, Open Space, and Cultural Affairs
- Jen Rutter, Planning and Development Manager
- John C. Stoll, Principal Long Range Planner
- Katie Keefe, Environmental Programs Manager
- Matthew Emmens, Senior Development Review Engineer
- Nick Eagleson, Senior Strategic Planner

TECHNICAL ADVISORY COMMITTEE

A Technical Advisory Committee advised and provided feedback throughout the course of the project. Thanks to the following members who served on the Technical Advisory Committee.

- Alex Davis, Assistant General Manager, Aurora Water
- Bao Chongtoua, Development Services Director, Mile High Flood District
- Cameron Bertron, Owner, Enviro Finance Group
- Daniel Kelshaw, Water Resource Engineer, South Adams County Water and Sanitation District
- Daniel Pershing, Director of Utilities and Capital Improvements, Town of Bennett
- Don Summers, General Manager, Todd Creek Village
- Drew Beckwith, Senior Water Resource Analyst, City of Westminster
- Greg Fischer, Maintenance District Manager, Adams County Public Works
- Juliana Archuleta, Stormwater Administrator, Adams County Public Works
- Kian McIntosh, Senior Water Quality Specialist, Adams County Health Department
- Matthew Stockton, Senior Water Resource Administrator, City of Thornton
- Tricia Williams, (formerly) Water Resource Engineer, South Adams County Water and Sanitation District

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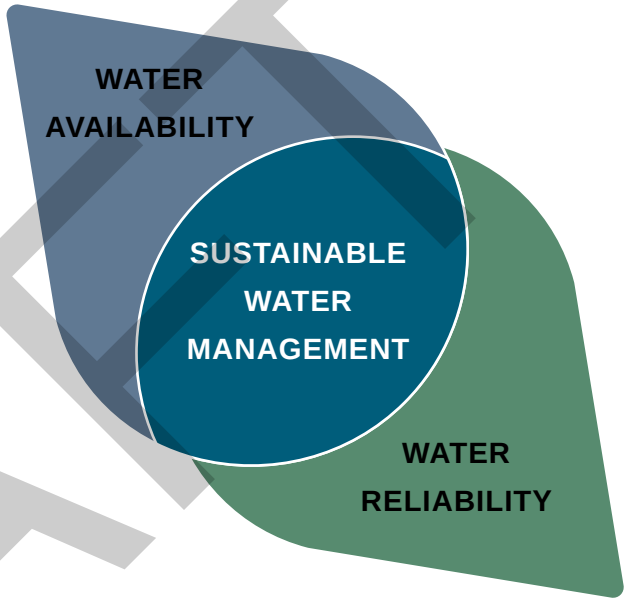
EXECUTIVE SUMMARY

The Adams County Water Master Plan focuses on managing water supply and demand at the county scale. Water management is a paradigm that jointly considers water availability and water reliability. While considering these two concepts together is important, approaching water management at a county-scale is complex. Varying jurisdictional boundaries, different levels of data availability and quality, and diverse water management approaches make implementing meaningful strategies challenging. These challenges are likely to be exacerbated under conditions such as drought and population growth.

The Adams County Water Master Plan aims to examine the state of sustainable water management in Adams County. While Adams County is not a water provider, it recognizes that water supply issues need to be prioritized to advance and create a sustainable future. As one of the fastest growing counties in Colorado, Adams County acknowledges the importance of understanding the impact of growth on water resources, as well as how water resources will shape future land uses. However, summarizing water demands and supplies at the County scale is complex. Interconnected systems — managed by different entities with varying policies and planning objectives — make it challenging to summarize data in meaningful ways.

Is high-quality water feasibly available and accessible for beneficial use?



Is water consistently physically and legally available for beneficial use?

Over the course of a year, Adams County worked with water providers, key stakeholders, and the public to complete a robust land-use based water demand analysis for current and future water demand. The analysis was informed by and aligned with the Advancing Adams County plans and coupled with water supply information and a groundwater model to perform a water availability assessment that focused on unincorporated areas of Adams County. The results from these efforts, as well as the engagement activities, lead to the identification of ten key water management challenges and the identification of 13 priority strategies to advance sustainable water management across Adams County. This plan also serves as the water element for the Advancing Adams County Comprehensive Plan.

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WATER SUPPLIES AND PROVIDERS

Adams County's water supply system is diverse and complex, reflecting the broader water supply challenges facing Colorado's Front Range. Adams County is served by over 80 individual water providers — one of the highest counts in the State — that depend on a combination of renewable water supplies, deep non-renewable groundwater from the Denver Basin aquifers, reuse water, and imported and wholesale water. While most of Colorado's water use is supported by surface water, over 60% of Adams County's water providers rely primarily on groundwater sources, particularly in unincorporated and rapidly developing areas. These various sources of supply differ significantly in terms of their regulatory oversight, long-term sustainability, and vulnerability to drought and climate change.

RENEWABLE WATER SUPPLY

Renewable water supplies include the South Platte River and alluvial groundwater aquifers that replenish annually.

All renewable water sources are subject to **prior appropriation and augementation plans** for use.

Much of the Adams County's sources are **already over-appropriated**, meaning development of additional renewable water sources will potentially be expensive and require unique solutions.

While they are renewable, relablity of these sources is threatend by **climate change** and **increasing competition** for water rights.

40%

Renewable water sources are the **primary source for 40%** of Adams County's water providers. These providers tend to be the larger providers, serving the western portions of Adams County.

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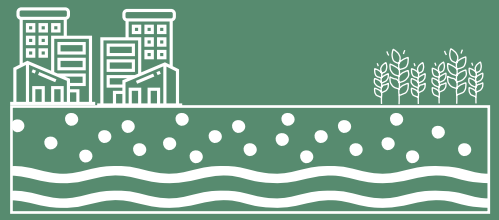
NON-RENEWABLE WATER SUPPLY



The non-renewable source in Adams County is the Denver Basin aquifer system. This system is a **deep, slowly recharging source** that is non-renewable on human timescales.

Non-renewable supplies are widely used in eastern Adams County, and by small and rural providers, but **groundwater levels are declining rapidly** in many areas.

While useful for short-term reliability, long-term dependence on Denver Basin groundwater is **unsustainable** without significant conservation or transition strategies.

60%

Non-renewable water sources are the **primary source for 60% of water providers** in Adams County and most self-supplied users.

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WATER REUSE

Reuse extends water supplies by reclaiming treated wastewater for non-potable (e.g., irrigation applications), and increasingly, for limited potable applications.

In Colorado, only certain water rights are legally eligible for reuse.

Reuse is a key tool for conservation and increasing reliability, supporting both augmentation and long-term supply strategies in alignment with the Colorado Water Plan.

0%

While some Adams County providers have reuse supplies, reuse is not a primary source of water for any major water providers within Adams County.

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IMPORTED AND WHOLESALE WATER

Imported (transbasin) water supplies are often fully consumable and critical to many major providers in Adams County. However, these types of projects are controversial and are becoming increasingly difficult to permit and construct due to environmental, legal, and interbasin concerns.

Wholesale water, from entities like Denver Water and City of Westminster, allow smaller or newer providers to access high-quality treated supplies without developing independent sources but may present challenges like contract restrictions or a lack of water supply diversity.

34%

Roughly 34% of Adams County's water providers purchase wholesale water.

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WATER DEMANDS

Land use, development standards, and climate trends drive water demands. Agricultural, industrial, residential and non-residential uses all use water differently. A residential development built to a high-water efficiency standard may use less water than a similar development built without efficiency standards in place. Alternatively, an efficient industrial development may use more water than an efficient residential development. Regardless of the type of land use, water demands tend to increase in the event of a hot and dry summer versus a wet and cool summer. Adams County's water demand profile reflects a diverse mix of agricultural, commercial, residential, industrial, and landscape water uses, each shaped by regional land use patterns and growth trajectories. Where and how Adams County develops will influence water demand now and into the future, necessitating careful planning to ensure future demands are met.

This plan leverages a land use-based water demand analysis to estimate water demands now and into the future. The baseline analysis accounts for spatial data, demographic trends, and water use benchmarks. The analysis of future demand accounts for land use changes, as well as the potential impacts of climate change and water conservation measures, providing a range of scenarios to inform long-term water resource planning.

Comparing Adams County land use today to Adams County land use in 2040, anticipated land use changes include:

- ✓ Growth of incorporated areas (i.e., annexations continue in municipal planning areas)
- ✓ Growth in areas where community services already exist
- ✓ Continued residential, commercial, and industrial development at varying intensities
- ✓ Conversion of agricultural lands to other land use types, especially near municipalities

Based on the current and future land use analysis:

- ✓ Baseline water demands are estimated to be approximately 105,000 acre-feet/year countywide, with domestic and non-residential uses accounting for 69% and agriculture contributing 31%.
- ✓ Baseline demands in incorporated areas are being driven primarily by municipal and industrial uses, whereas baseline demands in unincorporated areas are being driven primarily by agriculture.
- ✓ Looking to 2040, water demands are projected to increase significantly in the areas of Adams County that are expected to undergo annexation and development or redevelopment, while the rest of unincorporated Adams County may experience stagnant or slightly declining demands over time due to reductions in irrigated agricultural land.
- ✓ Projected 2040 water demands in unincorporated Adams County range between 16,000-26,000 AF/year depending on growth, and the degree to which water conservation and climate change drive demands over the next 15 years.

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WATER AVAILABILITY

This plan focuses on water availability in unincorporated areas of Adams County that depend on non-renewable groundwater within the Denver Basin aquifers. These areas are both the areas at the greatest risk of having water availability and reliability challenges, as well as the areas where County policies will most directly influence future development.

Based on the assessment:

- ✓ Overall, Adams County is estimated to have adequate supplies to meet future 2040 water demands.
- ✓ Based on an analysis of available groundwater in the Denver Basin aquifer beneath Adams County, unincorporated areas are projected to have sufficient supplies to meet current and 2040 demand levels for up to 300 years, in line with Adams County's long-term planning standard. However, continued development of these resources will lead to rising production and treatment costs, along with a decline in the long-term reliability and availability of the Denver Basin aquifer.

WATER CHALLENGES AND STRATEGIES

While Adams County has sufficient water supply to meet demands, there are certain geographic areas of Adams County that are at greater risk to specific water availability and reliability challenges (e.g., unincorporated areas of Adams County dependent on non-renewable groundwater). Additionally, even in the areas with adequate supplies there are inherent risks to the reliability of these sources due to factors such as climate change. The effort led to the identification of 10 water management challenges that synthesize over 40 identified risks. Together, the challenges aim to capture the primary water issues facing Adams County in terms of water supply, demand, and availability.

Each of the 10 water management challenges can be addressed in multiple ways. This plan identifies 13 priority, county-led strategies to initiate over the next five years. These priority strategies focus on the Adams County's role in advancing sustainable water management across the County. Of these, Adams County has a particularly important role to play in unincorporated areas of the County served by non-renewable groundwater supplies via land use decisions, as well as opportunities to increase water literacy across the County, and support providers through data sharing, collaboration, and education.

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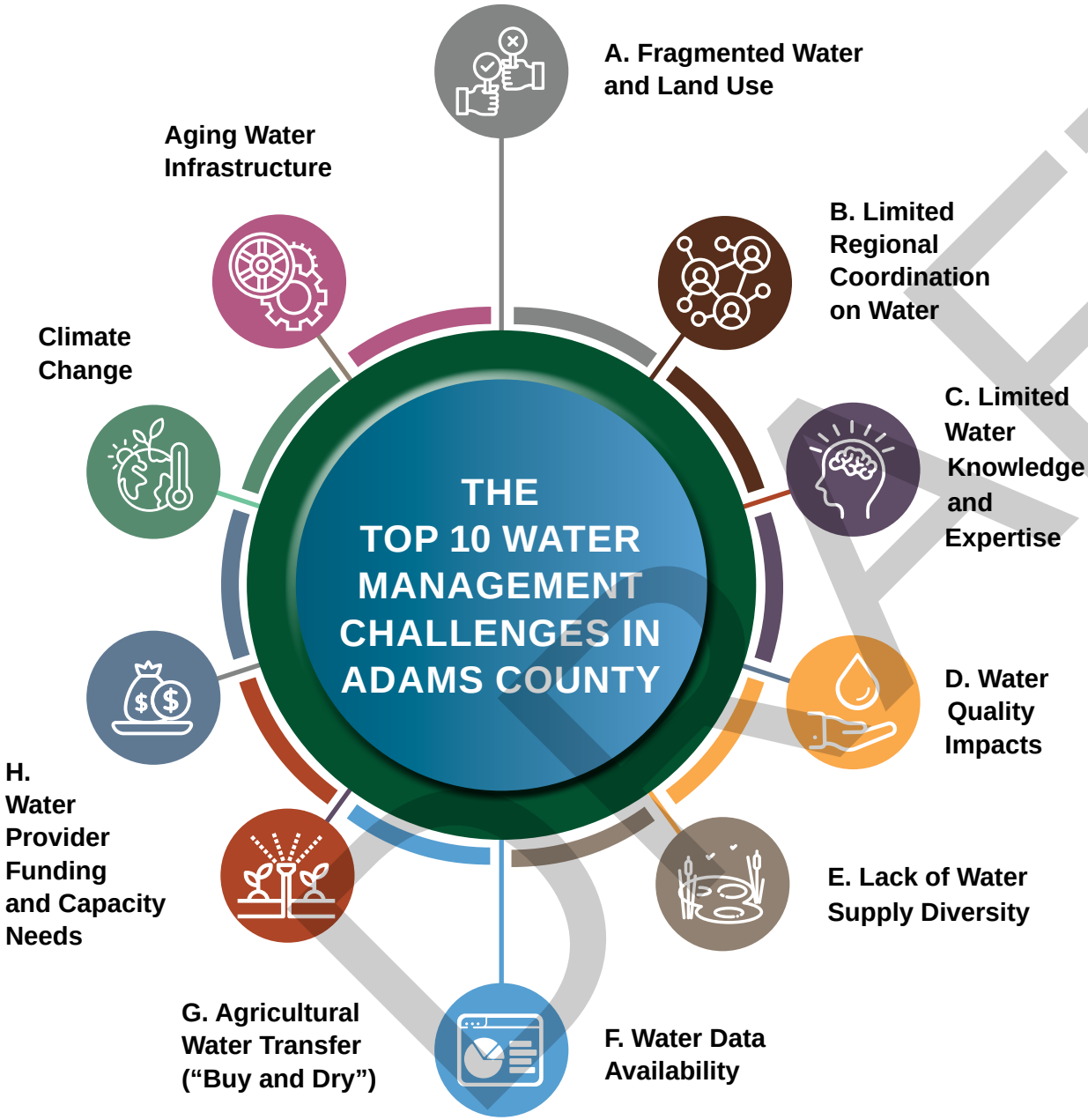
WATER CHALLENGES AND STRATEGIES



A1. Update water adequacy requirements/demand standards and improve related Adams County review processes

A2. Continue to work with water providers on land use planning and forecasting

A3. Update development codes to promote water efficiency in new development and redevelopment

A4. Create a groundwater overlay district to support sustainable development in areas with non-renewable groundwater supply

B1. Expand participation in regional water management groups and planning processes

B2. Establish an Adams County-led water efficiency program in partnership with water providers

C1. Dedicate Adams County staff to lead water efforts across Adams County

C2. Pursue water training and education for Adams County staff and leadership

D1. Guide property owners to repair/replace septic systems and/or connect to local sewer systems

E1. Support and/or partner with providers to apply for grant funds for storage, reuse, and renewable supply development

F1. Require observation wells or participation in a shared groundwater monitoring program for developments using Denver Basin or designated basin groundwater

G1. Leverage innovative land use and water management tools to retain valuable agricultural land and businesses

H1. Explore revitalization authorities to support water-related reinvestment

Chapter 1

INTRODUCTION

Chapter Contents

Adams County is a diverse and rapidly growing area located in the northeast part of the Denver Metro area. There are ten incorporated municipalities that are partially or fully within Adams County (Arvada, Aurora, Bennett, Brighton, Commerce City, Federal Heights, Lochbuie, Northglenn, Thornton, and Westminster). The unincorporated communities of Strasburg, Henderson, and Watkins are also within Adams County. These incorporated and unincorporated population centers, along with the rural and agricultural areas of Adams County, all need reliable access to quality water to thrive.

This plan focuses on water supply and demand, a regional issue that is managed at different scales, often in a decentralized way. Water management is a paradigm in which water availability and water reliability are jointly considered. While considering these two concepts together is important, approaching water management at a regional scale is complex (Figure 1). Varying jurisdictional boundaries, different levels of data availability and quality, and diverse water management approaches make implementing meaningful strategies challenging. These challenges are likely to be exacerbated under conditions such as drought and population growth.

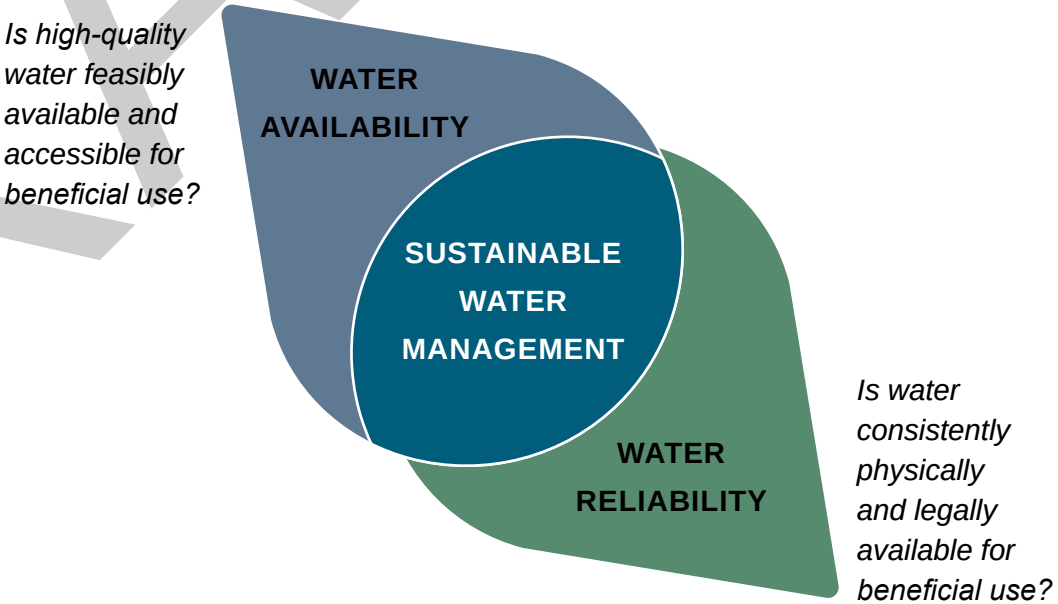


Figure 1. Sustainable Water Management

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While Adams County is not a water provider, Adams County recognizes the need to consider the impacts of Adams County's influence on water supply and demands, to advance and create a sustainable future. As one of Colorado's fastest-growing counties, Adams County recognizes that rapid growth puts increasing pressure on water supplies — and that limited water availability will, in turn, influence where and how future development can occur. However, summarizing water demands and supplies at Adams County-scale is complex. Interconnected systems — managed by different entities with varying policies and planning objectives — make it challenging to summarize data in meaningful ways. Currently, Adams County has roughly 80 different water providers, with over 4,000 water rights, 300 diversion structures, and approximately 14,000 wells. Additionally, supplies are sourced from watersheds and aquifers located within and outside of Adams County.

This Adams County Water Master Plan aims to take a holistic approach in understanding Adams County's water supply and demand, identifying water management-related risks and challenges, and clarifying Adams County government's role in connecting community members with one of the most vital resources — water.

The plan, developed with Colorado Water Plan grant funding from the Colorado Water Conservation Board, helps Adams County address water management-related challenges and opportunities head-on. Per C.R.S. §30-28-106, "it is the duty of a county Planning Commission to make and adopt a master plan for the physical development of the unincorporated territory of the county." Legislation adopted in 2024 (SB24-174), emphasizes the nexus between future growth, water availability, and water demands as part of long-range community planning. While previously encouraged, this legislation now requires counties to include a water supply element in their comprehensive master plans.

C.R.S. §30-28-106 Requirements

The water supply element in a county master plan must:

- be developed in consultation with entities that supply water for use within the county or region
- estimate a range of water supplies and facilities needed to support the potential public and private development described in the master plan
- include water conservation policies

The Advancing Adams Comprehensive Plan, developed under the Advancing Adams initiative, is an overarching comprehensive master plan that sets forth the community's vision for future land use, housing and population growth, the natural and built environments, economic development, cultural heritage, and corridors and subareas. It includes a framework of goals, policies and strategies to achieve that vision. In alignment with C.R.S. §30-28-106, **the Adams County Water Master Plan serves as the water element for the Adams County Comprehensive Plan, providing valuable insight to Adams County's water supply, demand, and capacity to support future growth.** Through development of the Water Master Plan and its implementation, Adams County is playing an increasingly valuable role convening and collaborating across a complex regional tapestry of water providers, municipalities, and water users.

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1.1 PLANNING PROCESS OVERVIEW

The development of the Adams County Water Master Plan originated with the 2023 Adams County Community Water Baseline Report. The Adams County Water Master Plan took the baseline analysis further by coordinating with water providers and the community through a year-long analysis and planning process. Key steps of the planning process are detailed in Figure 2. The Water Master Plan technical analysis leverages publicly available data used in the baseline report and was expanded to include information collected through a survey sent to water providers, as well as groundwater modeling and analysis, to further shape and inform the plan. Specific details about the engagement, data sources and analysis approaches are provided in the following chapters, as well as the Water Master Plan Appendices.

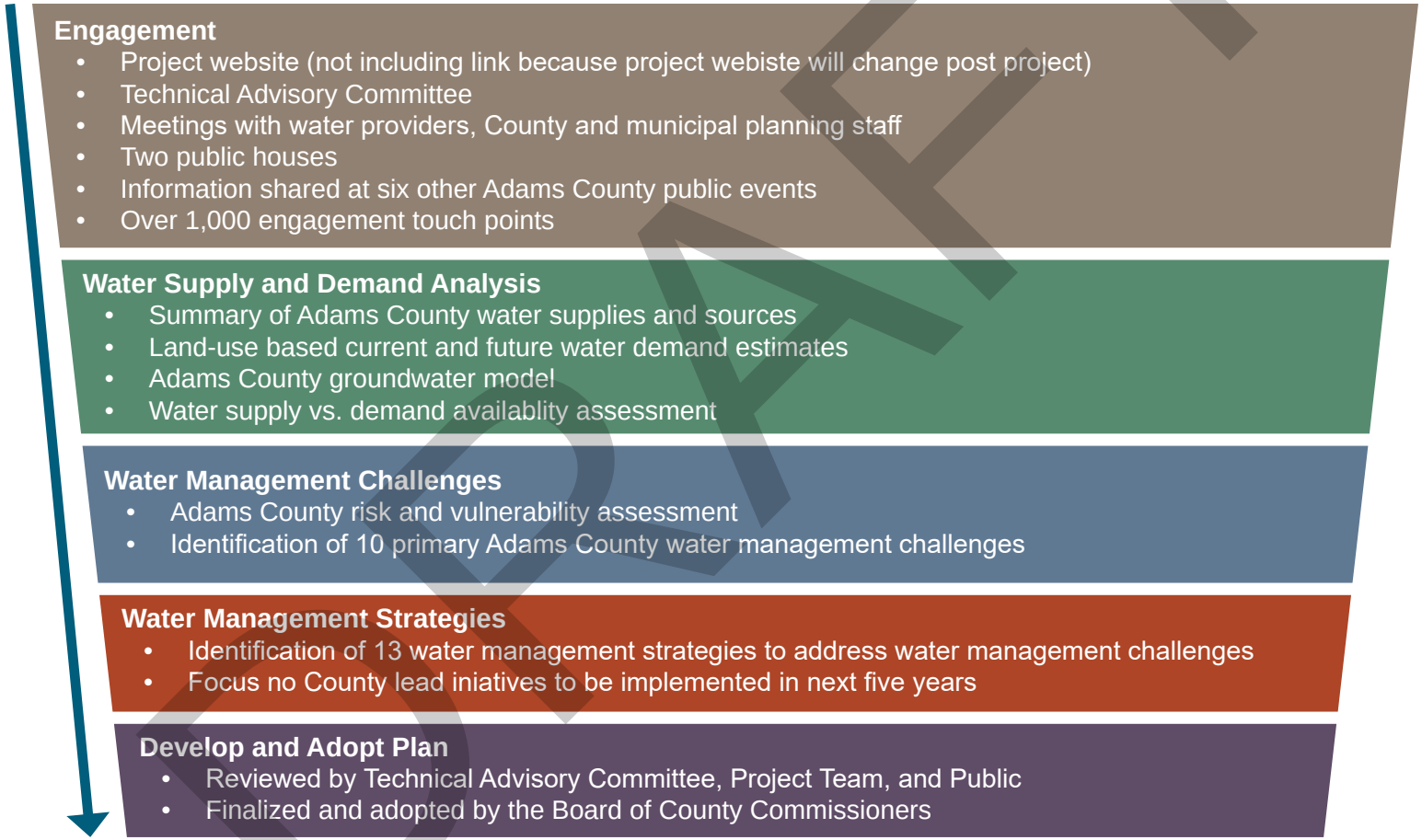

Figure 2. Major Steps of the Planning Process

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PLAN ENGAGEMENT MILESTONES

Stakeholder engagement was essential in developing a plan that addresses the unique challenges and opportunities in Adams County. There were over 1,000 unique engagement touchpoints over the course of the project via Techncial Advisory Meetings (TAC), public events, meetings with Planning Department staff from all major municipalities in Adams County, water providers not involved in the TAC, as well as engagement with the Planning Commission and Board of County Commissioners (BOCC).

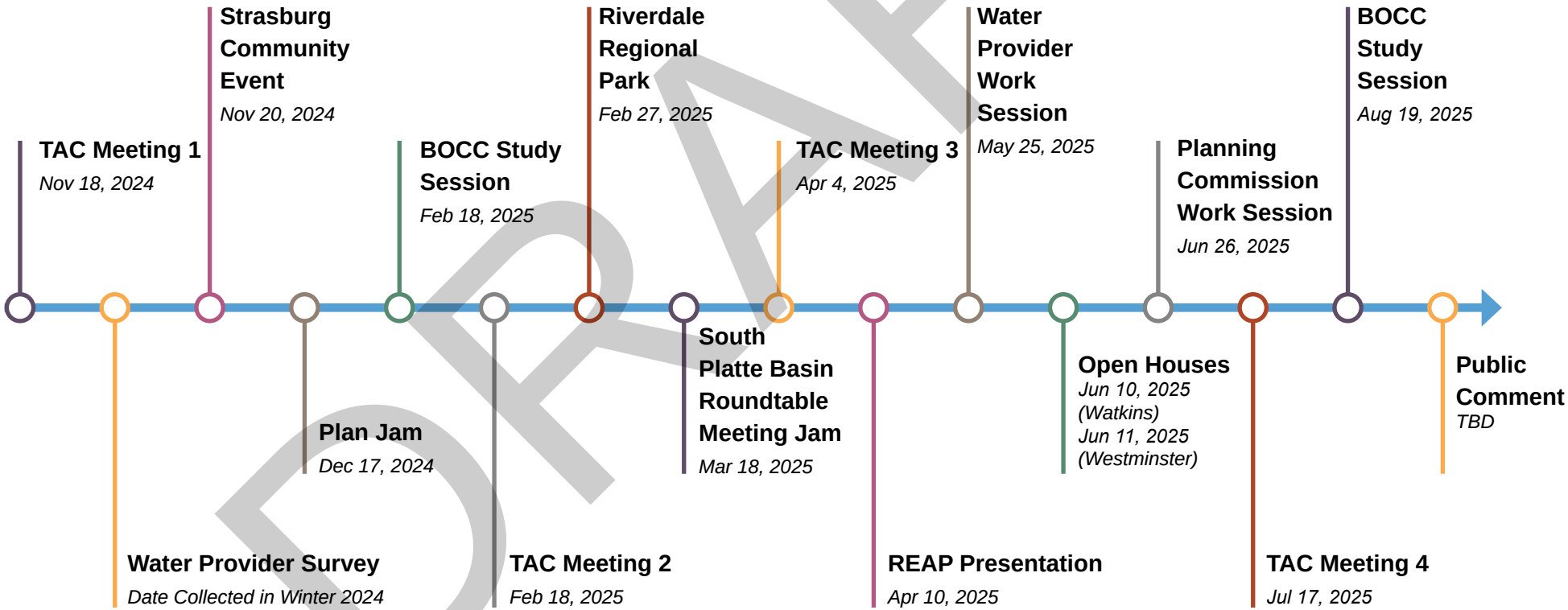

Figure 3. Planning Process Engagement Milestones

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1.2 ADVANCING ADAMS AND THE WATER MASTER PLAN

Land use and development patterns influence current and future water demands. For example, agricultural, industrial, and urban development all use water differently. Where and how Adams County develops, as outlined in the Advancing Adams Comprehensive Plan, will influence water demand now and into the future. The Advancing Adams Comprehensive Plan explored three planning scenarios to inform the final plan. Scenarios included:

A. **Stay the Course** – continue with the path that is established by current zoning, which includes growth in single-family development, industrial uses and warehousing, and strip-style commercial development.

B. **Many Small Nodes of Growth** – accommodates growth by proposing many small mixed-use nodes throughout Adams County, with a focus on Town Centers near transit lines and where community services already exist.

C. **Fewer, Concentrated Nodes of Growth** – builds on the Town Center concept and promotes fewer, denser Urban Centers.

Ultimately, the Advancing Adams Comprehensive Plan and its associated Future Land Use Map (FLUM) align most closely with Scenario B, promoting land use patterns that support complete communities that have housing, services, employment, and mobility options. The FLUM depicts a guiding vision for future land use and development in Adams County, whereas the Adams County Development Standards and Regulations establish the regulatory zoning, uses, and development standards. The 2025 Adams County Land Use Code Update intends to align the development standards and regulations with the Advancing Adams and FLUM vision.

This Water Master Plan leverages the Advancing Adams FLUM's Scenario B as a basis for the future water demand analysis. Because the Adams County FLUM does not prescribe future land uses for incorporated areas, the Water Master Plan analysis was also informed by municipal comprehensive plan and future land use maps, as well as Adams County subarea plans.

Beyond the FLUM, the chapters, goals, policies and strategies in the Advancing Adams Comprehensive Plan provide a solid foundation for water-related matters in Adams County. This Water Master Plan builds on those ideas, creating a more specific plan of action to advance Adams County's most pressing water management challenges (see Water Management Challenges and Strategies chapter). In addition to the Advancing Adams Comprehensive Plan, Adams County is involved in or leading several other efforts with water-related elements and implications (see Table 1).

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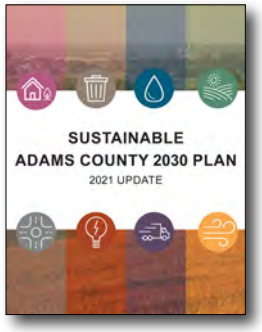
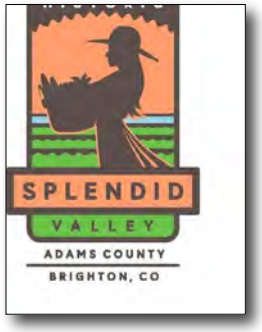
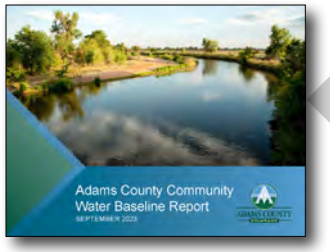
Table 1. Recent Adams County Water Related Planning and Regulatory Efforts

Related Effort	Title	Summary	Adams County Water Master Plan Connections
	2021 Sustainable Adams County 2030 Plan	This plan sets goals, targets, and strategies to advance sustainability across topics including energy efficiency and renewable energy, waste reduction, water quality and quantity, transportation options, food access, and sustainable neighborhoods. The plan includes both Countywide, community-focused goals and strategies and Adams County operations-focused goals and strategies.	Community water efficiency is the focus of *Goal 9*: *Promote water use efficiency for new and redeveloped residential and commercial properties in unincorporated Adams County*. Under this goal there is a specific strategy to "Develop a comprehensive Countywide Water Master Plan" (Strategy 9.3).
	2016 Historic Splendid Valley Plan	This plan, jointly adopted by Adams County and the City of Brighton, focuses on the Historic Splendid Valley, an agricultural area in south Brighton. The plan includes three overarching goals: preserve agricultural land, encourage local food production and consumption, and promote agritourism. It includes land use and water conservation recommendations and details about water requirements necessary to continue agricultural practices.	Water demand analysis conducted though the Adams County Water Master Plan process took a parcel-level approach to evaluate current and future water demand for agricultural lands in Adams County. Agricultural Water Transfer ("Buy and Dry") was also identified as one of the primary challenges in the Adams County Water Management Challenges and Strategies Chapter.
	2023 Adams County Community Water Baseline Report	This foundational report establishes an inventory of publicly available water supply and management information. It includes County-level metrics that quantify growth patterns, changing land use patterns, and surface and groundwater supply; a summary of water providers with key information for some of the largest providers; and a list of notable water supply related risks and vulnerabilities.	The Adams County Water Master Plan builds on the data and analysis included in the 2023 report. The Water Master Plan expands on the data analysis through a comprehensive water demand analysis, groundwater modeling, as well as a water availability assessment – focusing on unincorporated Adams County. The Water Master Plan planning process also engaged water providers across Adams County to collect baseline information on current system demands and any concerns regarding future water availability.

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Related Effort	Title	Summary	Adams County Water Master Plan Connections
	Adams County Land Use Code 2025 Update	The Land Use Code guides how property is used and developed in unincorporated Adams County. It impacts housing, environment, sustainability, landscaping, commercial and industrial activities, process, governance, and more. The code update will make it easier for staff and the public to use, implement the Advancing Adams Comprehensive Plan (2022), and incorporate best practices and community feedback.	The intersection of land use and water resource planning is considered in the Fragmented Land Use and Planning Challenge of the Water Master Plan. Strategy A1, A3, and A4 focus on the intersection of the Land Use Code and water management.

1.3 CONNECTIONS TO OTHER REGIONAL PLANNING EFFORTS

Recognizing that water management requires coordination beyond Adams County control, this plan seeks to align with regional and statewide water planning efforts. Other related efforts that were considered during plan development are summarized in Table 2.

Table 2. Related State and Region Water and Planning Efforts

Related Effort	Title	Summary	Adams County Water Master Plan Connections
	2023 Colorado Water Plan	This plan serves as a framework for helping Colorado meet its water management challenges through collaborative action around water development and water conservation.	The Colorado Water Plan estimates that if no new projects or strategies are implemented Colorado may need between 230,000 and 740,000 acre-feet of additional water by 2050. The plan identifies four focus areas for collaboration (vibrant communities, thriving watersheds, robust agriculture and resilient planning) to address this gap and other water issues. The Adams County Water Master Plan connects to the Colorado Water Plan by levering similar assumptions as the Colorado Water Plan for the future demand scenarios described in the Water Demands chapter, as well as in the challenge and strategy identification and prioritization process described in the Water Management Challenges and Strategies chapter.

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Related Effort	Title	Summary	Adams County Water Master Plan Connections
	2022 South Platte Basin Roundtable and Implementation Plan	The South Platte Basin Roundtable is a forum to facilitate discussion on water management issues in the South Platte Basin. The associated Basin Implementation Plan (BIP), developed by basin stakeholders, focuses on the current and future water needs in the South Platte and Republican River Basins, where Adams County is located.	More specific to Adams County, the South Platte Basin Roundtable Implementation Plan estimates the South Platte Basin average annual municipal and industrial water gap ranges between 190,000 and 400,000 acre-feet per year by 2050. The plan includes a number of goals and projects to close this gap. This, as well as the South Platte Decision Support system, was used to inform the analysis described in the Water Demands chapter, as well as in the challenge and strategy identification and prioritization process described in the Water Management Challenges and Strategies chapter.
	Metro Basin Roundtable	The Metro Basin Roundtable is a forum to facilitate discussion on water management issues in the Denver Metro region. It lies within the South Platte Basin and includes about half of the State of Colorado's population. Part of Adams County falls within the Metro Basin round table.	More specific to Adams County, the Metro Basin Roundtable estimates the Metro Basin area may need an additional 183,000 to 272,000 acre-feet to meet its 2050 demands, assuming passive water conservation. The South Metro area of the basin is expected to need approximately 25,900 acre-feet of additional annual supplies to replace non-renewable Denver Basin groundwater by 2050. This information was used to inform the challenges and strategies described in the Water Management Challenges and Strategies chapter.
MHFD MILE HIGH FLOOD DISTRICT	Mile High Flood District	The Mile High Flood District (MHFD) is a special district that serves as a regional resource for floodplain management, flood warning program, stream projects, watershed master planning, research, and development referrals. MHFD spans the Denver Metro region, including Adams County.	While not as specific to water supply, there is an important intersect between water supply and watershed planning. The Mile High Flood district includes watershed master planning with details on projects to remediate stormwater quality and flood risks. Additionally, the district provides education and completes stream restoration projects with local governments. These details were considered through the Plan process, especially to inform the challenges and strategies described in the Water Management Challenges and Strategies chapter.

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1.4 PLAN ORIENTATION

The Adams County Water Master Plan summarizes current and anticipated future conditions for Adams County's water supplies, water demands, and water availability. It identifies the top water management challenges facing Adams County and prioritizes 13 strategies to address those challenges. The Water Master Plan's appendices provide technical documentation and additional detail related to development and implementation of the Water Master Plan.

WATER SUPPLIES AND PROVIDERS

An overview of current water supplies and how Adams County receives water

WATER DEMANDS

An estimate of current and future (2040) water demands in Adams County

WATER AVAILABILITY

A summary of Adams County water supply needs to support potential development

WATER MANAGEMENT CHALLENGES AND STRATEGIES

Top 10 water management challenges for Adams County based on supplies, demands, and availability

Summary of priority strategies for Adams County government to lead and support to address water management challenges

IMPLEMENTATION NEXT STEPS

A summary of resources to support plan implementation, recommendations for keeping the plan up to date, and recommendations for tracking and reporting implementation progress

APPENDICES

I. Water Demand Analysis
II. Groundwater Analysis
III. Water Management Challenges and Strategies
IV. Engagement Summary
V. Implementation Plan

Figure 4. Water Master Plan Chapters

Additional documentation, including summary of the water demand analysis and groundwater analysis, water management challenges and strategies creation, engagement summary, as well as a glossary of key terms, and implementation plan appendix with key details on implementing the strategies outlined in the plan. Some of these appendices are confidential for Staff use, due to inclusion of sensitive water data (e.g., Water Demand Analysis and Groundwater Analysis appendices).

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Chapter 2

Water Supplies and Providers

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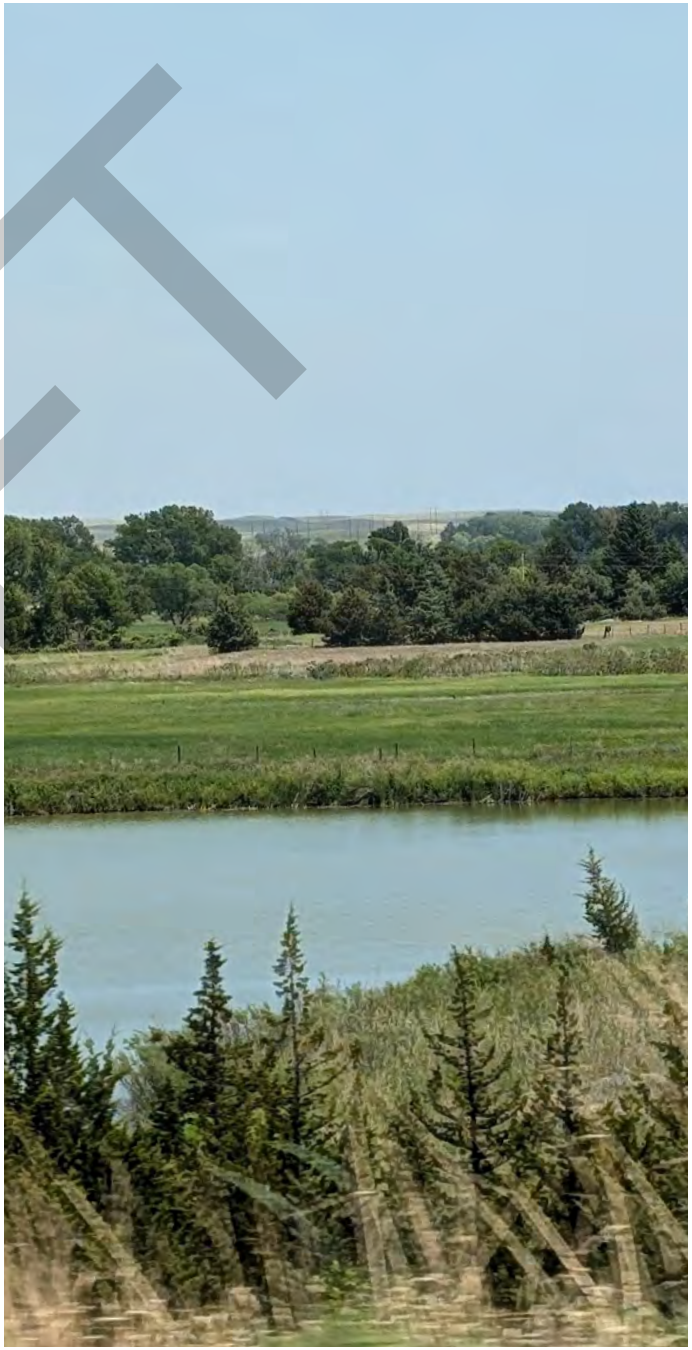
Chapter Contents



@KERSHMAN

Adams County's water supply system is diverse and complex, reflecting the broader water supply challenges facing Colorado's Front Range. Adams County is served by 86 individual water providers — one of the highest counts in the State — that depend on a combination of surface water, tributary groundwater, and deep non-renewable groundwater from the Denver Basin aquifers as their source of supply. While most of Colorado's water use is supported by surface water, over 60% of Adams County's water providers rely primarily on groundwater sources, particularly in unincorporated and rapidly developing areas. Groundwater is also used as a primary source for agricultural irrigation, drawn from a range of aquifer systems, including tributary alluvial and deeper confined aquifers like the Arapahoe and Laramie-Fox Hills formations within the Denver Basin aquifer. These various sources of supply differ significantly in terms of their regulatory oversight, long-term sustainability, and vulnerability to drought and climate change.

This chapter provides an overview of Adams County's key water sources, followed by a discussion of the various types of water providers that manage and deliver these supplies across the region.

2.1 ADAMS COUNTY WATER SUPPLIES

Within Adams County, there are four main sources of water supply:

- Renewable Water Supplies: Surface Water and Alluvial Groundwater
- Non-Renewable Water Supplies: Denver Basin Aquifer
- Water Reuse
- Imported and Wholesale Water

The following sections summarize each source and include case studies highlighting the different water management considerations related to the source.

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RENEWABLE WATER SUPPLIES: SURFACE WATER AND ALLUVIAL GROUNDWATER

Renewable water sources are regularly replenished through the natural hydrologic cycle (e.g., rain or snow). Renewable water supplies in Adams County consist of both surface water and alluvial groundwater sources. **Surface water** includes rivers, streams, and reservoirs that are replenished annually by snowmelt and precipitation, primarily originating from mountain watersheds. **Alluvial groundwater** (also referred to as tributary groundwater) is stored in permeable materials such as sand and gravel adjacent to rivers, most notably the South Platte River in the Adams County region. This groundwater is hydrologically connected to surface flows, meaning streamflow directly contributes to aquifer recharge and, conversely, groundwater pumping can deplete nearby surface water.

Key Takeaways for Renewable Water Supplies

Renewable water supplies include the South Platte River and alluvial groundwater aquifers that **replenish annually**.

All renewable water sources are subject to **prior appropriation and augementation plans** for use.

Much of the Adams County's sources are **already over-appropriated**, meaning development of additional renewable water sources will potentially be expensive and require unique solutions.

While they are renewable, relablity of these sources is threatend by **climate change** and **increasing competition** for water rights.

40%

Renewable water sources are the **primary source for 40%** of Adams County's water providers. These providers tend to be the larger providers, serving the western portions of Adams County.

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Within Adams County, there are five primary surface water sources (Figure 5, Figure 6, and Figure 7):

South Platte River

The dominant surface water feature in Adams County, the South Platte River supports municipal, agricultural, and industrial uses and serves as the backbone of the region's water supply and return flow systems.

Clear Creek

Flowing along Adams County's southern edge, Clear Creek provides a surface water source for several major providers, including Westminster and Thornton.

Sand Creek

This urban tributary runs through the southern portion of Adams County, primarily serving as a stormwater conveyance corridor and habitat corridor rather than a water supply source.

Big Dry Creek

Extending through western Adams County, Big Dry Creek receives treated effluent from several municipalities and plays a growing role in streamflow restoration and water quality monitoring.

Box Elder Creek

Located in the eastern part of Adams County, Box Elder Creek primarily serves rural agricultural users and contributes to localized groundwater recharge and flood management.

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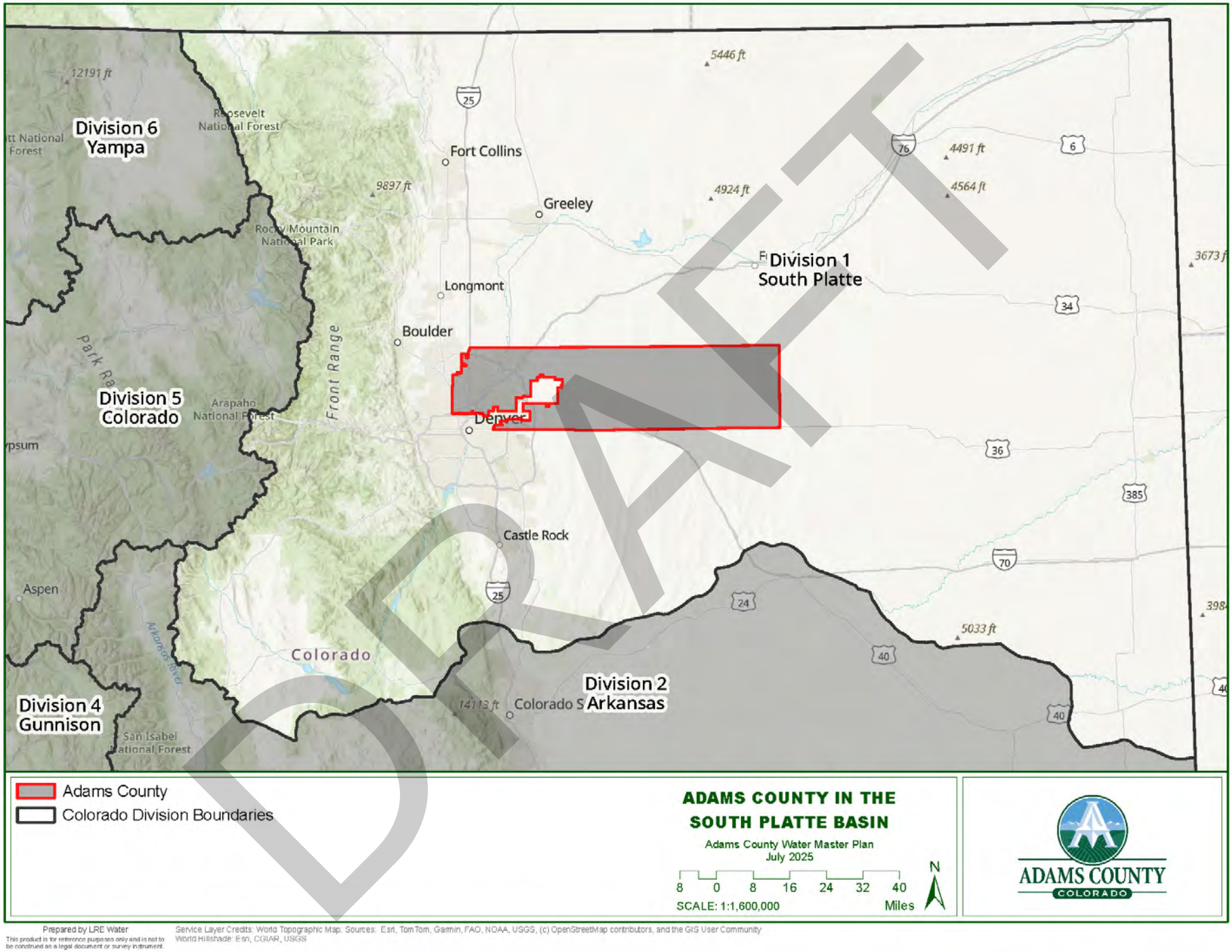

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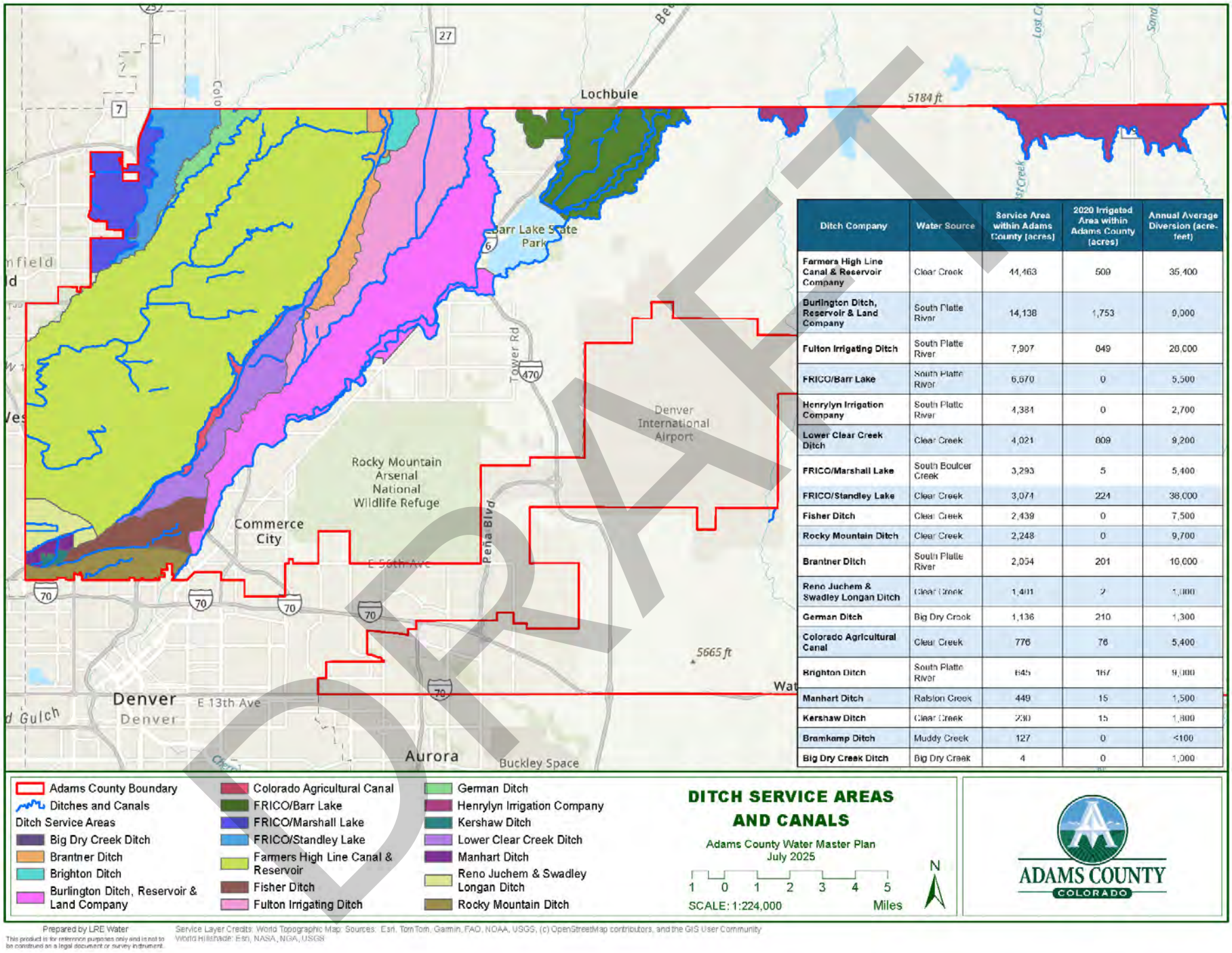
Figure 5. Adams County in the South Platte Basin



Ditch Company	Water Source	Service Area within Adams County (acres)	2020 Irrigated Area within Adams County (acres)	Annual Average Diversion (acre-feet)
Farmers High Line Canal & Reservoir Company	Clear Creek	44,463	509	35,400
Burlington Ditch, Reservoir & Land Company	South Platte River	14,138	1,753	9,000
Fulton Irrigating Ditch	South Platte River	7,907	849	20,000
FRICO/Barr Lake	South Platte River	6,670	0	5,500
Henrylyn Irrigation Company	South Platte River	4,381	0	2,700
Lower Clear Creek Ditch	Clear Creek	4,021	609	9,200
FRICO/Marshall Lake	South Boulder Creek	3,293	5	5,400
FRICO/Standley Lake	Clear Creek	3,074	224	38,000
Fisher Ditch	Clear Creek	2,439	0	7,500
Rocky Mountain Ditch	Clear Creek	2,248	0	9,700
Brantner Ditch	South Platte River	2,054	201	10,000
Reno Juchem & Swadley Longan Ditch	Clear Creek	1,401	2	1,000
German Ditch	Big Dry Creek	1,136	210	1,300
Colorado Agricultural Canal	Clear Creek	776	76	5,400
Brighton Ditch	South Platte River	645	167	9,000
Manhart Ditch	Ralston Creek	449	15	1,500
Kershaw Ditch	Clear Creek	230	15	1,800
Bramkamp Ditch	Muddy Creek	127	0	<100
Big Dry Creek Ditch	Big Dry Creek	4	0	1,000

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Figure 6. Ditch Service Areas and Canals

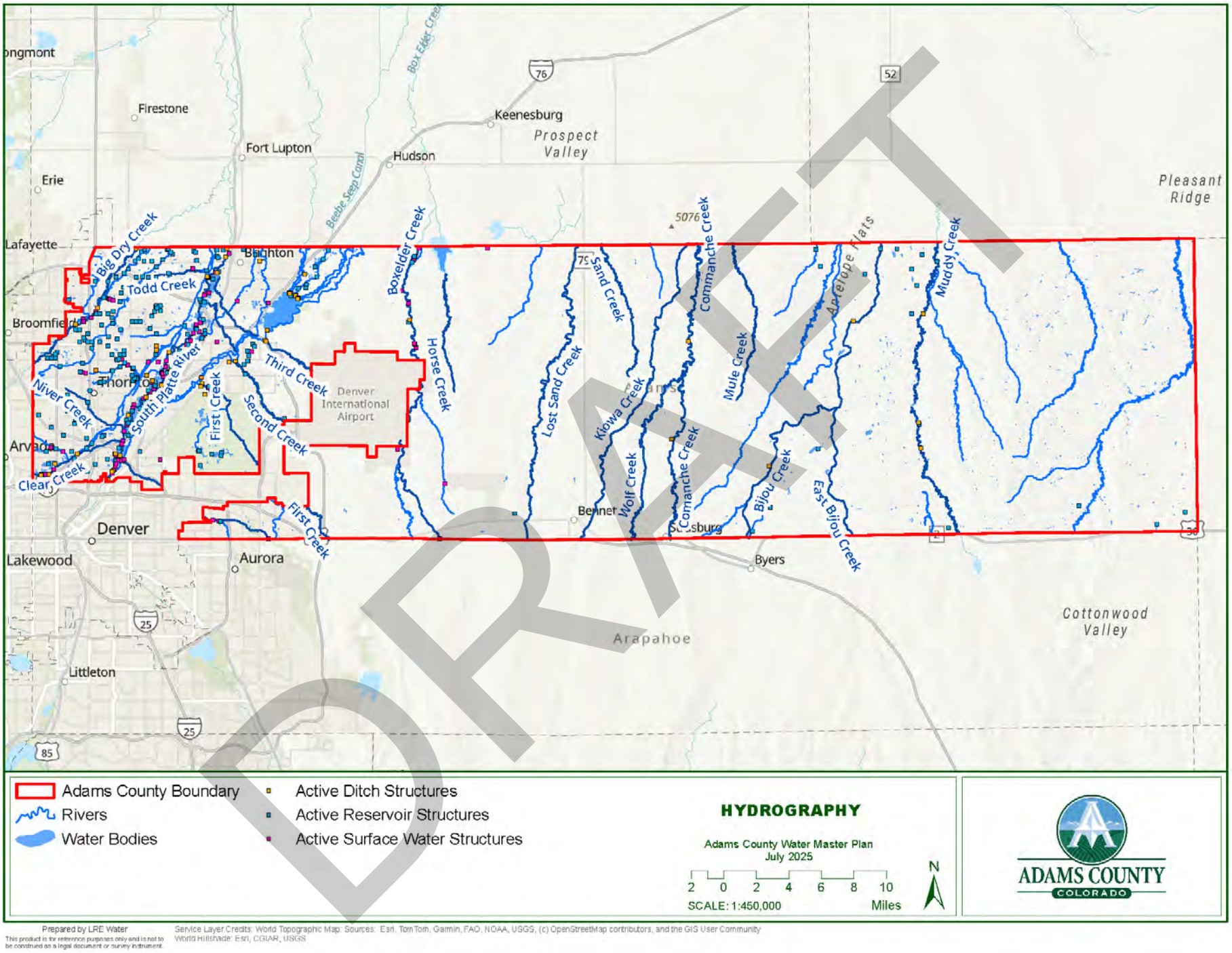

Figure 7. Adams County Hydrography and Surface Water Structures

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Additionally, irrigation ditches, canals, lakes, and reservoirs play a role in Adams County's surface water (Figure 6 and Figure 7):

- **Irrigation ditches and canals** divert water from the South Platte River and other surface water sources. Historically, irrigation ditches and canals served agricultural land throughout Adams County. Today, many ditches also provide municipal water supply. In Colorado, ditch company shares are tied to specific beneficial uses (e.g., irrigation, stock, municipal, etc.) that define how the water can be used. Any shift in use (e.g., from irrigation to municipal) requires a formal change of use approved through water court, ensuring that the historical return flow and timing of use are maintained to protect downstream water rights.
- **Lakes and reservoirs** store water during periods of low demand and/or high water supply and release water during periods of high demand, drought, or when natural stream flows are insufficient. In addition to supporting municipal and agricultural supply, reservoirs are essential for retiming water deliveries to meet augmentation requirements, facilitate water exchanges, and enhance overall system reliability.

Return Flows

Return flows refer to the portion of water that, after being diverted for use (such as irrigation or municipal supply), is not consumed and returns to the surface water or groundwater system. This water can re-enter streams, rivers, or aquifers and may be reused by other water users downstream. Return flows are a critical part of Colorado's water supply and water rights system.

Types of Water Providers that Rely on Surface Water Supplies in Adams County

Within Adams County there are a variety of different water providers that rely on surface water sources. These include:

- Most municipal water utilities
- All ditch companies (50+)
- Most water and sanitation districts
- Regional water providers (e.g., Denver Water)

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REGULATORY CONSIDERATIONS

Surface and alluvial groundwater are administered by Colorado's Office of the State Engineer in accordance with the Prior Appropriation Doctrine, in which more senior water rights have priority to divert and use water before users with more junior water rights. A water right's priority is determined by the date of appropriation, or the date on which that water right was first put to a beneficial use. The earlier the date, the more senior the water right. The State, Adams County, and water providers all play important roles in managing renewable water supplies (Table 3).

A court-approved augmentation plan is required to obtain a well permit for withdrawal of alluvial (tributary) groundwater. For new surface water diversions, augmentation plans are common but not always required, depending on the potential for injury to senior water rights. In all cases, augmentation plans allow for out-of-priority diversions by providing replacement water to the stream in terms of time, place, quantity, and quality. Within the Adams County region, many of these renewable water supplies are already fully appropriated and/or require an augmentation plan (typically involving the change of senior water rights) to be considered a reliable source of new supply to support future growth. Challenges and opportunities with managing these renewable surface water supplies are summarized on the following pages.

For additional discussion of Colorado's water rights, please refer to the Adams County Community Water Baseline Report.

Table 3. Roles in Managing Renewable Water Supplies

State's Role	Adams County/Local Jurisdiction's Role	Water Provider's Role
• The Colorado Division of Water Resources (DWR), also known as the State Engineer's Office, administers water rights, oversees well permitting for alluvial/tributary groundwater, and ensures compliance with interstate compacts and water court decrees. • The Colorado Water Conservation Board (CWCB) develops State water policy, provides funding for water projects, and works to protect and develop Colorado's water resources.	• Coordinates with local water providers and sanitation districts to support water infrastructure planning and development. • Engages in watershed management and stormwater quality programs to protect water sources and ensure sustainable use. • Leverages its land use authority, regional planning influence, and coordination role to promote or incentivize an emphasis on renewable water sources.	• Manages the delivery, treatment, and distribution of water to residents and businesses. • Develops and maintains infrastructure, monitors water quality, and implements conservation measures to ensure a reliable water supply. • Responsible for the long-term planning of their systems, which often includes acquiring new water rights or changing the use of existing water rights.

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Challenges

Associated with Non-Renewable Water Supplies

Tightening River Administration

Many large regional water providers currently hold significant portfolios of conditional water rights that have not yet been exercised (i.e., put to beneficial use). As these entities build out and begin diverting their water, the amount of "free river" will decline, increasing pressure on available supplies (i.e., when a river has more water than is needed to satisfy all water rights, allowing junior users to divert without restriction.). Water providers relying on junior water rights will face growing challenges in acquiring and developing firm (i.e., reliable) water sources without seniority.

Augmentation Requirements

Augmentation plans are required to pump from alluvial groundwater wells. This is to protect senior water rights from being impacted. Therefore, any water provider developing junior groundwater rights must also secure a firm, reliable source of augmentation water supply, such as reusable effluent, irrigation water rights, or senior water stored and released under an approved augmentation plan. Historically, most senior water rights in the region have been appropriated for agriculture — diverted directly from the South Platte River or its ditches for crop irrigation. Augmentation requirements place pressure on municipalities and metro districts to acquire senior water rights, often through "buy-and-dry" transactions, where farmland is permanently taken out of production to supply urban growth. Adams County has long recognized agriculture as a vital part of its cultural heritage and has worked to preserve farmland through its land use planning policies. Accordingly, the transfer of agricultural water rights (or "buy and dry") is identified as a key challenge within this Plan, with strategies aimed at protecting long-term water security for actively irrigated farmland.

Climate Change

Surface water and alluvial groundwater are particularly susceptible to the impacts of climate change. According to the Technical Update to the Colorado Water Plan, available flows on the South Platte River are expected to diminish, with peak runoff occurring earlier in the season reducing the reliability of supplies for late-summer municipal and agricultural uses. Climate change is also expected to have a negative impact on ecosystem health, particularly for areas east of I-25, due to rising temperatures, reduced snowpack, and diminished stream flow.

Varying Access Across the County

While renewable supplies are proximate to many urban areas on the western side of Adams County, access to these supplies is limited in the eastern portions of Adams County. As a result, these areas are more reliant on non-renewable sources.

Water Quality

The main water quality concerns for surface water supplies stem from both urbanization and agricultural activity along the South Platte River and its tributaries. These concerns affect both potable water treatment needs and regulatory compliance for water providers. Algal blooms and seasonal variability of water quality in lakes and reservoirs can reduce the volume of water that is economically treatable, reducing availability during peak demand periods. Surface water and alluvial groundwater are also at higher risk of PFAS (per- and polyfluoroalkyl substances) contamination which requires costly treatment solutions.

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Opportunities

Associated with Non-Renewable Water Supplies

Less Dependence on Non-Renewable Resources

Denver Basin groundwater is declining due to unsustainable pumping and limited natural recharge. It is considered a non-renewable source of water. An emphasis on renewable water supplies supports long-term water supply sustainability and aligns with the Colorado Water Plan's goal to encourage a transition away from non-renewable groundwater supplies such as the Denver Basin aquifers.

Firm Yield through Augmentation and Reuse

Alluvial groundwater can be legally and sustainably developed when paired with augmentation water from reusable water supplies. This expands firm yield options without requiring new surface diversions or "buy-and-dry" transactions.

Proximity to Growth Corridors

Renewable water sources like the South Platte River lie near rapidly urbanizing areas in western Adams County. This enables the development of water supplies close to demand, reducing the need for long transmission infrastructure.

Opportunities for Regional Collaboration

Shared augmentation plans or cooperative reuse projects (e.g., regional reservoirs, joint wellfields) can enhance reliability and reduce costs. These sources can serve as a bridge supply until long-term projects or the other regional effort comes online.

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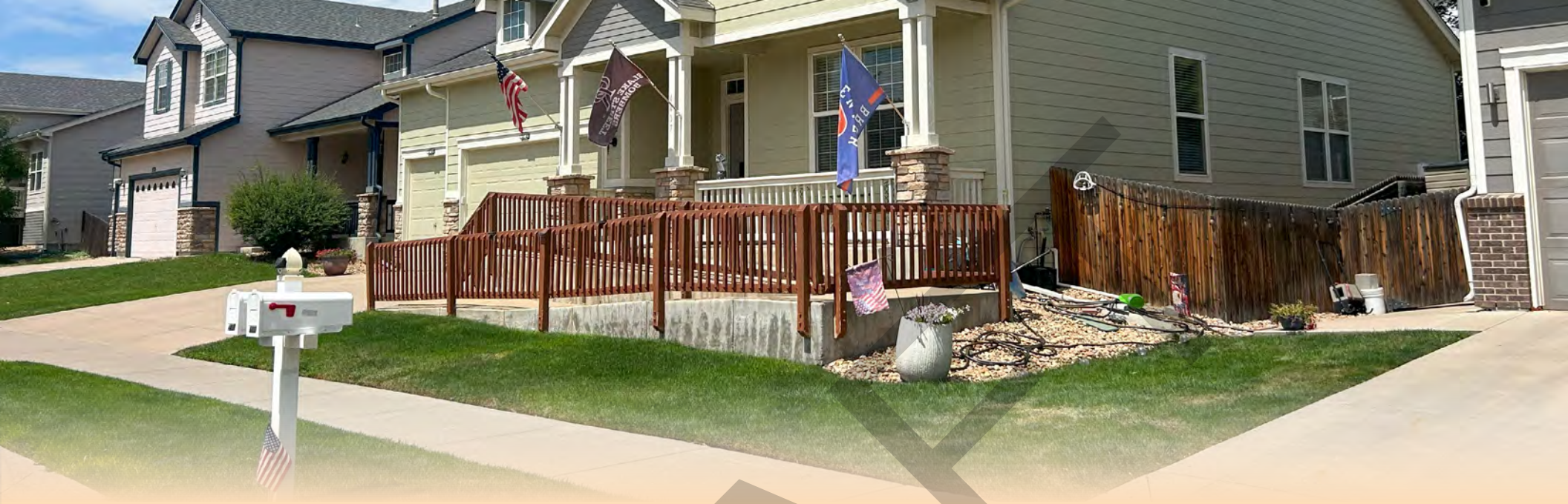

CITY OF NORTHGLENN CASE STUDY

Northglenn is a municipality located in western Adams County that provides water to its population through a municipal water utility. The City of Northglenn's primary water supply originates from snowmelt and rainfall in the Clear Creek watershed, which is conveyed through a network of ditches (such as the Church Ditch) and stored in Standley Lake. Northglenn owns shares in the Church Ditch and the Farmers Reservoir and Irrigation Company (FRICO), granting it rights to divert water to Standley Lake for municipal use. The City operates a water treatment facility that processes this stored water to meet the community's drinking water needs. However, challenges such as limited availability of additional water rights and sole reliance on Standley Lake for storage have prompted Northglenn to explore alternative storage solutions, including aquifer storage and recovery, to enhance supply resilience.

BURLINGTON DITCH, RESERVOIR, AND LAND COMPANY CASE STUDY

The Burlington Ditch is part of one of the largest irrigation systems in northeastern Colorado. Today, it serves over 14,000 acres of Adams County, making it a critical component of the local agricultural economy (Figure 6). The company operates in conjunction with the Farmers Reservoir and Irrigation Company and the Henrylyn Irrigation District. The two companies share headworks and infrastructure to manage water distribution effectively. Several entities have successfully changed the use of Burlington Ditch shares from agricultural to municipal purposes through Colorado's Water Court process. Notably, in 1987 Thornton sought to change 501 shares of Burlington Ditch water rights from irrigation to municipal use. The application, filed in Case No. 87CW107, provided Thornton with over 1,000 acre-feet of fully consumable water annually.

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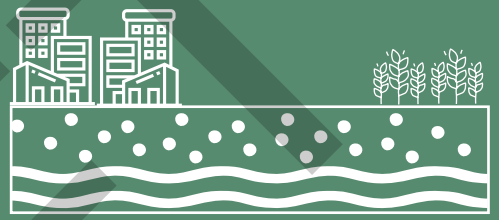
NON-RENEWABLE WATER SUPPLIES: DENVER BASIN AQUIFER

Non-renewable sources of water in Adams County include non-tributary groundwater, or groundwater that is not hydrologically connected to surface water sources like streams, lakes, and rivers. Non-tributary groundwater is categorized into three groups: designated groundwater, non-tributary groundwater, and Denver Basin groundwater. Each of these three types of groundwater are administered differently in the State of Colorado. The majority of Adams County resides in the Denver Basin aquifer system, with portions of Adams County falling within designated basins.

The Denver Basin aquifer system is a deep bedrock groundwater source that is a critical groundwater resource for Colorado's Front Range, supplying water to rapidly growing urban, suburban, and rural communities along the I-25 corridor. Originally developed in the 1970s and 1980s as an alternative to limited surface water supplies, the aquifer system became especially important for municipal and domestic water use in areas lacking access to renewable water sources. Today, these aquifer supplies are used as a supplemental supply by many of Adams County's water providers, or as the primary source of irrigation and drinking water throughout eastern portions of Adams County.

Key Takeaways for Non-Renewable Water Supply



The non-renewable source in Adams County is the Denver Basin aquifer system. This system is a **deep, slowly recharging source** that is non-renewable on human timescales.

Non-renewable supplies are widely used in eastern Adams County, and by small and rural providers, but **groundwater levels are declining rapidly** in many areas.

While useful for short-term reliability, long-term dependence on Denver Basin groundwater is **unsustainable** without significant conservation or transition strategies.

60%

Non-renewable water sources are the **primary source for 60% of water providers** in Adams County and most self-supplied users.

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The Denver Basin aquifer system consists of four primary aquifers: Dawson, Denver, Arapahoe, and Laramie-Fox Hills (Figure 8).

- **Dawson Aquifer:** Shallowest and most productive of the four aquifers; designated as "not non-tributary," meaning pumping may require augmentation. Primarily used in areas near the foothills. Less relevant for most of Adams County due to limited geographic extent.
- **Denver Aquifer:** One of the most commonly used aquifers for municipal supply in Adams County.
- **Arapahoe Aquifer:** Deeper than the Denver Aquifer, with generally higher yields than other Denver Basin aquifers. Often used when the overlying aquifers become depleted or are insufficient.
- **Laramie-Fox Hills Aquifer:** The deepest and typically lowest-yielding of the four. Water quality can be poorer and often requires additional treatment (e.g., reverse-osmosis system). Generally used as a backup or supplemental supply when shallower aquifers are no longer viable.

These aquifers are confined and recharge extremely slowly, often over thousands of years. As such, they are considered non-renewable on human timescales. This aquifer system has long been a source of supply for the region; however, since the 2002 drought, declining groundwater levels, due to increased water demands, have led to concern about the basin's long-term viability as a reliable source of supply.

In addition to the Denver Basin aquifers, within Adams County there are two Designated Groundwater Basins (Figure 8). Though the Denver Basin aquifers and Designated Groundwater Basins overlap geographically, they are governed by different legal and administrative rules.

- **Lost Creek Basin:** The Lost Creek Basin spans northeastern Adams County and adjacent areas. It includes the Denver Basin Groundwater system, as well as other areas where groundwater is slightly connected to surface streams but regulated separately under designated basin rules. It is more developed than other basins in the region, with a growing number of municipal and special district wells replacing traditional agricultural use, leading to increasing pressure on groundwater resources. Additionally, within the Lost Creek Basin the alluvial aquifer is no longer available for new well permits, as the State has declared that the alluvium is over appropriated.
- **Kiowa Bijou Basin:** Located in southeastern Adams County and extending into Elbert and Arapahoe Counties, the Kiowa-Bijou Basin remains largely agricultural and rural in nature. Groundwater here is generally deeper and more isolated from surface systems, with limited municipal development to date, though urban expansion may increase future demand on the basin.

Types of Providers that Rely on Non-Renewable Groundwater Supplies in Adams County

Within Adams County there are a variety of different water providers that use and rely on non-renewable groundwater supplies. These include:

- Self-supplied users (e.g. metro districts, developers/HOAs, and farmers in eastern Adams County)
- Smaller municipal providers in eastern Adams County (e.g., Bennett)
- Smaller water and sanitation districts (e.g., Strasburg Water and Sanitation District)
- Conjunctive use systems, operated by most major water providers, which blend surface water and groundwater supplies to enhance reliability

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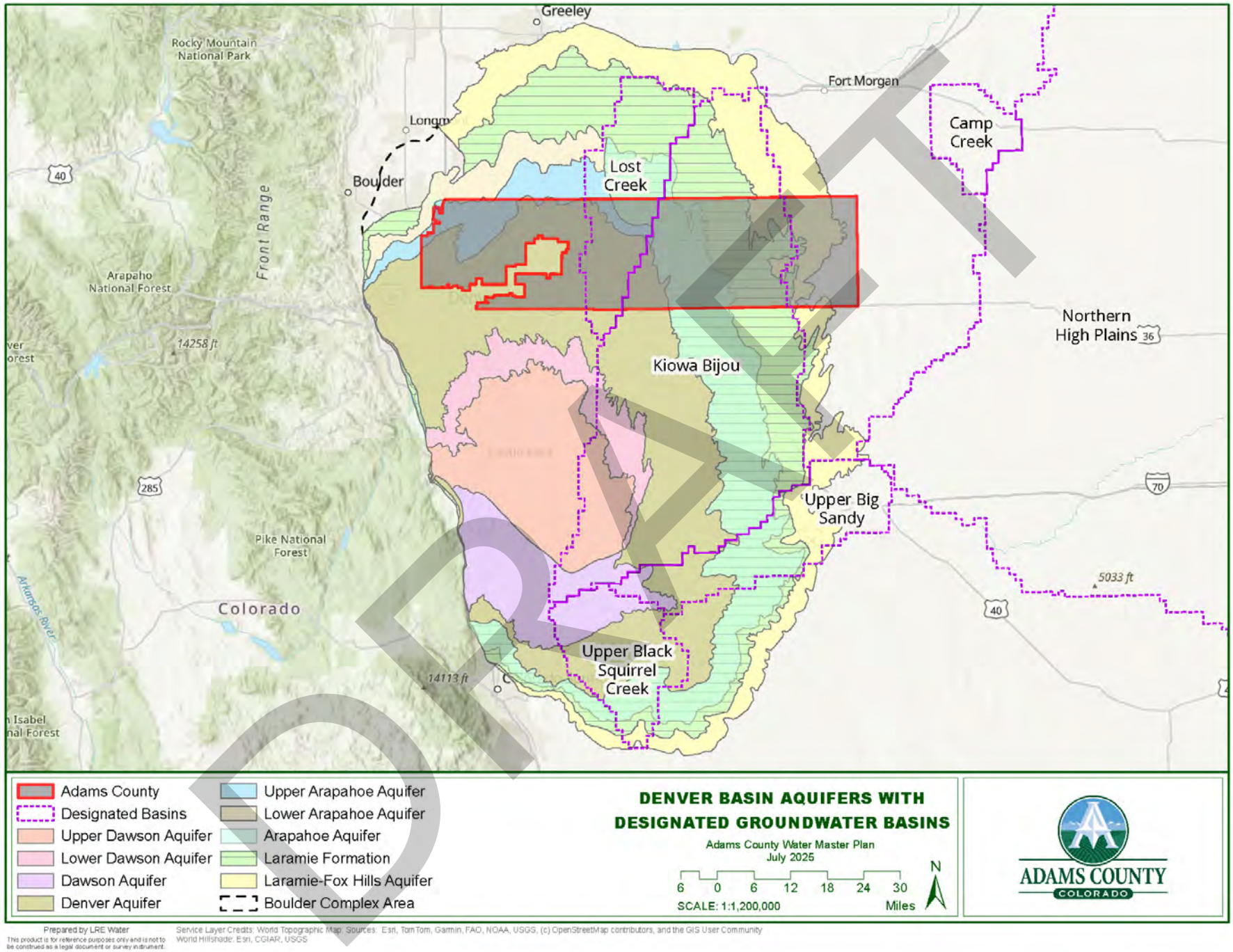

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Figure 8. Denver Basin Aquifers With Designated Groundwater Basins, June 2025

REGULATORY CONSIDERATIONS

Denver Basin groundwater is administered by the Colorado Division of Water Resources (DWR) under the 100-year aquifer life rule, which permits property owners to withdraw a specified volume of groundwater over a 100-year period, based on the saturated thickness of the aquifer beneath their land. The legal classification of the water as either non-tributary or not non-tributary determines whether pumping must be augmented to protect senior surface water rights. Non-tributary groundwater (such as deeper portions of the Denver Basin aquifers in some areas) does not require augmentation, while not non-tributary groundwater (such as the Dawson Aquifer in parts of western Adams County) does require augmentation to offset impacts on nearby surface streams.

All wells constructed in the Denver Basin aquifer system, but outside of the Designated Groundwater Basins, must be permitted through DWR and are often subject to metering and annual water use reporting requirements. In contrast, within the Designated Groundwater Basins, groundwater is managed by the Colorado Ground Water Commission, which may apply additional permitting, monitoring, and administrative regulations. While the legal framework allows for planned aquifer depletion over time, it does not ensure long-term sustainability, creating pressure on communities and water providers to develop alternative sources of supply. Adams County, for example, applies a more conservative “300-year rule” for new developments, requiring proof that a groundwater supply will last for at least 300 years to ensure greater long-term reliability (see Water Management Challenges and Strategies). Across the County there are over 14,000 wells (Figure 9). The State, Adams County, and water providers all play important roles in managing non-renewable water supplies (Table 4).

Conjunctive Use

Conjunctive use of water resources in Colorado refers to the coordinated management of surface water and groundwater supplies to optimize water availability, reliability, and long-term sustainability. Many major water utilities in Adams County operate conjunctive use systems that utilize surface water supplies when available (e.g., during spring runoff) while relying on groundwater during dry periods, droughts, or when surface water supplies are limited. Excess water is stored in reservoirs or underground, such as in aquifer storage and recovery (ASR) facilities, for future use. Conjunctive use helps conserve groundwater resources during wet years and maintain stream flows during dry ones.

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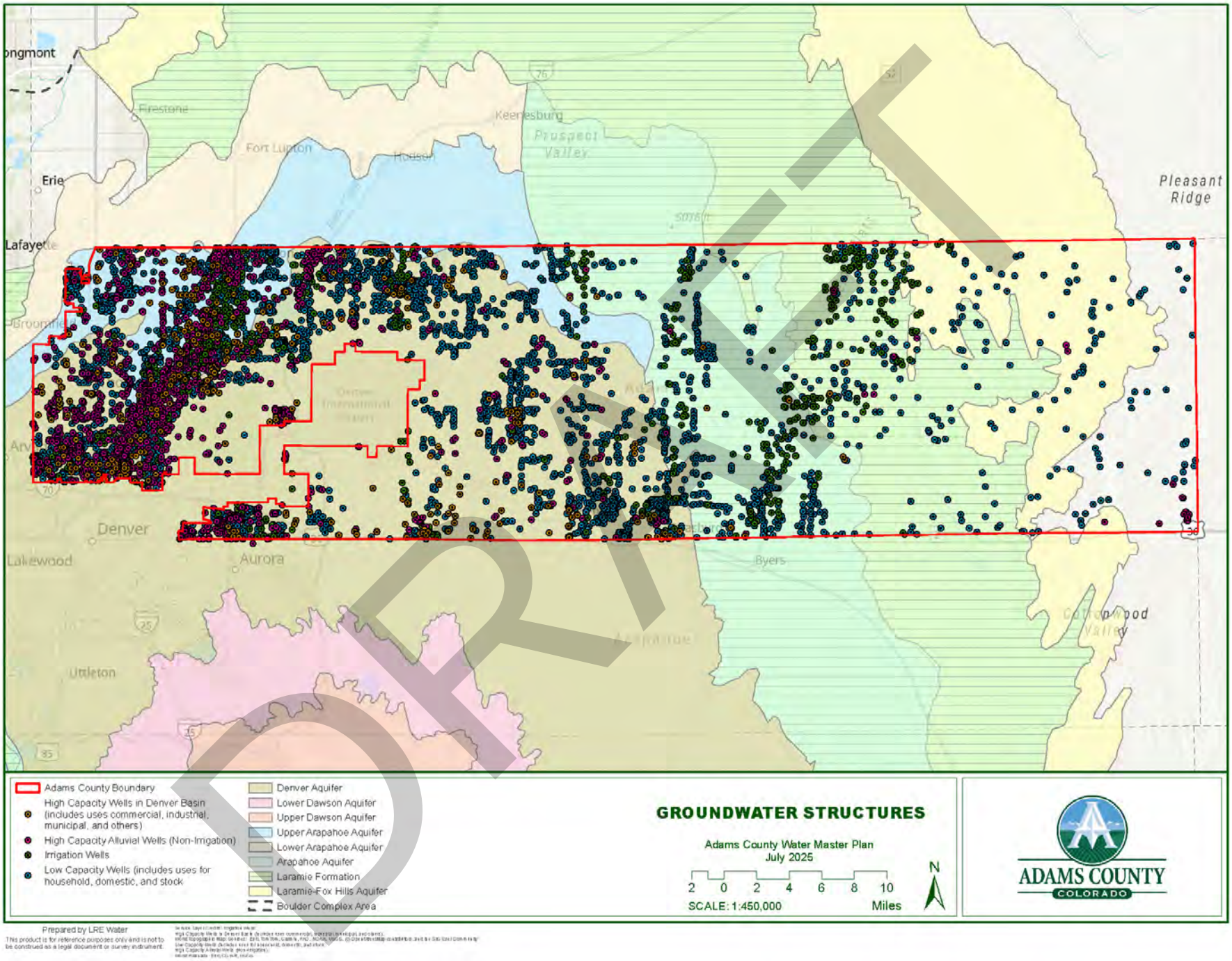

Figure 9. Adams County Groundwater Structures

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Table 4. Roles in Managing Non-Renewable Water Supplies

State's Role	Adams County/Local Jurisdiction's Role	Water Provider's Role
• Permits wells and sets withdrawal limits based on the 100-year rule. • Classifies aquifers as non-tributary, not non-tributary, or designated. • Administers the Colorado Ground Water Commission for Designated Basins. • Enforces metering, reporting, and augmentation requirements.	• Reviews development proposals for adequacy of water supply (e.g., ensuring compliance with Adams County's 300-year rule). • Can set specific development requirements related to water use and water efficiency as part of subdivision and zoning approvals. • Influences reliance on Denver Basin groundwater through land use and planning decisions. • Coordinates with local districts and regional planning agencies on regional infrastructure investments and strategies to reduce reliance on non-renewable groundwater.	• Drills, operates, and maintains Denver Basin wellfields. • Monitors groundwater levels and water quality. • Responsible for long-term planning, including transitions to renewable supplies (e.g., surface water, reuse). • Ensures compliance with permits, augmentation plans, and relevant decrees.

While the Denver Basin aquifer system is largely considered a non-renewable water source, it is a critical component of Adams County's water supply, serving areas of Adams County that lack access to renewable surface water supplies. Some of the challenges and opportunities associated with non-renewable water supplies are summarized in on the following page.

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Challenges

Associated with Non-Renewable Water Supplies

Declining Water Levels

Water levels are dropping by 30-100 feet per decade in some areas, reducing well productivity (see Water Availability). Since the Denver Basin aquifer is not meaningfully recharged on human timescales, overuse results in permanent depletion. Also, as water levels decline, wells must be drilled deeper and energy use for pumping increases. Deeper aquifers contain iron, manganese, or radionuclides, requiring costly treatment.

Infrastructure and Equity Challenges

Smaller or rural water providers relying on water from the Denver Basin aquifer may face higher per-capita costs to treat groundwater, develop infrastructure (e.g., drill deeper wells), and fund transition strategies to renewable water supplies. Smaller providers serving rural areas may also have less capacity, technical expertise, and financial resources to adequately monitor groundwater resources and project the reliable yield of these supplies far into the future.

Legal and Planning Uncertainty

While Denver Basin groundwater is legally permitted under Colorado's 100-year aquifer life rule, Adams County applies a more conservative 300-year rule when evaluating the adequacy of water supplies for new development. This discrepancy can create conflicting standards between State water rights administration and local land use approvals, but helps ensure greater long-term reliability of this water resource (see Water Management Challenges and Strategies).

Opportunities

Associated with Non-Renewable Water Supplies

Short-to-Medium-Term Reliability

The Denver Basin provides a known, accessible, "bridge" supply that can support development while longer-term, renewable sources are pursued. The Denver Basin aquifer system is essential to agriculture in Adams County, as well as smaller providers and self-supplied users without access to other sources of supply (see Water Availability).

Distributed Availability and Regional Infrastructure Potential

Wells can be located close to demand, reducing transmission costs in areas not yet connected to centralized water infrastructure. Also, Denver Basin supplies may serve as part of regional conjunctive use systems, where multiple providers share wellfields, pipelines, and treatment infrastructure to improve reliability, reduce costs, and facilitate a coordinated transition to renewable supplies.

Legal Certainty (with Permits)

Rights to Denver Basin water are quantified and protected by the State, offering a level of legal and operational stability. However, groundwater permits do not guarantee the long-term reliability of these supplies.

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ESTATES AT BROMLEY CASE STUDY

In Adams County, several water providers rely heavily — or even exclusively — on the Denver Basin aquifer system for their water supply. This includes homeowners' associations (HOAs) and metro districts serving individual developments. For example, at the Estates at Bromley, the HOA is responsible for maintaining six community wells, drilled into the Laramie-Fox Hills aquifer, which serve 56 residential lots. HOA dues are established to maintain infrastructure, and special assessments are levied for major system repairs. During the planning process, the HOA provided the following input: "it would be great to see a plan that addresses rural residents who get their water from wells and isn't solely focused on improving the supply for urban areas and cities."

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WATER REUSE

Water reuse in Colorado involves reclaiming treated wastewater for beneficial purposes, thereby extending water supplies beyond a single use. In Colorado, only certain types of water rights can be legally decreed for reuse. These include fully consumable supplies such as water diverted from one basin to another (transbasin diversions), non-tributary groundwater, changed irrigation rights (where the historical return flows have been quantified and replaced), and any other water right decreed for successive uses under a court-approved water right. Native basin surface water rights generally cannot be reused after the first use unless specifically decreed for that purpose, as return flows are legally owed to the stream to protect downstream water rights.

Specifically, there are three different types of reuse water sources:

- **Non-potable Reuse:** Treated wastewater repurposed for uses not involving human consumption, such as landscape irrigation, industrial processes, and agricultural applications. This approach conserves potable water for essential uses, like drinking, cooking, and showering.
- **Indirect Potable Reuse (IPR):** Highly treated reclaimed water is introduced into natural water bodies like aquifers or reservoirs, serving as an environmental buffer before being extracted and treated again for potable use.
- **Direct Potable Reuse (DPR):** Advanced treatment processes purify reclaimed water to drinking standards, allowing it to be directly integrated into the potable water supply without an environmental buffer.

Key Takeaways for Water Reuse

Reuse extends water supplies by reclaiming treated wastewater for non-potable (e.g., irrigation applications), and increasingly, for limited potable applications.

In Colorado, only certain water rights are legally eligible for reuse.

Reuse is a key tool for conservation and increasing reliability, supporting both augmentation and long-term supply strategies in alignment with the Colorado Water Plan.

0%

While some Adams County providers have reuse supplies, reuse is not a primary source of water for any major water providers within Adams County.

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Several municipalities in Adams County, including Bennett and Westminster, use reuse water for non-potable purposes such as irrigating city-owned parks and green spaces. Many utilities also rely on reuse water as a source of augmentation supply, and in some cases, such as Aurora, as an indirect potable water supply.

REGULATORY CONSIDERATIONS

The Colorado Division of Water Resources (DWR) oversees the administration of water rights, including those decreed for reuse. Any changes to water rights, such as converting them to fully consumable status or incorporating them into augmentation plans, require approval through the water court system to ensure compliance with the prior appropriation doctrine and protection of existing water rights.

The Colorado Department of Public Health and Environment (CDPHE) regulates water reuse in the State, primarily through two key regulations: Regulation 11 and Regulation 84. Regulation 11 establishes a framework for treating and reintroducing reclaimed water directly into potable water systems without an environmental buffer (direct potable reuse), whereas Regulation 84 governs the use of reclaimed water for non-potable purposes, aiming to promote water conservation while protecting public health and the environment. The State, Adams County, and water providers all play important roles in managing reuse water supplies (Table 5). Some of the challenges and opportunities with managing reuse supplies are summarized on the following page.

Table 5. Roles in Managing Resue Water Sources

State's Role	Adams County/Local Jurisdiction's Role	Water Provider's Role
• CDPHE develops and enforces regulations that govern the safe use of reclaimed water for both potable and non-potable purposes. • DWR administers the legal and operational aspects of reuse water rights. • Provides guidance and support to water utilities and other stakeholders in developing and managing water reuse programs. Many reuse projects are eligible for CWCB grant funding. • Conducts stakeholder processes to gather input on regulatory updates and to educate the public on the benefits and safety of water reuse.	• While local jurisdictions do not permit the reuse of water itself, they can approve or deny the physical infrastructure necessary to implement reuse systems through their 1041 powers. • Local jurisdictions can help administer federal or State grant applications for large-scale reuse projects and support regional infrastructure planning.	• Providers design, build, and maintain treatment, storage, and distribution systems for non-potable and potable reuse — such as purple pipe networks or advanced treatment trains for DPR. • Providers must track and report reuse volumes, comply with water rights decrees (e.g., augmentation plans or successive use provisions), and meet CDPHE requirements.

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Challenges

Associated with Non-Renewable Water Supplies

Regulatory Compliance

Water rights limitations may not allow for successive use (i.e., reuse) of water supplies. Also, stringent State regulations make reuse impractical for some water providers. Non-potable systems require dedicated infrastructure (often called “purple pipe” systems), whereas direct potable reuse requires advanced treatment processes, both of which may be cost-prohibitive to some utilities.

Opportunities

Associated with Non-Renewable Water Supplies

Water Conservation

Reuse reduces the volume of treated potable water needed to meet non-potable demands, such as irrigation, and (in the case of DPR) can directly supplement drinking water supplies. Reuse water can also serve as an augmentation source, preserving raw (i.e., non-potable) water for other uses. Maximizing reuse aligns with Colorado Water Plan goal to “encourage the development and expansion of both non-potable and potable water reuse as a critical tool to stretch existing water supplies.”

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PRAIRIE WATERS AND WATER INFRASTRUCTURE AND SUPPLY EFFICIENCY CASE STUDY

The Prairie Waters Project, developed by the City of Aurora, is a large-scale potable water reuse system designed to improve drought resilience and long-term water security. The project captures treated effluent from Aurora's wastewater treatment plant after it is discharged into the South Platte River, then recovers it approximately 34 miles downstream near Brighton through a network of wells, pipelines, and advanced treatment facilities. After being pumped back to Aurora, the water undergoes extensive purification, including ozonation, filtration, and UV disinfection, before being reintroduced into the potable system. This indirect potable reuse project allows Aurora to reuse fully consumable supplies multiple times, significantly increasing the yield of its existing water rights and reducing dependence on new acquisitions.

A portion of this treated water is delivered through the Water Infrastructure and Supply Efficiency (WISE) pipeline network to participating members of the South Metro Water Supply Authority. The WISE Project is a collaborative regional water supply initiative involving Aurora Water, Denver Water, and the South Metro Water Supply Authority (SMWSA). Its primary objective is to provide a sustainable and renewable water supply to communities in the south Denver Metro area by reducing reliance on non-renewable groundwater sources. The project achieves this by utilizing existing infrastructure to distribute treated water to various communities, thereby maximizing the use of available water resources. By leveraging existing infrastructure and fostering inter-agency collaboration, this partnership exemplifies a model for regional cooperation in water resource management.

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IMPORTED AND WHOLESALE WATER

In Colorado, imported (or transbasin) water refers to water diverted from one river basin to another, typically across the Continental Divide, to meet the demands of areas with limited local water resources. These diversions are crucial for supplying water to Colorado's population east of the Continental Divide, and many of Adams County's largest water providers rely on imported water as part or all of their water supply. Under Colorado water law, imported water is often considered fully consumable, meaning it can be reused for irrigation, augmentation, or municipal purposes. Notable transbasin diversion projects that may be serving Adams County include:

- **Thornton Water Project:** Transports water purchased in the 1980s through Larimer, Weld and Adams counties to the city of Thornton.
- **Moffat Tunnel Collection System:** Transports water from the Fraser River Basin to Gross Reservoir and then to Denver Water's service area. While not directly in Adams County, Denver Water's treated supply reaches parts of western Adams County via wholesale or contract service (Figure 10).

Key Takeaways for Imported and Wholesale Water

Imported (transbasin) water supplies are often fully consumable and critical to many major providers in Adams County. However, these types of projects are controversial and are becoming increasingly difficult to permit and construct due to environmental, legal, and interbasin concerns.

Wholesale water, from entities like Denver Water and City of Westminster, allow smaller or newer providers to access high-quality treated supplies without developing independent sources but may present challenges like contract restrictions or a lack of water supply diversity.

34%

Roughly 34% of Adams County's water providers purchase wholesale water.

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In Colorado, imported (or transbasin) water refers to water diverted from one river basin to another, typically across the Continental Divide, to meet the demands of areas with limited local water resources. Under Colorado water law, imported water is often considered fully consumable, meaning it can be reused for irrigation, augmentation, or municipal purposes. These diversions are crucial for supplying water to Colorado's population east of the Continental Divide, and many of Adams County's largest water providers rely on imported water as part or all of their water supply. That said, while transbasin diversions have been a water management tool in Colorado for more than a century, moving water from one basin to another has created tensions. Balancing water demand needs, while protecting environmental and agricultural interests and lands is complicated and can result in outcomes that impact local communities. Basins of origin have seen reduced streamflows, loss of productive agricultural lands, and water quality impacts. As pressures continue to grow understanding these impacts, especially where and if new transbasin projects are being considered is key to creating a sustainable future for not just Adams County, but the entire State of Colorado. Notable transbasin diversion projects that may be serving Adams County include:

- **Denver Water:** Denver Water is Colorado's largest water utility, supplying water to the City and County of Denver and surrounding suburbs through contractual agreements with various water providers. In Adams County, Denver Water provides wholesale water to several providers including North Washington Street, South Adams, North Pecos, and Crestview Water and Sanitation Districts (Figure 10). Additionally, the City of Westminster has contracts with Denver Water for raw water from the Moffat Tunnel.
- **City of Westminster:** the City of Westminster provides water to the City of Federal Heights and the unincorporated area of Shaw Heights.

Types of Providers that Rely on Wholesale Water

- Mobile home parks and small private systems
- Municipalities and water and sanitation districts that require supplemental supplies, or do not have a water portfolio of their own (e.g., Crestview, Federal Heights, Brighton)
- Metro districts serving one (or several) communities

Types of Providers that Rely on Imported Water

- Large municipal water providers (e.g., Aurora Water, Thornton, Westminster, Northglenn)
- Any provider receiving deliveries from Denver Water
- Regional utilities like Denver Water

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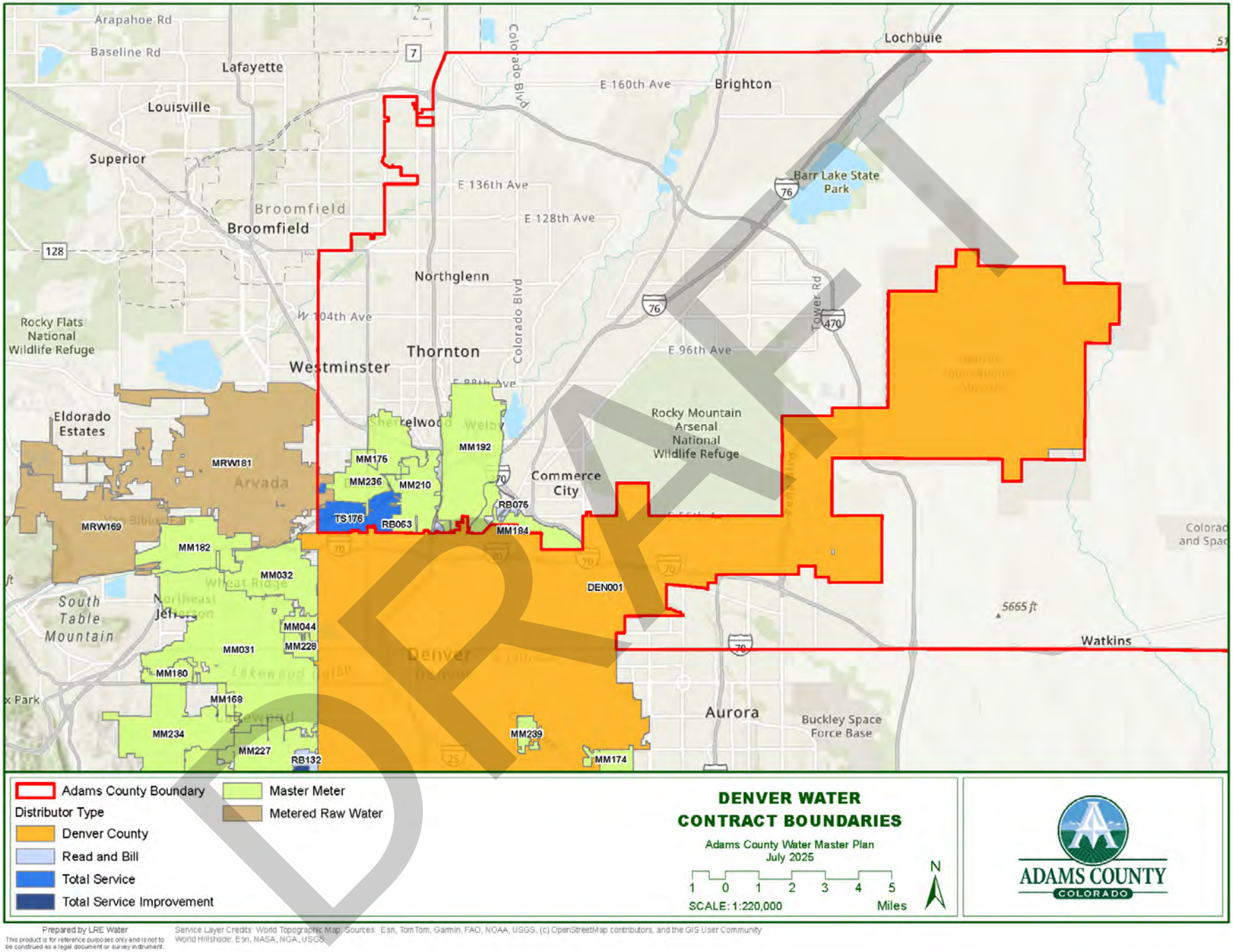

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Figure 10. Denver Water Wholesale Contract Boundaries

REGULATORY CONSIDERATIONS

Regulatory considerations for imported versus wholesale water differ (Table 6). As Colorado continues to grow, and water availability of all sources becomes more limited, new imported, or transbasin water, will likely become increasingly more difficult, controversial, expensive, and complicated to permit. Imported water must be decreed for use in the receiving basin and often involves detailed accounting and administration under court-approved augmentation plans. Under Colorado water law, imported water is typically considered fully consumable, allowing for reuse, successive use, or discharge without return flow obligations — but only if explicitly authorized by decree. Projects involving transbasin diversions may require coordination between basin roundtables, conservancy districts, and the Colorado Water Conservation Board (CWCB), especially if the diversions impact instream flows or downstream rights. Large-scale imports may be subject to National Environmental Policy Act (NEPA), 401/404 permitting, and State Engineer's Office approvals for structures crossing multiple jurisdictions or involving significant environmental impact.

Wholesale agreements often include usage limits, delivery schedules, and conditions related to firm versus interruptible supply. These contracts are legally binding and may include drought curtailment provisions. Entities purchasing wholesale water may be required to protect or replace return flows, especially when using the water for types of use not originally decreed (e.g., from irrigation to municipal use). Contracts may be contingent on available infrastructure capacity, and some require providers to construct or connect to shared conveyance systems, which can trigger local or State permitting. Challenges and opportunities associated with imported and wholesale water are summarized on the following page.

Table 6. Roles in Managing Imported and Wholesale Water

State's Role	Adams County/Local Jurisdiction's Role	Water Provider's Role
• Colorado Water Courts adjudicate water rights associated with transbasin and storage projects, while DWR administers those rights in real time, ensuring compliance with the doctrine of prior appropriation and interstate compact obligations (e.g., the Colorado River Compact). • For wholesale water supplies, the State's role is more indirect but includes oversight through entities like CDPHE, which regulates water quality, and the Colorado Public Utilities Commission (PUC), which may regulate rates and service areas for certain wholesale providers.	• Review and approve land use and infrastructure proposals, including 1041 permits for major water projects such as pipelines or reservoirs — this includes evaluating impacts from transbasin diversions (e.g., Larimer County's review of the Thornton pipeline).	• Hold water rights or contracts and operate under decreed use conditions. • Negotiate and manage wholesale agreements • Maintain the pipelines, pump stations, interconnects, and storage needed to reliably deliver water to contract customers.

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Challenges

Associated with Non-Renewable Water Supplies

Interbasin Conflicts and Public Opposition

Diversions from one basin to another (particularly from the western slide of the continental divide to the eastern side of the continental divide) are controversial, drawing concerns over environmental impacts and equity between regions.

Infrastructure and Environmental Permitting

Transbasin diversion projects often require significant infrastructure investment and must undergo NEPA, 401/404, and CWCB reviews, which can delay or outright inhibit implementation. Litigation over environmental issues poses serious obstacles for most large-scale storage and infrastructure projects.

Contract Limitations

Wholesale water contracts may have usage caps, peak use restrictions, or drought curtailments. The purchasing entity often has limited control over their water supplies, especially during times of shortage.

Opportunities

Associated with Non-Renewable Water Supplies

Fully Consumable Water Rights

Transbasin water is typically considered fully consumable, enabling successive uses, reuse, and augmentation without return flow obligations.

Increased Reliability and Diversification of Supplies

Large transbasin projects have enabled urban growth along the Front Range by delivering water to areas with limited local supply. Imports also diversify a community's portfolio by supplementing native surface or groundwater supplies, improving resilience in dry years.

Infrastructure Efficiency

Wholesale water leverages regional storage, treatment, and delivery systems reducing the need for costly, duplicative infrastructure at the local level.

Near-Term Supply Security

Wholesale agreements can provide immediate or short-term water security, especially for fast-growing or newly urbanizing areas without existing water supply portfolios

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THORNTON WATER PROJECT CASE STUDY

The Thornton Water Project is a 70-mile pipeline initiative designed to transport approximately 14,000 acre-feet of water annually from the Cache la Poudre River (via water rights acquired by Thornton in the 1980s) to meet the City's long-term municipal needs. While segments of the pipeline through Weld and Adams counties proceeded with construction, the project faced significant permitting challenges in Larimer County. In 2018, Larimer County denied Thornton's initial 1041 permit application, citing non-compliance with several land use criteria. After subsequent legal appeals upheld the denial, Thornton submitted a revised application in 2023, featuring a shortened route and additional mitigation measures. Despite continued public opposition advocating for the use of the Poudre River as a natural conveyance, Larimer County commissioners approved the permit in May 2024, allowing the project to advance with stipulated conditions. This project provides an example of the types of permitting challenges, and potential costs, associated with large transbasin diversions.

CRESTVIEW WATER AND SANITATION DISTRICT CASE STUDY

The Crestview Water and Sanitation District in Adams County relies entirely on wholesale water deliveries from Denver Water to meet its municipal supply needs (Figure 10). This contractual relationship is governed by Denver Water's operating rules, which stipulate that during periods of drought or water shortages, deliveries to distributors like Crestview may be curtailed or reduced. Such limitations are part of Denver Water's broader water shortage response strategy, which aim to manage supply and demand during times of scarcity. Consequently, Crestview faces potential risks associated with supply reductions during drought conditions, underscoring the importance of contingency planning and adequate drought response measures for wholesale water customers, to ensure service reliability.

2.2 ADAMS COUNTY WATER PROVIDERS

Adams County residents, businesses, and agricultural receive water from one of three types of "providers."

- Public Water Systems
- Irrigation and Ditch Companies
- Self-Supplied Users

The following sections summarize each.

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PUBLIC WATER SYSTEMS

Public water systems (also called “public water providers” or “water providers”) play a central role in delivering safe and reliable drinking water to residents, businesses, and institutions across Adams County. Their supply portfolios, infrastructure, and service strategies collectively shape Adams County’s ability to meet growing demand, respond to drought, and coordinate with broader regional and State water planning efforts.

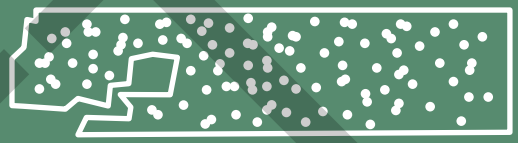
According to the Colorado Department of Public Health and Environment’s (CDPHE) Public Water System (PWS) database, Adams County is served by 86 public water providers (Figure 11). CDPHE defines a PWS in alignment with the federal Safe Drinking Water Act (SDWA). A PWS is any system that provides water for human consumption through pipes or other constructed conveyances and has:

- At least 15 service connections, or
- Regularly serves at least 25 individuals daily for at least 60 days out of the year

These providers vary widely in the composition of their water supply portfolios, customer demand profiles, physical infrastructure, and geographic service areas. Most are centralized utilities that deliver potable (and in some cases, non-potable) water to residential, commercial, and institutional customers. While some, such as large municipalities and water and sanitation districts, serve tens of thousands of connections, others operate at a much smaller scale, supplying water to only a handful of users or individual developments.

CDPHE’s PWS database identifies the primary water source for each provider. While most major providers draw from a combination of surface water, groundwater, and imported supplies, the database reflects only the dominant source type for each system. As shown in Figure 12, more than 60% of water providers in Adams County rely on groundwater as their primary and/or only source of supply.

Key Takeaways for Public Water Systems



The large number of public water systems in Adams County underscores the importance of regional coordination in planning for resilient and efficient water service to Adams County residents.

Although many water providers in Adams County rely primarily on groundwater sources, most of Adams County’s population is served by native surface water supplies delivered by a few large municipal systems.

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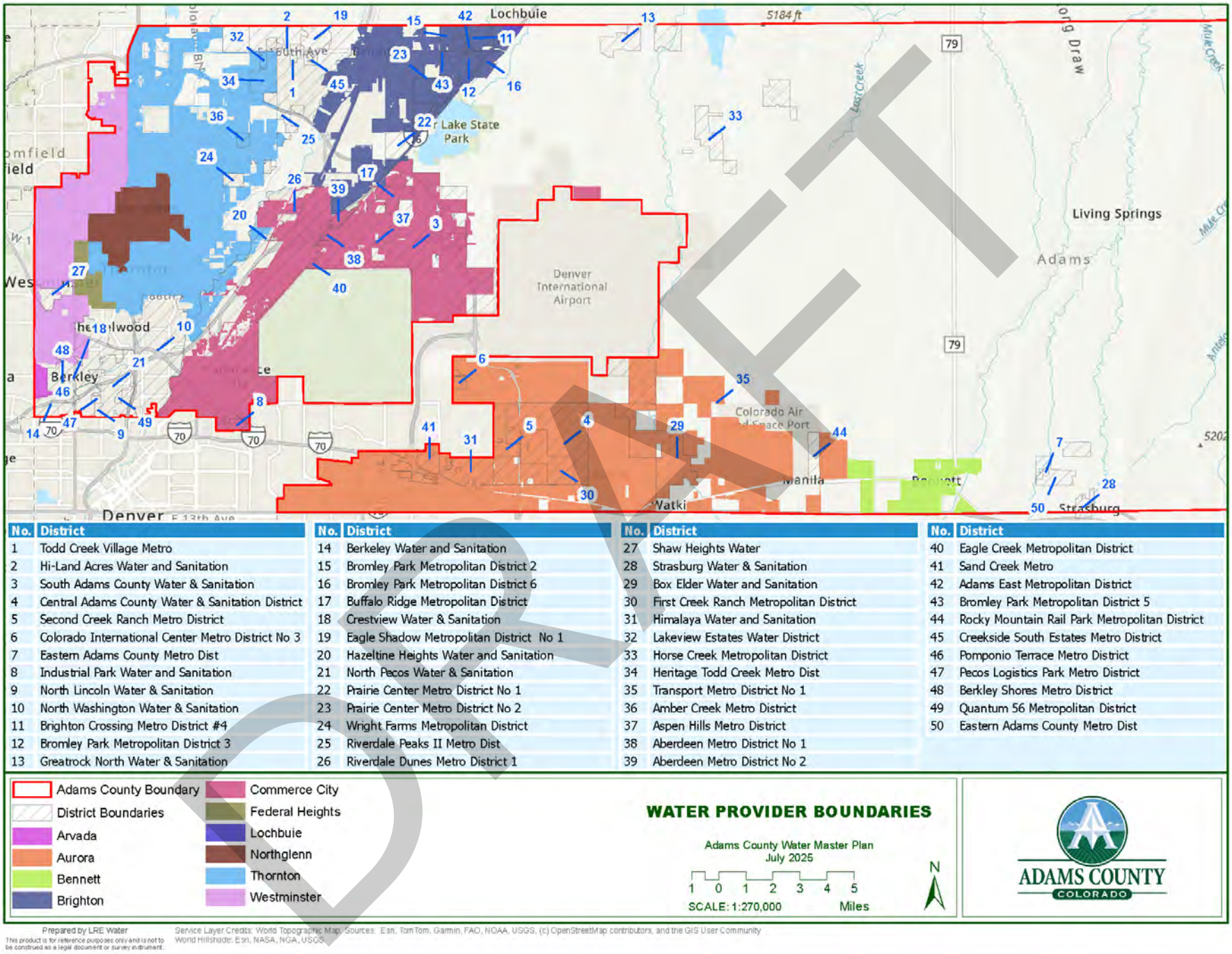

No.	District
1	Todd Creek Village Metro
2	Hi-Land Acres Water and Sanitation
3	South Adams County Water & Sanitation
4	Central Adams County Water & Sanitation District
5	Second Creek Ranch Metro District
6	Colorado International Center Metro District No 3
7	Eastern Adams County Metro Dist
8	Industrial Park Water and Sanitation
9	North Lincoln Water & Sanitation
10	North Washington Water & Sanitation
11	Brighton Crossing Metro District #4
12	Bromley Park Metropolitan District 3
13	Greatrock North Water & Sanitation

No.	District
14	Berkeley Water and Sanitation
15	Bromley Park Metropolitan District 2
16	Bromley Park Metropolitan District 6
17	Buffalo Ridge Metropolitan District
18	Crestview Water & Sanitation
19	Eagle Shadow Metropolitan District No 1
20	Hazeltine Heights Water and Sanitation
21	North Pecos Water & Sanitation
22	Prairie Center Metro District No 1
23	Prairie Center Metro District No 2
24	Wright Farms Metropolitan District
25	Riverdale Peaks II Metro Dist
26	Riverdale Dunes Metro District 1

No.	District
27	Shaw Heights Water
28	Strasburg Water & Sanitation
29	Box Elder Water and Sanitation
30	First Creek Ranch Metropolitan District
31	Himalaya Water and Sanitation
32	Lakeview Estates Water District
33	Horse Creek Metropolitan District
34	Heritage Todd Creek Metro Dist
35	Transport Metro District No 1
36	Amber Creek Metro District
37	Aspen Hills Metro District
38	Aberdeen Metro District No 1
39	Aberdeen Metro District No 2

No.	District
40	Eagle Creek Metropolitan District
41	Sand Creek Metro
42	Adams East Metropolitan District
43	Bromley Park Metropolitan District 5
44	Rocky Mountain Rail Park Metropolitan District
45	Creekside South Estates Metro District
46	Pomponio Terrace Metro District
47	Pecos Logistics Park Metro District
48	Berkley Shores Metro District
49	Quantum 56 Metropolitan District
50	Eastern Adams County Metro Dist

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Figure 11. Water Provider Service Territory Boundaries

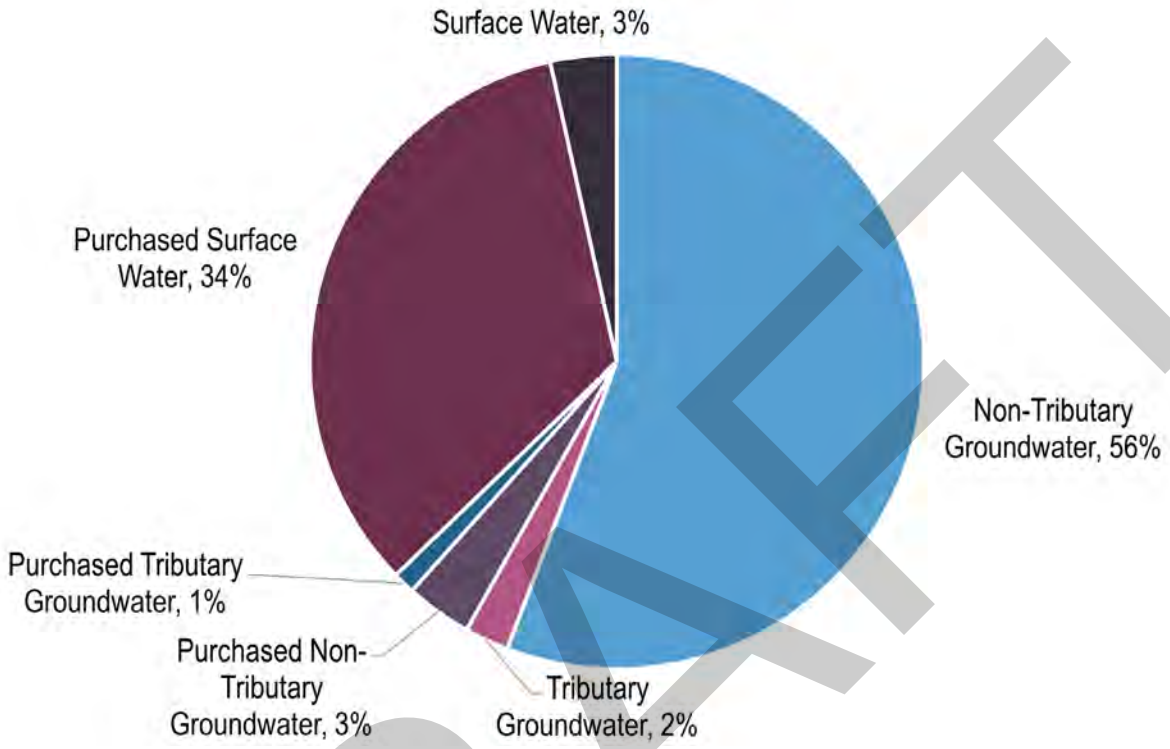

Figure 12. Breakdown of Water Provider Sources in Adams County

Despite the large number of water providers in Adams County, the largest 15 serve approximately 500,000 residents – roughly 94% of Adams County's total population, based on the State Demography Office's latest (2023) estimate of 533,500. Figure 13 summarizes the estimated number of Adams County residents served by each of these 15 providers.[1]

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[1] *Note that values presented in Figure 13 are rounded and intended for planning-level purposes only; they do not represent precise service population counts.*

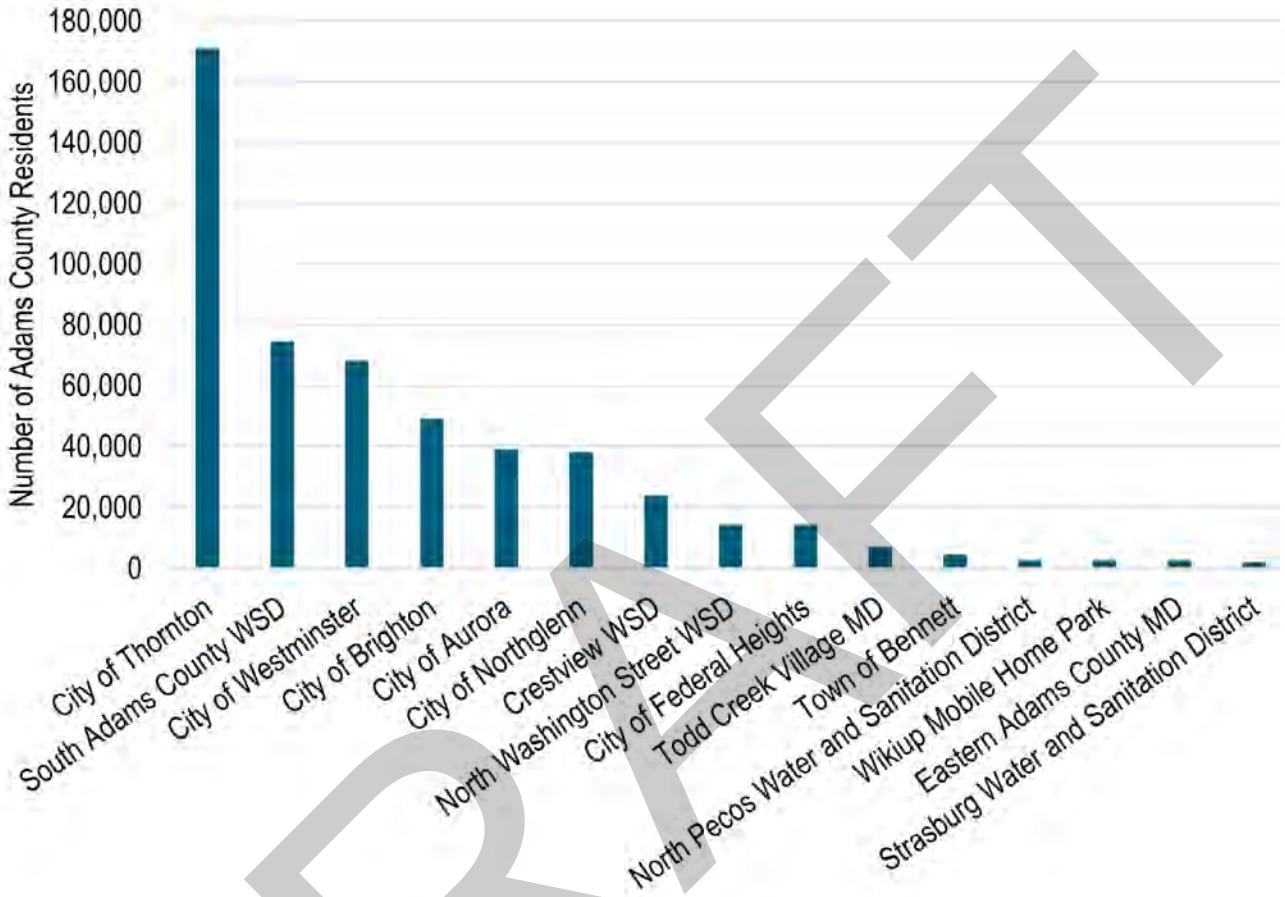

Figure 13. Estimate of Adams County Residents Served by the Largest 15 Water Providers, Spring 2025

Figure 14 estimates the number of Adams County residents served by each water source, based on the water supply profiles for the largest 15 providers.[2] While, most of Adams County's water providers rely primarily on groundwater sources, the majority of Adams County's population receives its water from surface water sources since some of Adams County's largest providers (e.g. Thornton, Westminster, and Northglenn) rely almost exclusively on surface water.

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[2] *These estimates are likely to change over time, especially as Thornton's Water Project comes online which aims to transfer an average of 14,000 acre-feet per year from the Cache la Poudre River basin. Information was derived from a combination of sources including the Baseline Report, water provider survey responses, and the Colorado Water Conservation Board's 1051 Public Data Reports. The State's 1051 reports are compiled from provider-submitted data as required by House Bill 10-1051 to support coordinated water planning at both the regional and State levels.*

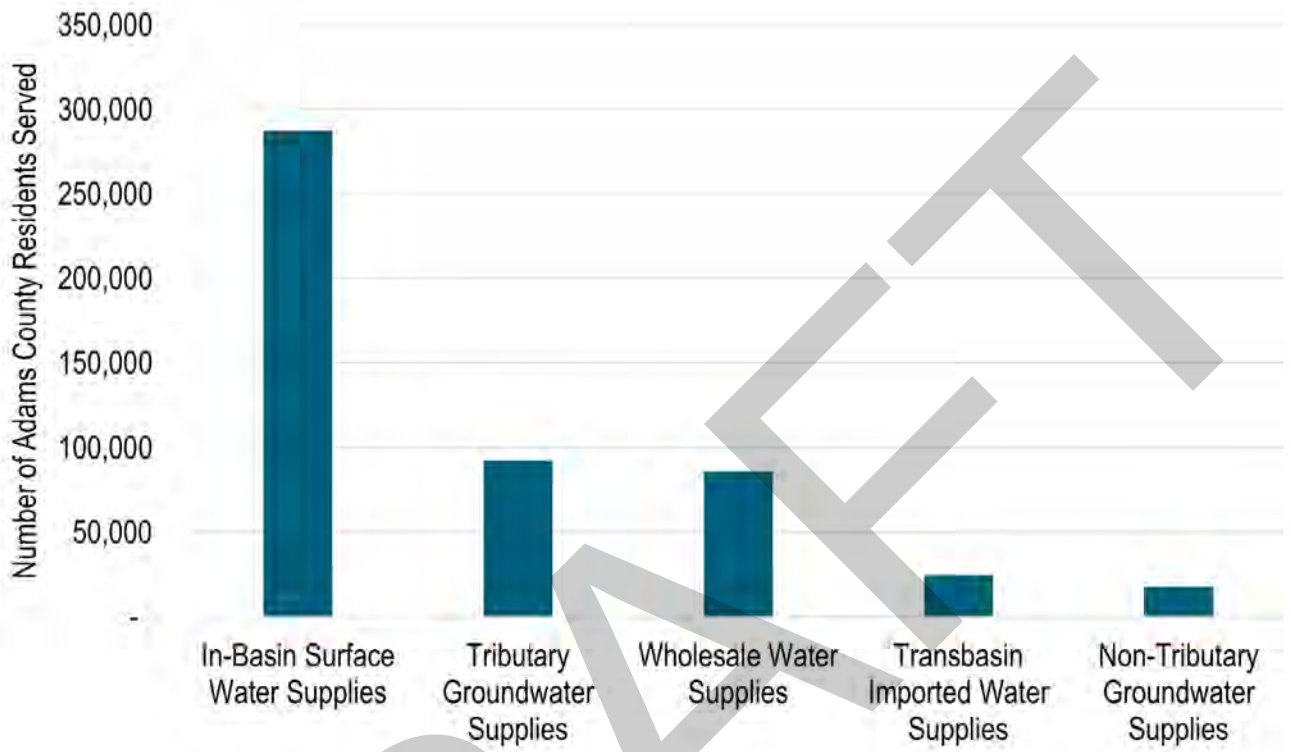

Figure 14. Estimate of Adams County Residents Served by Water Source Based on the Largest 15 Providers, Spring 2025

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IRRIGATION AND DITCH COMPANIES

Ditch companies play a foundational role in the water supply landscape within Colorado. These entities, many of which were established in the late 19th and early 20th centuries, own and operate senior water rights and delivery infrastructure that convey surface water from rivers and streams to agricultural lands, municipalities, and industrial users. In Adams County, municipalities and water providers often lease or acquire shares in local ditch companies to secure reliable surface water supplies. Ditch companies also serve as the primary water source for many of the irrigated agricultural lands in Adams County, supporting both legacy farming operations and transitional land uses at the urban-agricultural interface.

As was indicated in the Baseline Report, the Colorado Decision Support System (CDSS) lists 56 individual irrigation and ditch companies for Adams County, about 50% of which are sourced from the South Platte River, with the remaining 50% sourced from a variety of gulches and creeks. A full list of these companies can be found in the Water Demand Analysis Appendix. A map of key ditch systems in Adams County, as defined by the Division of Water Resources and Colorado Water Conservation Board in the South Platte Decision Support System, is provided in Figure 6.

SELF-SUPPLIED USERS

In Adams County, self-supplied users are primarily rural subdivisions and individual properties that rely on privately held groundwater rights rather than municipal water systems. These users typically operate domestic wells permitted for household use and limited outdoor irrigation, drawing primarily from Denver Basin aquifers. Some subdivisions have adjudicated collective water rights, allowing them to share groundwater supplies among residents or to support community wells. These self-supplied systems are common in unincorporated areas where municipal infrastructure is limited.

Figure 15 shows the distribution of groundwater wells permitted for domestic use within areas of Adams County that are not served by a municipal or special district water provider. While this dataset likely does not capture every self-supplied user in Adams County, it provides a representative overview of where such users are concentrated and the approximate scale of self-supplied groundwater use. In total, approximately 330 domestic wells were identified.

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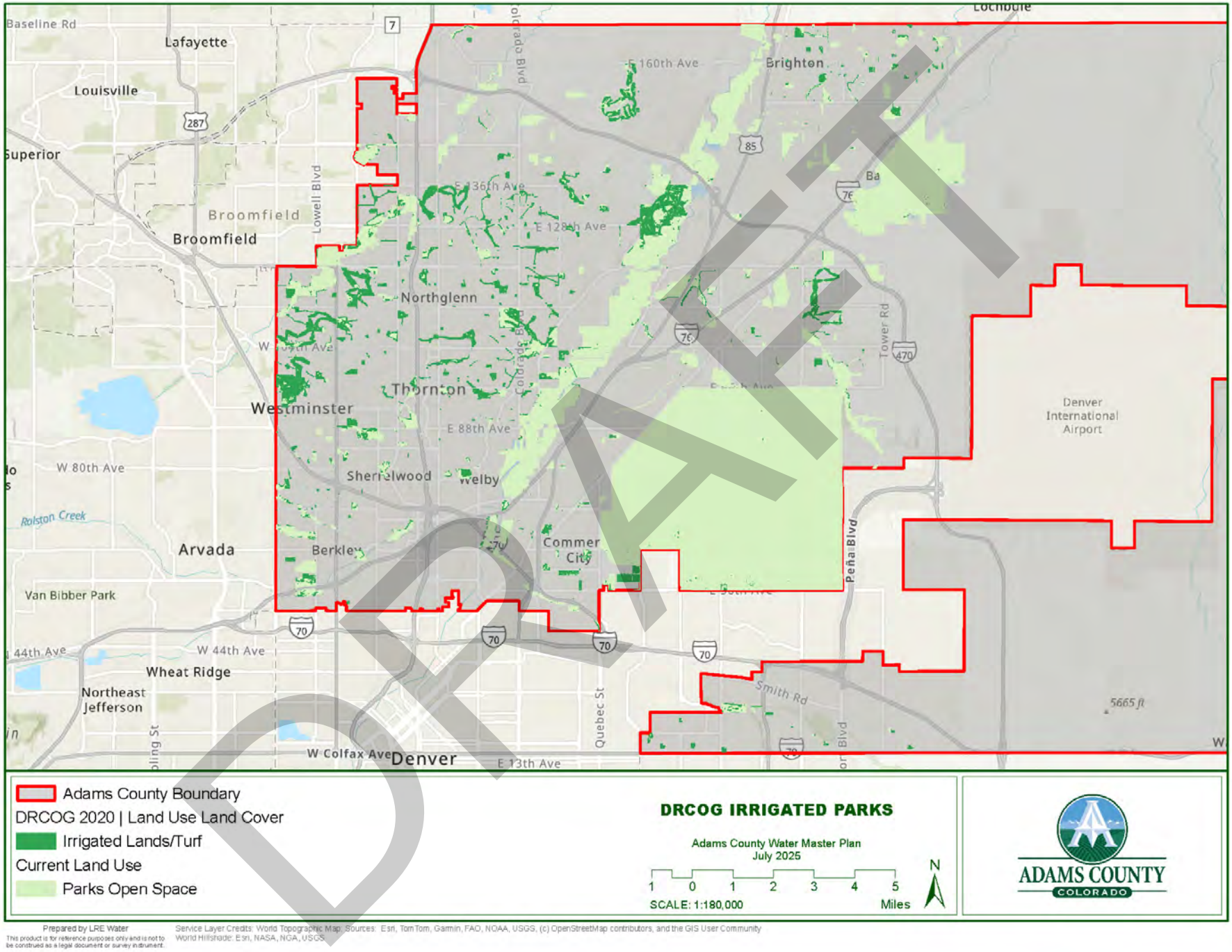

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Figure 15. Adams County Self-Supplied Users

Chapter 3

WATER DEMANDS

Chapter Contents

Adams County's water demand profile reflects a diverse mix of agricultural, domestic, non-residential, and landscape water uses, each shaped by regional land use patterns and growth trajectories. Agricultural demand continues to play a significant role, particularly in Adams County's eastern areas, while domestic and non-residential demands are concentrated in urban centers and areas targeted for future development. Adams County's evolving land use, population growth, and changing climate all contribute to increasing water demands, which in turn puts pressure on water resources, necessitating careful planning to ensure future demands are met (see Advancing Adams and the Water Master Plan).

A demand analysis was completed to estimate current and forecasted water needs through 2040. Spatial data, demographic trends, and water use benchmarks were collected to produce demand projections for regions of Adams County using both a land-use based approach and a StateCU analysis to estimate agricultural demands. These projections also account for potential impacts of climate change and conservation measures, providing a range of scenarios to inform long-term water resource planning.

Chapter 3: Key Takeaways

Baseline demands total approximately 105,000 acre-feet/year countywide.

Domestic and non-residential uses accounting for 69% and agriculture contributing 31%.

Demands in incorporated areas are driven primarily by municipal and industrial uses, whereas demands in unincorporated areas are driven primarily by agriculture.

Looking to 2040, water demands are projected to increase significantly in the areas of Adams County that are expected to undergo annexation and development or redevelopment, while the rest of unincorporated Adams County may experience stagnant or slightly declining demands over time due to reductions in irrigated agricultural land

Projected 2040 water demands in unincorporated Adams County range between 16,000-26,000 acre-feet/year depending on growth, and the degree to which water conservation and climate change drive demands over the next 15 years.

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3.1 REGIONAL FRAMEWORK

Adams County was divided into four regions, to establish a more meaningful framework for presenting water demand, and ultimately water availability, information (Figure 16). Specifically, the four regions include:

- **Incorporated:** Currently incorporated cities and towns as of 2025. This region represents areas served by water providers where Adams County has limited control over water supply planning, zoning, and land use policy.
- **Annexing:** Currently unincorporated areas that will likely annex into a city or town by 2040. Characterizing supplies and demands for these areas helps Adams County and municipalities better plan for this transition. These areas were identified based on municipal planning area and growth management area boundaries and one-on-one meetings with each of the 10 respective municipalities (Federal Heights, Northglenn, Arvada, Lochbuie, Brighton, Bennett, Aurora, Westminster, Commerce City, and Thornton).
- **Unincorporated:** Areas outside of cities and towns that are unlikely to annex by 2040 and/or are more rural or undeveloped. This region represents areas where Adams County has land use authority and the ability to regulate future growth through its zoning and development codes. This region is intended to help Adams County understand whether available supplies can sustain current and future levels of population and water demand.
- **Intensifying:** Unincorporated areas that are expected to develop/intensify by 2040 but are unlikely to annex. This helps Adams County understand whether available supplies can support planned intensification in these areas. These areas were identified based on Adams County's planning staff input and review of subarea plans.

Adams County has the most influence over unincorporated areas, where Adams County development regulations apply. As a result, the analysis focuses on unincorporated areas and areas that may change from unincorporated to incorporated by 2040, in alignment with Advancing Adams plans and local jurisdiction comprehensive plans.

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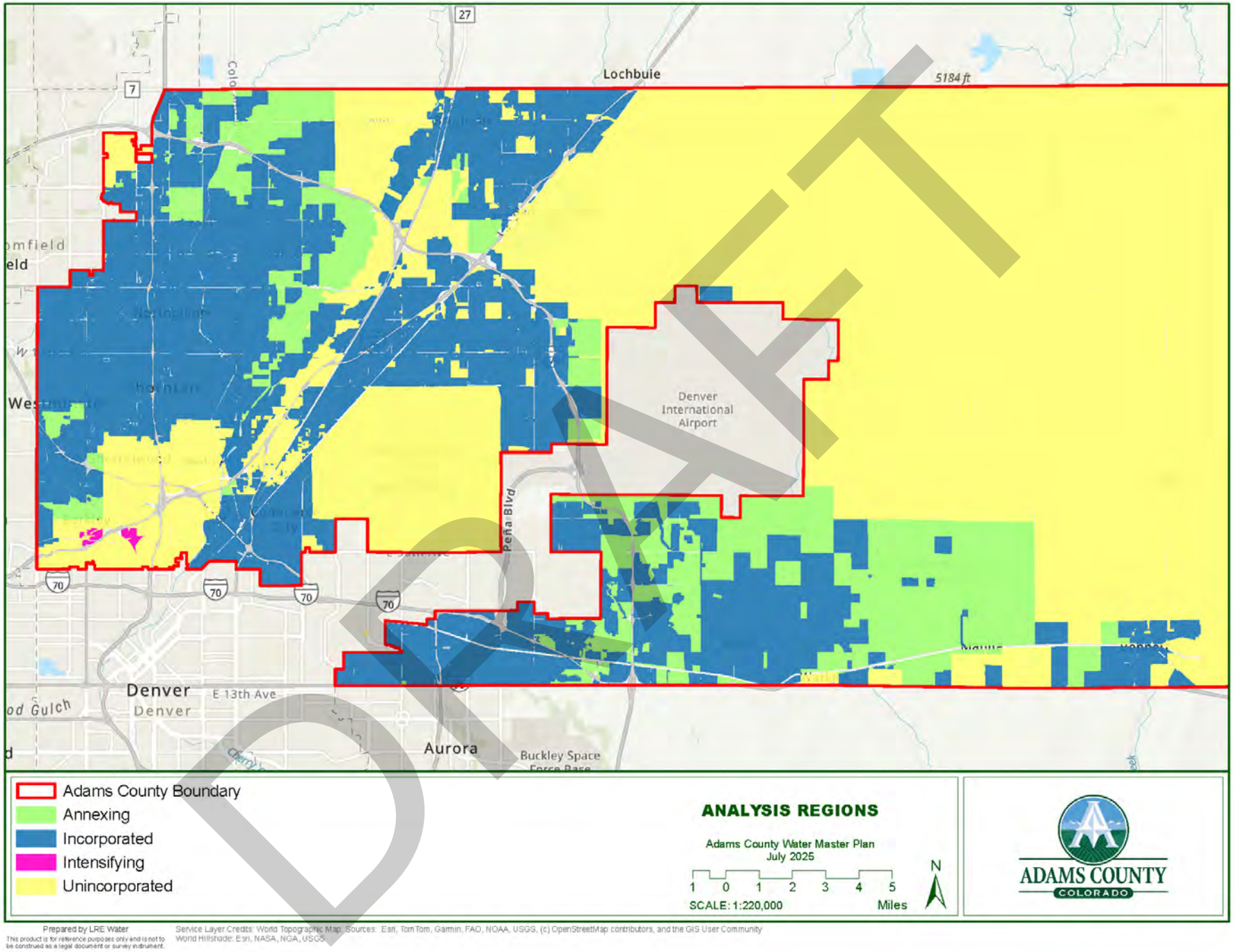

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Figure 16. Water Demand Analysis Regions

3.2 CURRENT LAND USE IN ADAMS COUNTY

Based on 2025 Adams County Assessor data, current land use in Adams County reflects a broad mix of urban, suburban, rural, and agricultural uses, influenced by proximity to the Denver metropolitan area and historical patterns of settlement and development (Figure 17).

Municipalities and urban centers along the western side of Adams County — such as Westminster, Thornton, and Commerce City — contain high concentrations of residential, commercial, and industrial uses supported by established infrastructure and services.

Moving eastward, land use transitions into lower-density residential development interspersed with agricultural operations and large-lot rural housing. Agricultural lands, particularly in eastern Adams County, include irrigated croplands, pasture, and open fields, many of which are zoned for large-scale agricultural use that is unlikely to be developed. In 2022, according to the USDA's Census of Agriculture, Adams County had 877 farms, totaling roughly 638,000 acres, of which 74% were used to produce crops, and the remaining 26% to produce livestock, poultry, and other products. The estimated market value of agricultural products sold in 2022 totaled $94.4M, making it the 18th most agriculturally profitable county out of the 64 total counties in Colorado. The vast majority of this farmland operates under dryland farming—an agricultural practice that relies on natural rainfall rather than irrigation in semi-arid regions. The Colorado Water Conservation Board's CDSS database reported just over 20,000 acres of irrigated farmland in 2020, suggesting that roughly 97% of the County's cropland is either dryland farmed or otherwise not actively irrigated.

Adams County also includes significant open space and recreational land, along with transportation corridors and public facilities, which shape overall land use distribution and influence water demand. Figure 18 summarizes the various land use types present in Adams County (by acreage and region), as identified in the analysis of Adams County's 2025 Assessor data. The data suggest that 91% of Adams County is comprised of agricultural (77%) and low-density residential (14%) land uses.3 For more details on the land use analysis, see the Water Demand Analysis Appendix.

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[3] *The analysis approach leveraged parcel level property assessment and building type characteristics to determine the current land use. Because there is no mixed-use property assessment category, nor a mixed-use building type, current land use was characterized as mixed-use only when there was a combination of commercial and residential characteristics described for a given parcel.*

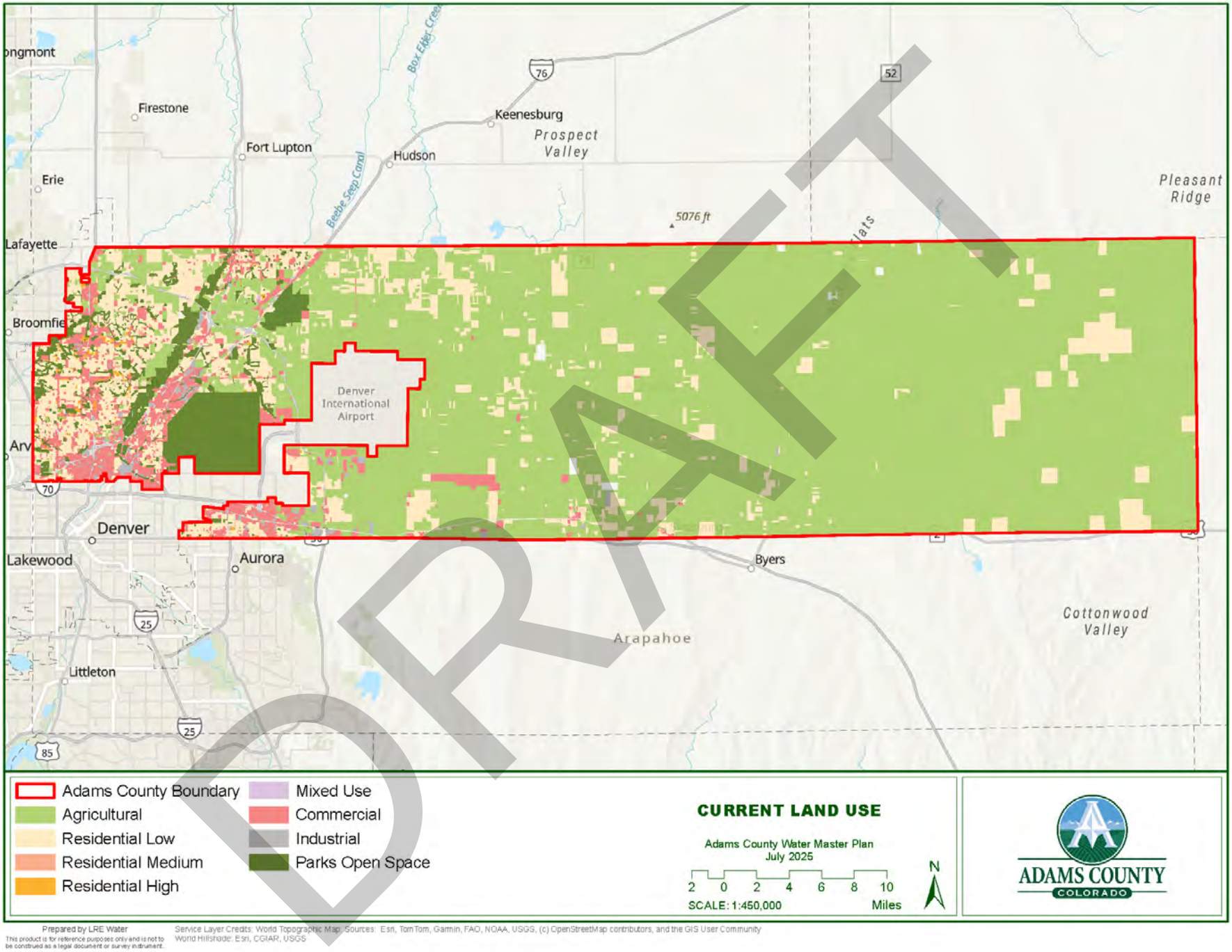

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Figure 17. Adams County Current Land Use Map

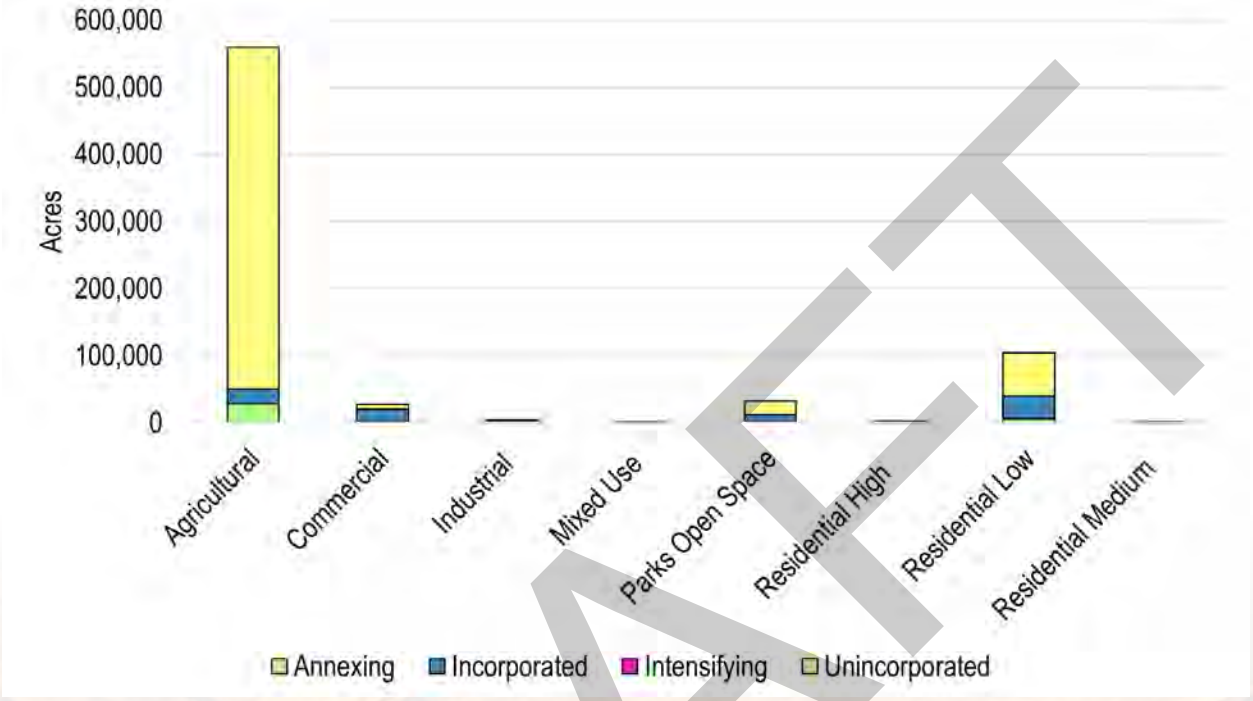

Figure 18. Current Land Use Composition by Region

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3.3 BASELINE WATER DEMANDS

The following section outlines the approach used to estimate baseline water demands. Agricultural demands were calculated using a StateCU model, while domestic and non-residential demands were estimated using local land use data, building characteristics, and water provider benchmarks (see Current Land Use in Adams County). **Baseline demands total approximately 104,700 acre-feet/year Countywide, with domestic and non-residential uses accounting for 72,050 acre-feet/year and agriculture contributing 32,650 acre-feet/year.**

BASELINE AGRICULTURAL WATER DEMANDS

Baseline agricultural water demands were modeled using the StateCU tool developed by the Colorado Division of Water Resources and the Colorado Water Conservation Board. StateCU is widely used to estimate consumptive use by incorporating data on historical diversions, climate conditions, crop types, and irrigation system characteristics. Using this tool, a baseline scenario was modeled for the period 2018–2023, indicating an **average agricultural water demand of 32,650 acre-feet/year across Adams County**. **Most of this demand is concentrated in unincorporated areas, where irrigated agriculture remains most prevalent (Table 7).** Importantly, when comparing land use and water demand data, not all areas zones for agricultural use will be actively irrigated, resulting in differences between total area zoned for agricultural uses compared to total irrigated area included in the analysis (e.g., ~550,000 acres in Figure 18 vs. ~21,000 acres in Table 7). A detailed description of the StateCU model methodology is provided in the Water Demand Analysis Appendix.

Consumptive Use

Consumptive use refers to the portion of water that is diverted from a source and not returned to the original system because it is consumed through processes such as evaporation, plant uptake (transpiration), incorporation into products, or human use. In water rights and resource planning, consumptive use is critical because it represents water that is permanently removed from the stream or aquifer and is unavailable for reuse by downstream users.

Table 7. Baseline StateCU Model Results

Category	Baseline Irrigated Area (acres)	Baseline Consumptive Use (acre-feet/year)
Incorporated	2,400	4,130
Unincorporated	16,720	25,750
Annexing	1,610	2,770
Total	**20,730**	**32,650**

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BASELINE DOMESTIC AND NON-RESIDENTIAL

Domestic and non-residential water demands include residential, non-residential (e.g., commercial, industrial, and institutional — or CII), and outdoor irrigation for parks, rights-of-way, and other landscaped areas. A land use-based modeling approach served as the basis to estimate municipal and industrial water demands, assigning unit water demand estimates (e.g., acre-feet per structure or per acre) to each land use category based on a combination of local data sources and studies. A detailed summary of the modeling methodology is provided in the Water Demand Analysis Appendix.

Table 8 summarizes the baseline domestic and non-residential water demand results alongside the agricultural demands presented in the Baseline Agricultural Water Demands section. These results are further summarized by water use type in Figure 19, and mapped spatially in Figure 20.

Table 8. Baseline Domestic and Non-Residential Demand Results

Region	Domestic and Non-residential Demands		Agricultural Demand (acre-feet/year)		Total Demand (acre-feet/year)
	acre-feet/year	Percent of total	acre-feet/year	Percent of total	
Incorporated	55,790	53%	4,130	4%	59,920
Unincorporated	12,680	12%	25,750	25%	38,430
Intensifying	10	<1%	0	<1%	10
Annexing	3,570	3%	2,770	3%	6,340
TOTAL	**72,050**	**69%**	**32,650**	**31%**	**104,700**

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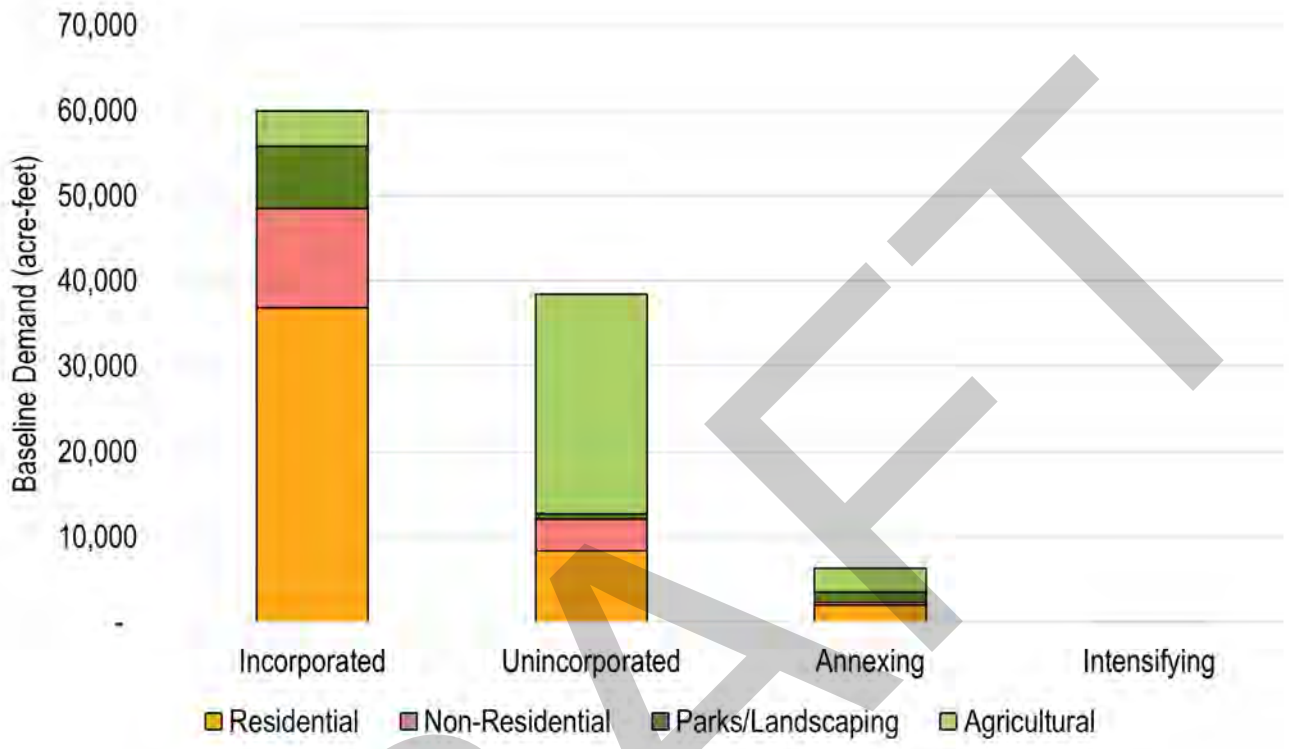

Figure 19. Baseline Water Demand by Region and Water Use Type

BASELINE DEMAND ESTIMATES

Baseline water demand in Adams County total approximately 104,700 acre-feet/year, with the majority (57%) originating from incorporated areas. Demands in incorporated areas are driven primarily by domestic and non-residential uses (62% residential, 19% non-residential, and 12% parks/landscaping) whereas demands in unincorporated areas are driven primarily by agriculture (67%) followed by residential (22%). Given that water demand in unincorporated Adams County is driven by irrigated agriculture, land use decisions should consider the value of agriculture against the desire to accommodate growth.

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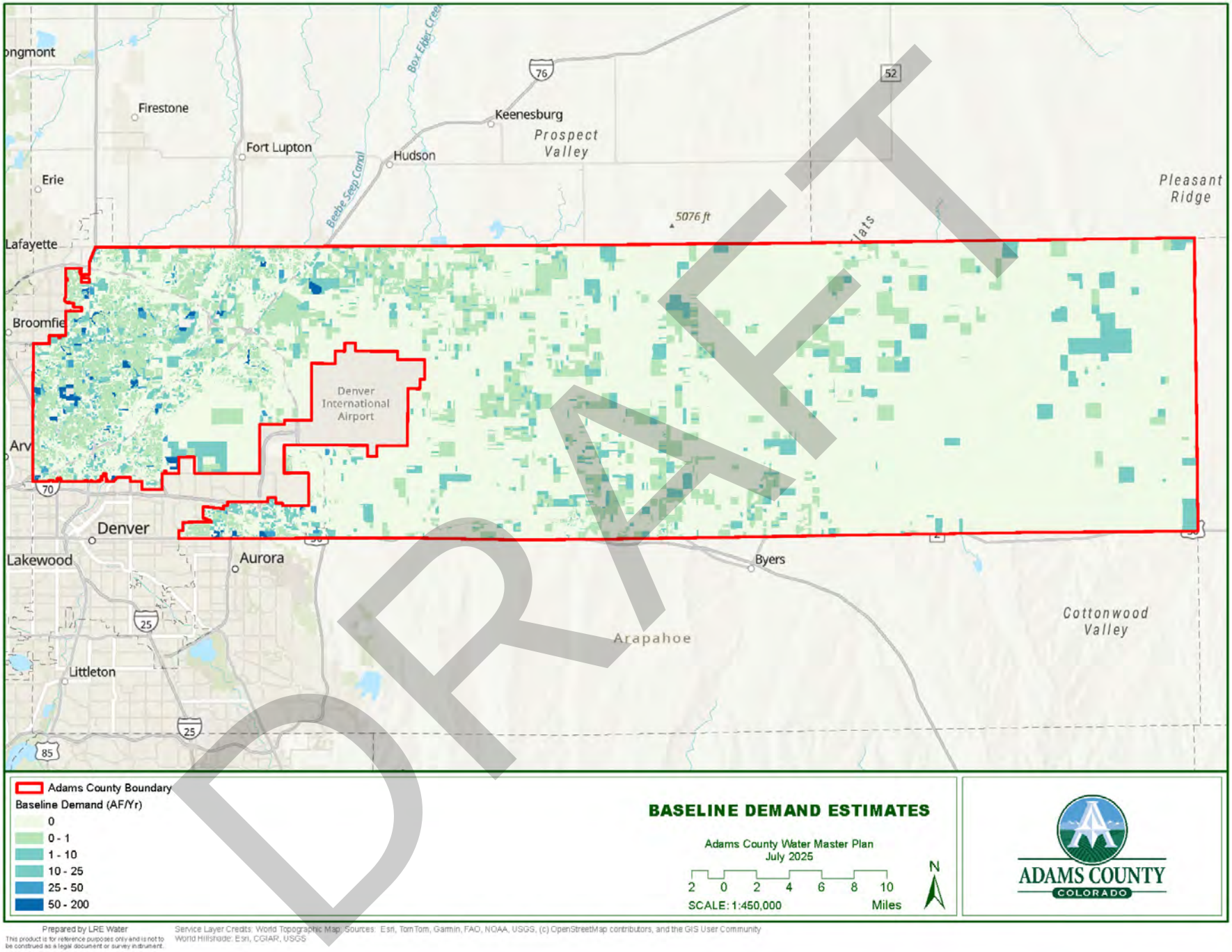

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Figure 20. Baseline Demand Estimates

3.4 FUTURE LAND USE AND GROWTH ASSUMPTIONS

To estimate future water demands, the consulting team integrated the Advancing Adams Future Land Use Map (FLUM) with future land use maps from municipalities in Adams County (where available) and established standard future land use categories. Next, the consulting team conducted subarea plan reviews and held conversations with municipal planners to identify parcels likely to annex by 2040.

This consolidated Future Land Use Map closely aligns with the Advancing Adams "Scenario B" which accommodates growth though many small mixed-use "town centers" throughout Adams County in areas along transit lines and where community services already exist today (Figure 21). Town centers support a blend of commercial, retail, light industrial, office space, and higher density residential development such as condos or apartment complexes. As such, Adams County will likely experience growth and development concentrated in municipal planning areas, around where community services already exist or can easily be extended. Much of this development will be residential, commercial or industrial uses at varying intensities. Additionally, **Adams County is likely to see conversion of agricultural land to other uses, especially near municipalities.**

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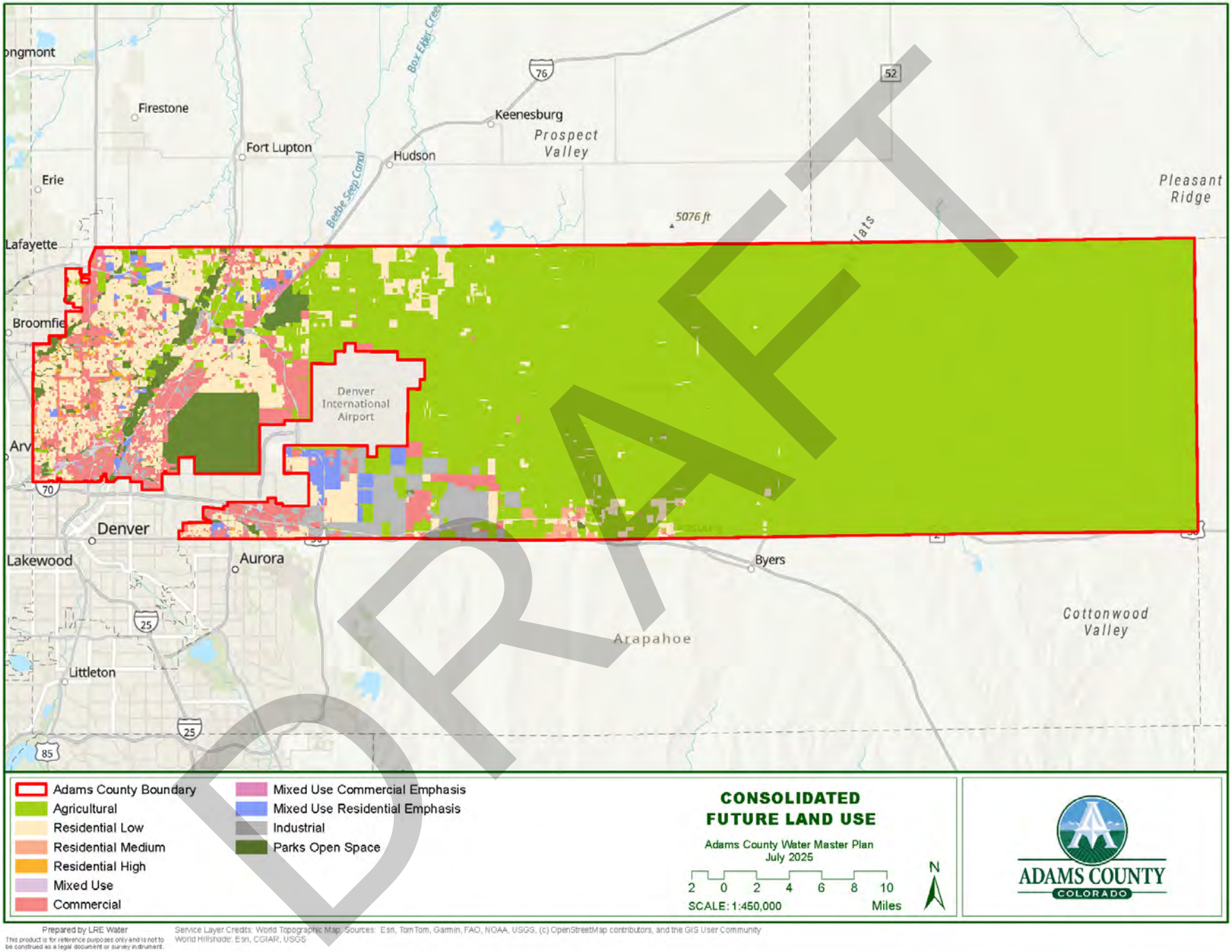

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Figure 21. Adams County Consolidated Future Land Use Map

Figure 22 presents a comparison of current and future land use by region and suggests a reduction in agricultural land uses across annexing and incorporated areas and an increase in mixed land uses in intensifying portions of unincorporated Adams County. It should be noted that mixed use lands were not characterized explicitly in the baseline analysis but are included under the commercial and residential categories.

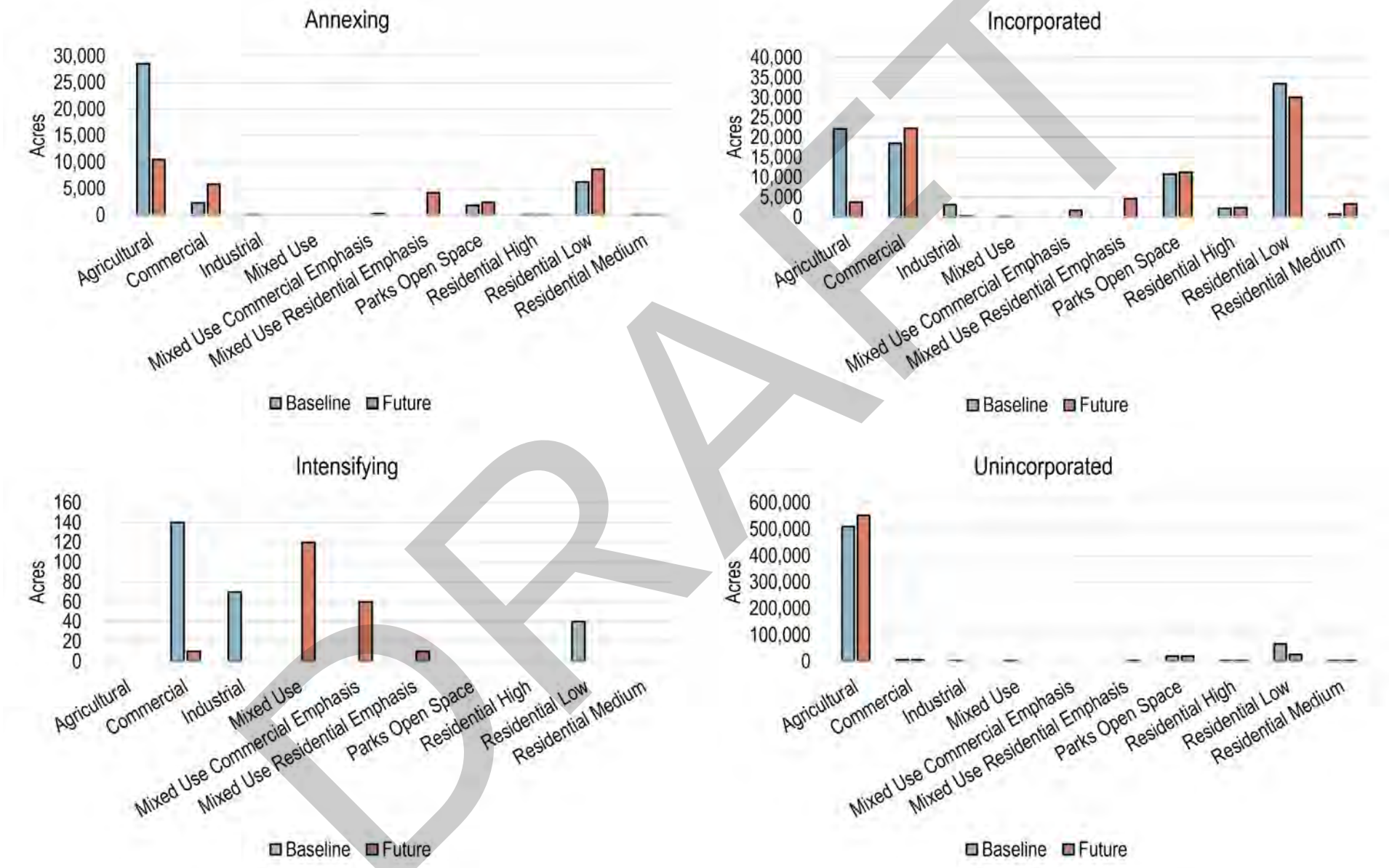

Figure 22. Comparison of Baseline and Future Land Use by Region

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3.5 FUTURE DEMAND PROJECTIONS

A land-use approach was applied to estimate future water demands across Adams County, similar to what is described in the Baseline Water Demands section, with adjustments made to reflect unique sectoral trends based on the findings described in the Future Land Use and Growth Assumptions section. This included taking a modified approach for estimating agricultural demand that accounted for historical land use conversion and the fact that certain agricultural areas are more susceptible to development pressure. Additionally, for the residential and non-residential sectors, analysis focused on "areas of change", or portions of unincorporated Adams County anticipated to undergo development or intensification within the 15-year planning horizon (e.g., "Intensifying" region). A detailed summary of the modeling methodology is provided in the Water Demand Analysis Appendix.

FUTURE AGRICULTURAL WATER DEMANDS

Continued development across the Front Range, coupled with increasing scarcity of new water supplies, places pressure on irrigated agricultural land within Adams County. This pressure leads to land and water rights being transferred from agricultural to municipal uses; the transfer of agricultural water is commonly referred to as "buy and dry." According to the Baseline Report, the percentage of irrigated lands in Adams County decreased by 52% between 1987 and 2020. Recent trends between 2015 and 2020 suggest as much as a 20% decline in irrigated lands. Much of this change has occurred on the west side of Adams County, where urbanized areas and municipalities are located.

For the analysis of future agricultural demands, active farmland was first characterized as "stable" or "strained" (Figure 23). The project team designated all acreage within the Adams County's "A-3" zone district as "stable" as this zone district supports large-lot agriculture and is predominantly located in eastern Adams County where development pressures are lower. Agricultural areas designated as stable were assumed to maintain their baseline consumptive use. In contrast, farmland in all other land use categories were classified as "strained," reflecting greater susceptibility to development pressures due to redevelopment potential and proximity to growth corridors (e.g., "buy and dry"). Based on historical land use conversion trends, **strained areas are projected to experience a 40% reduction in irrigated acreage by 2040.** This **reduction is expected to result in a total decrease of about 2,600 acres of irrigated land** and a corresponding **decrease in consumptive use of about 4,300 acre-feet/year** (Table 9). While this reflects a decrease in demand for the agricultural sector, in practice, such reductions in agricultural use often coincide with increased domestic and non-residential demands reflecting the transition of farmland to urban uses.

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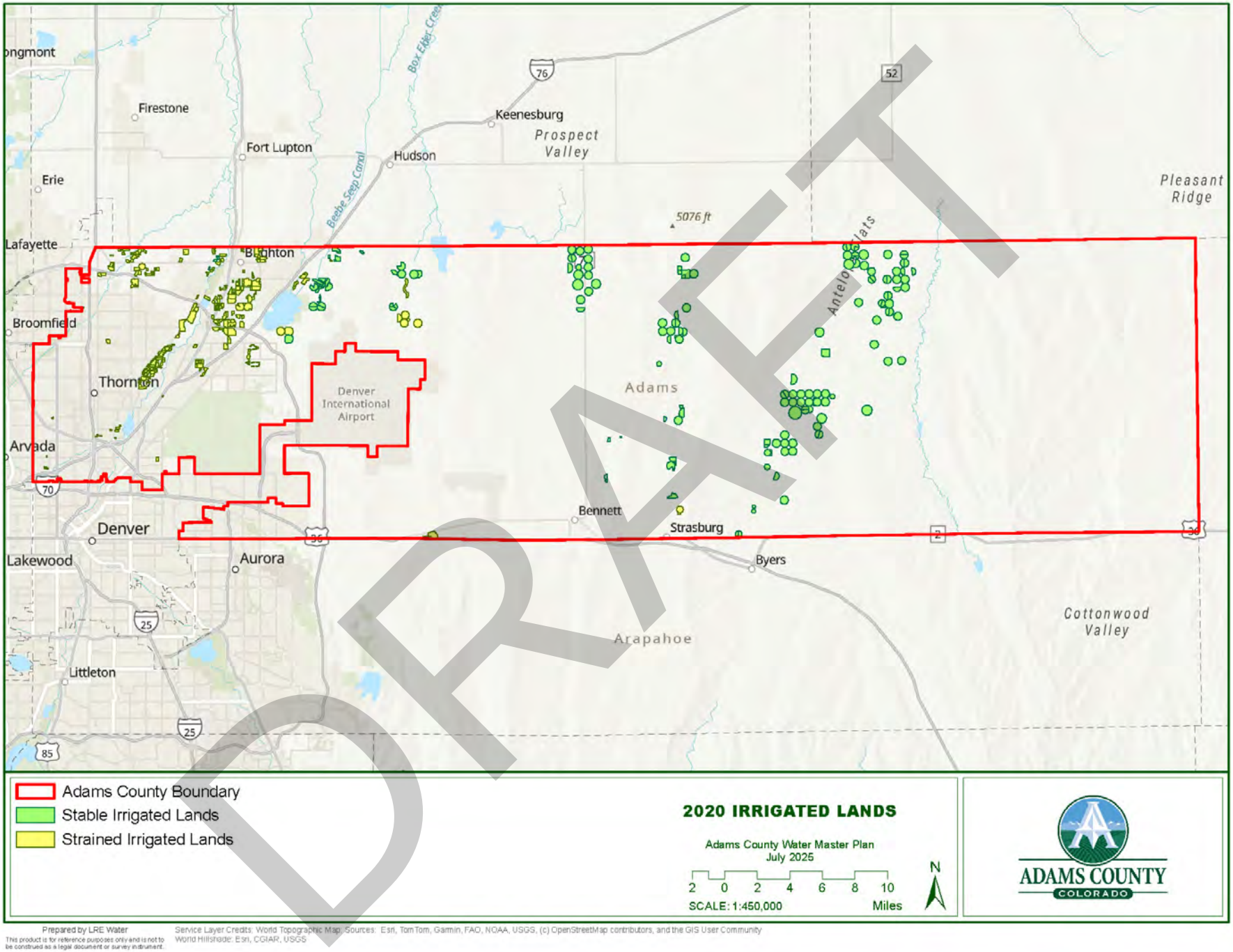

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Figure 23. Adams County 2020 Irrigated Lands

Table 9. Future StateCU Model Results

		Baseline Irrigated Area (acres)	Future Irrigated Area (acres)	Percent Change	Baseline CU (acre-feet/year)	Future CU (acre-feet/year)	Percent Change
Stable	**Annexing**	0	0	0%	0	0	0%
	Incorporated	0	0	0%	0	0	0%
	Unincorporated	14,280	14,280	0%	21,990	21,990	0%
	Total	**14,280**	**14,280**	**0%**	**21,990**	**21,990**	**0%**
Strained	**Annexing**	1,610	970	-40%	2,770	1,660	-40%
	Incorporated	2,400	1,440	-40%	4,130	2,480	-40%
	Unincorporated	2,440	1,460	-40%	3,760	2,260	-40%
	Total	**6,450**	**3,870**	**-40%**	**10,660**	**6,400**	**-40%**
	TOTAL	**20,730**	**18,150**	**-12%**	**32,650**	**28,390**	**-13%**

FUTURE DOMESTIC AND NON-RESIDENTIAL WATER DEMANDS

The 2040 domestic and non-residential demand projections were developed using a similar land use-based approach to the baseline analysis with a focus on unincorporated areas expected to experience change within annexing and intensifying regions (Figure 24). The analysis assumes major water providers already account for future water demands in their long-term planning. Thus, incorporated areas were not included as part of this analysis.

To identify areas of change, vacant parcels identified as suitable for development were assigned future land uses based on Adams County's Consolidated Future Land Use Map (see discussion in Future Land Use and Growth Assumptions). Figure 24 shows the areas of change used in the analysis and Figure 25 provides total acreages for these areas by land use type.

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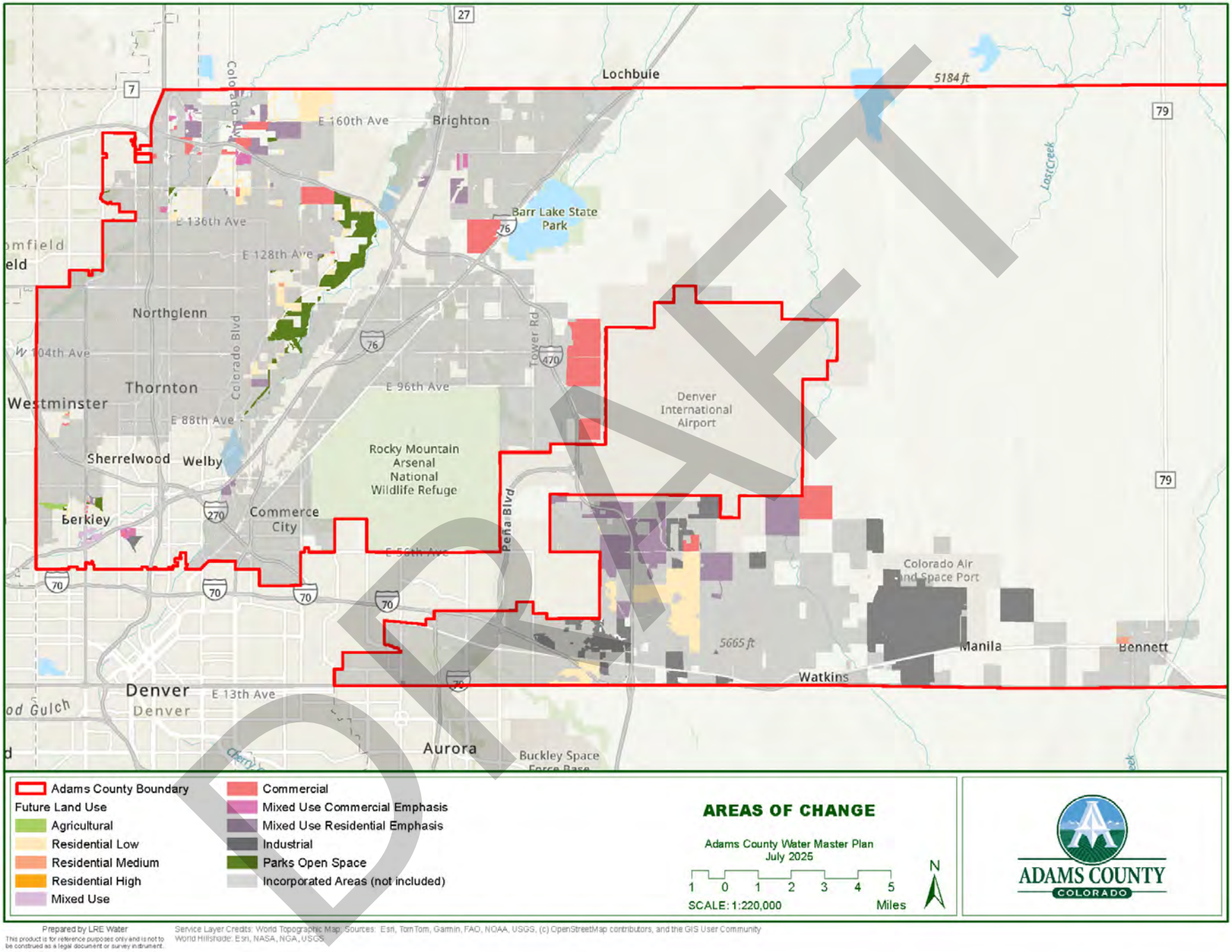

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Figure 24. Areas of Change

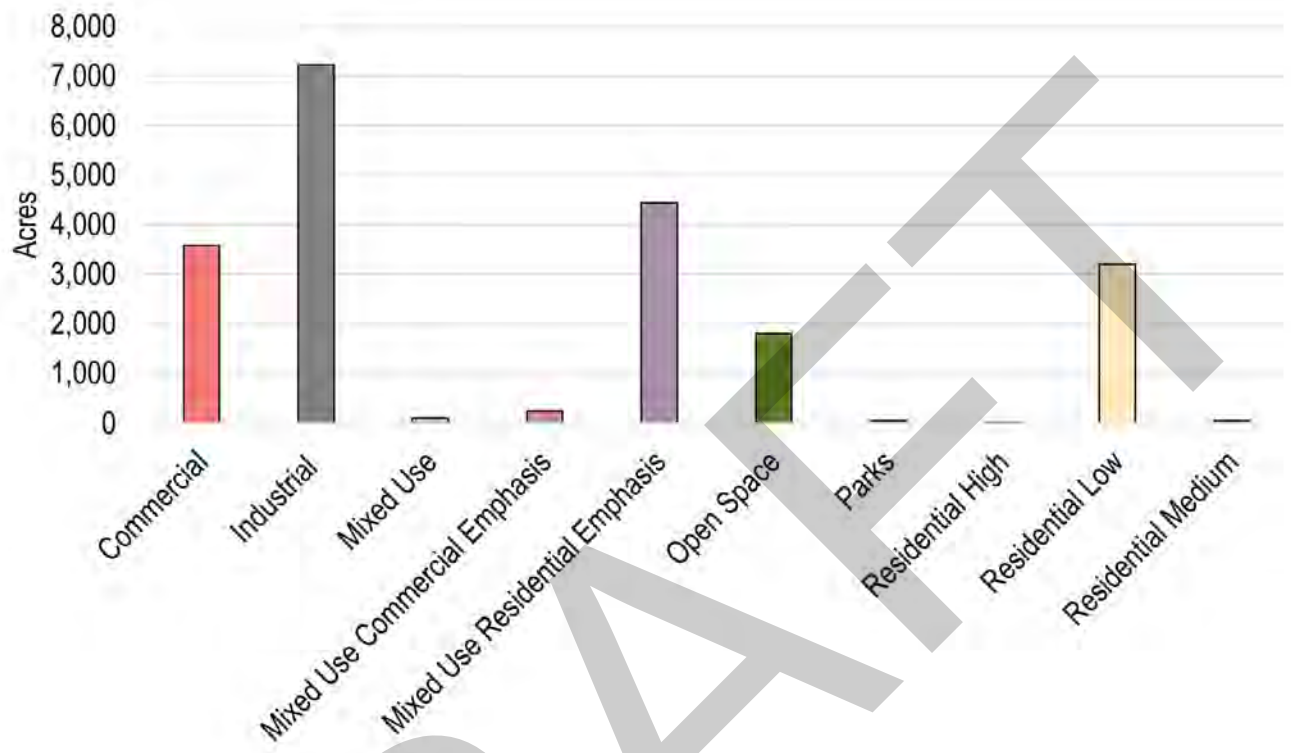

Figure 25. Areas of Change Summarized by Future Land Use Type

To reflect the inherent uncertainty in estimating future demands, two growth scenarios were modeled. One reflects **expected growth** based on Adams County's Consolidated Future Land Use Map and feedback gathered during conversations with municipal planning staff, while the second reflects a **slow growth** trajectory or 70% of the growth expected to occur by 2040. These scenarios were chosen based on feedback that they are the two most likely scenarios for Adams County, from a population growth perspective. Additionally, each future water demand scenario was further adjusted for climate change and water conservation using the assumptions outlined in Table 10. These adjustments reflect potential future conditions under moderate climate stress and active conservation practices based on information in Colorado's Water Plan. A detailed summary of the modeling methodology is provided in the Water Demand Analysis Appendix.

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Table 10. Future Domestic and Non-Residential Demand Assumptions

Water Demand Scenario	Growth Assumption	Climate Change Assumption	Water Conservation Assumption
Expected Growth	Areas of change fully built out by 2040	No change	No change
Slow Growth	Areas of change 70% built out by 2040	No change	No change
Expected Growth under Climate Change	Areas of change fully built out by 2040	15% increase in demand	No change
Slow Growth Under Climate Change	Areas of change 70% built out by 2040	15% increase in demand	No change
Expected Growth with Water Conservation	Areas of change fully built out by 2040	No change	15% decrease in demand
Slow Growth with Water Conservation	Areas of change 70% built out by 2040	No change	15% decrease in demand

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Projected new water demands for areas of change in unincorporated Adams County range between 16,000-26,000 acre-feet/year depending on growth, and the degree to which water conservation and climate change drive demands over the next 15 years. The largest increases in demand are driven primarily by new commercial, industrial, and mixed-use (MU) development. **Notable areas include continued commercial and industrial growth along the Interstate 70 corridor in Aurora's planning area, continued residential and commercial development along the E-470 corridor in Commerce City's planning area, and continued buildout within Thornton's growth boundary.**

Table 12 provides a comparison of baseline and total future demand projections for the Expected Growth scenario. As expected, water demands are projected to increase significantly in areas of Adams County expected to undergo annexation (a threefold increase) and intensification (a forty-three-fold increase) (Figure 26). In contrast, the rest of unincorporated Adams County may experience stagnant or slightly declining demands over time due to reductions in irrigated agricultural land.

For all demands presented in this section, actual results may be higher or lower depending on factors like actual development patterns and weather conditions. While the water demand scenarios presented in the Future Demand Projections section try to account for some of this variability, in all cases demands will be higher if Adams County develops at a faster rate than projected or the weather is hotter or dryer than expected. In contrast, if Adams County develops slower than expected, water conservation has a greater impact than expected, or weather patterns decrease irrigation needs water demands may be lower.

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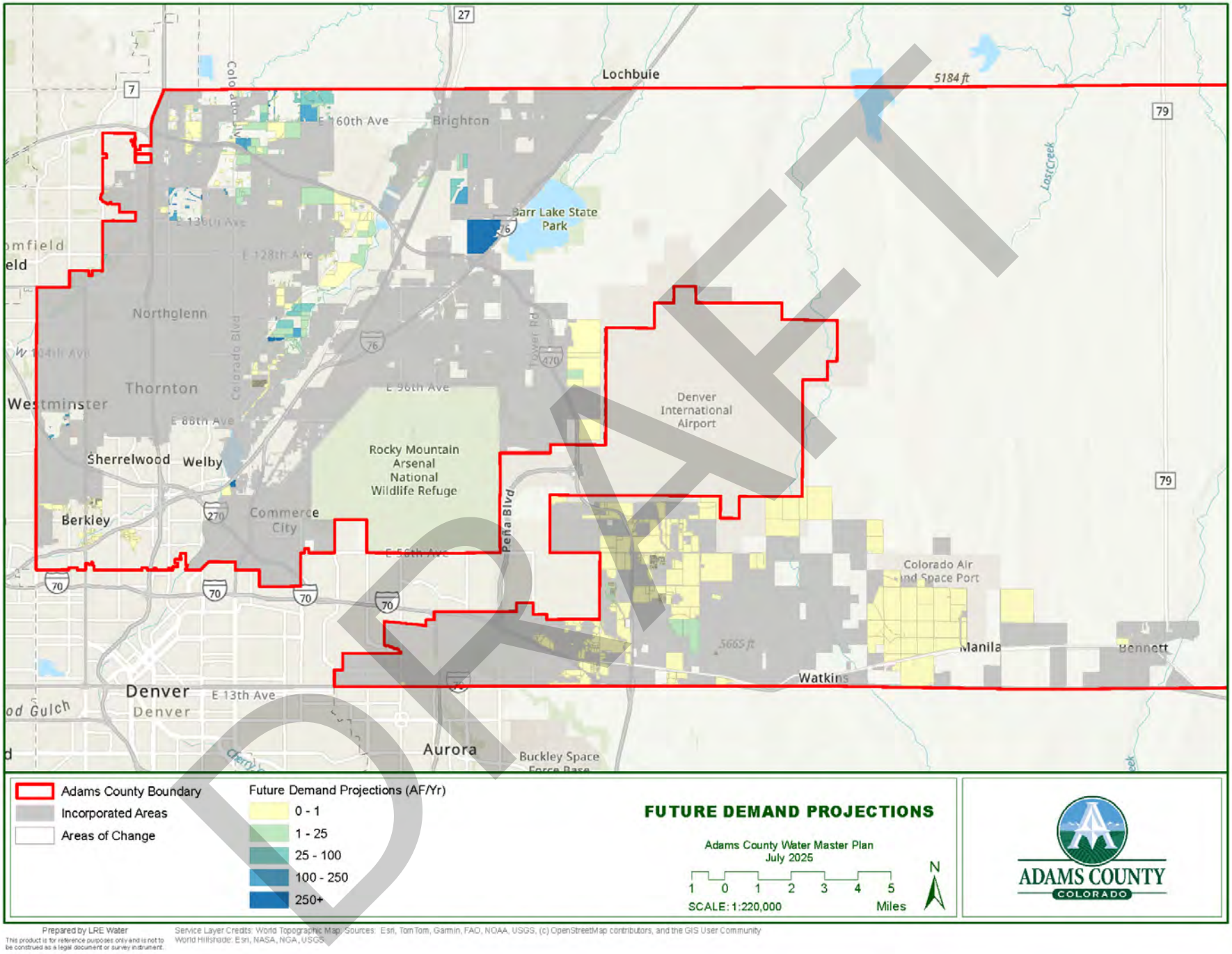

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Figure 26. Future Demand Projections

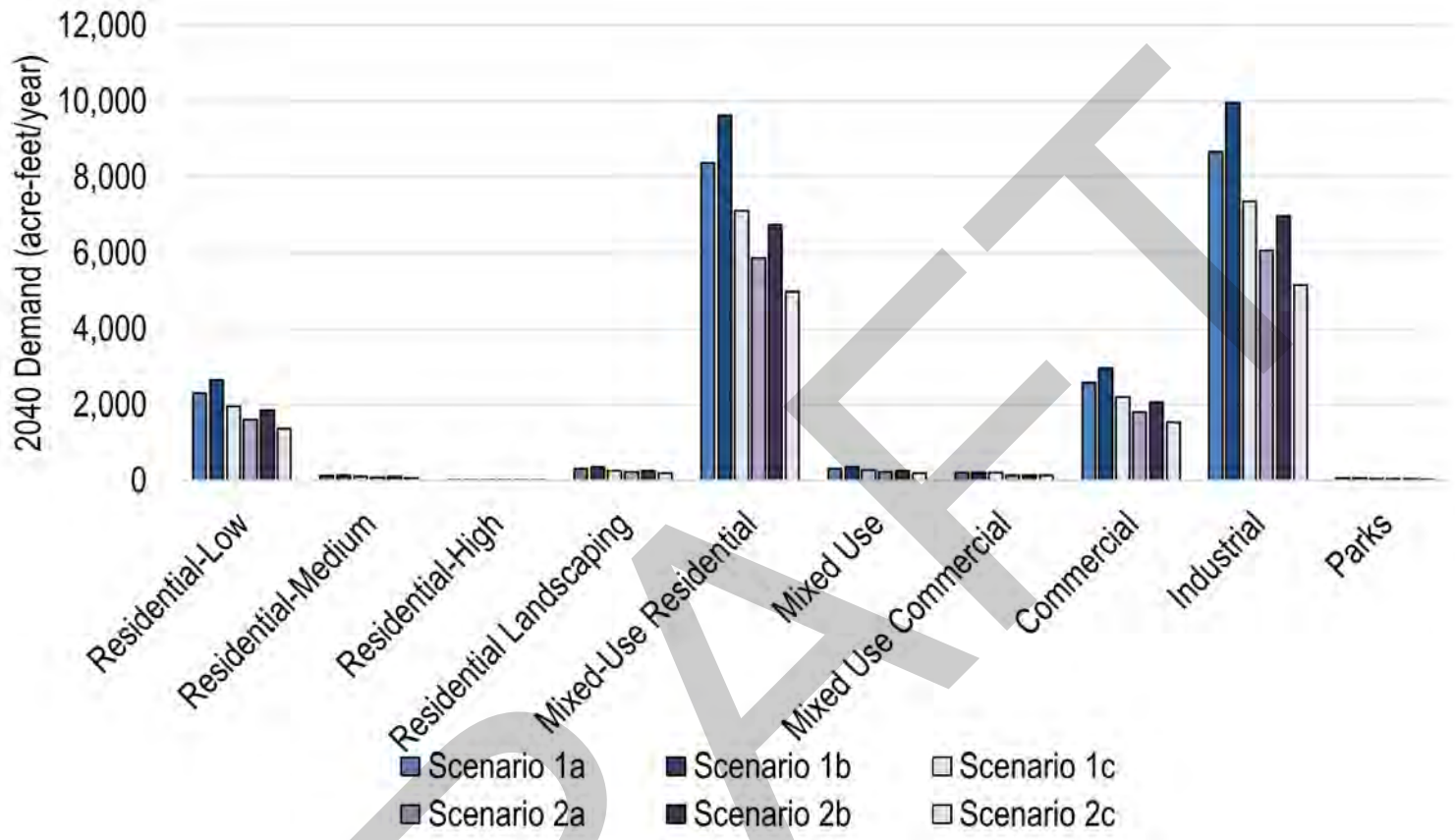

Figure 27. Scenario Water Demand Projections for Areas of Change

Table 11. Scenario Water Demand Projections for Areas of Change by Region

		Projected New Demand by 2040 (acre-feet/year)					
	Baseline	Expected Growth	Expected Growth under Climate Change	Expected Growth with Water Conservation	Slow Growth	Slow Growth under Climate Change	Slow Growth with Water Conservation
Intensifying	10	440	500	380	310	350	270
Annexing	3,570	22,490	25,840	19,140	15,740	18,090	13,400
Total	**3,580**	**22,930**	**26,340**	**19,520**	**16,050**	**18,440**	**16,670**

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Table 12. Comparison of Baseline Demands and Future Demand Projections

Region	Baseline Demand (acre-feet/year)	Future Demand (acre-feet/year)[4]	Percent Change
Incorporated	59,920	59,920[5]	0%
Unincorporated	38,430	36,930	-4%
Intensifying	10	440	4,300%
Annexing	6,340	24,150	281%
TOTAL	**104,700**	**121,440**	**16%**

[4] Future demand estimates based on "Expected Growth" scenario (Table 10).

[5] Given the focus on unincorporated areas of the County, changes in domestic and non-residential demands across incorporated areas were not modeled as part of the analysis.

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Chapter 4

WATER AVAILABILITY

Chapter Contents

An assessment of water availability was completed leveraging the results of the water demand analysis and an in-depth analysis of Adams County's groundwater supplies. The water availability assessment focused on groundwater resources within the Denver Basin aquifers, specifically in unincorporated areas of Adams County where Adams County policies will most directly influence future development. As Adams County plans for continued growth, understanding the long-term availability of these non-renewable groundwater supplies is especially critical to support informed land use decisions.

For this assessment, it was assumed that incorporated areas of Adams County served by a water provider have sufficient water supplies to support planned growth. This assumption is supported by conversations with water providers, as well as information gathered during the water provider survey. While Adams County is not responsible for ensuring adequate supplies in these areas, it plays a supportive role through regional coordination, planning guidance, and alignment of water and land use policies where appropriate. As a result, and while not the focus of the water availability assessment, opportunities to support water providers to ensure adequate and reliable supply are included in the Adams County Water Management Strategies chapter of this plan.

Chapter 4: Key Takeaways

Overall Adams County is estimated to have adequate supplies to meet future 2040 water demands.

Based on an analysis of available groundwater in the Denver Basin aquifer beneath Adams County, unincorporated areas are projected to have sufficient supplies to meet current and 2040 demand levels for up to 300 years, in line with Adams County's long-term planning standard. However, continued development of these resources will lead to rising production and treatment costs, along with a decline in the long-term reliability of the Denver Basin aquifer.

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4.1 DENVER BASIN AQUIFER GROUNDWATER ANALYSIS

As discussed in previous chapters, groundwater in Adams County includes both renewable and non-renewable sources. This study did not quantify renewable (alluvial) groundwater resources, as many of these supplies are already fully appropriated or require an augmentation plan (typically involving the change of senior water rights) to be considered a reliable source of new supply to support future growth.

Adams County's non-renewable supplies are sourced from the Denver Basin aquifer system. The Denver Basin aquifer consists of a sequence of bowl-shaped sedimentary aquifers. The aquifers recognized by the State are the Dawson, Denver, Arapahoe, and Laramie Fox-Hills, with some designations of an upper and lower portion separated by a geologic confining unit such as shale or clay (Figure 8). Although the Denver Basin aquifer system is considered a non-renewable water source, it remains critical to the region as it serves as the primary water source for areas of Adams County that lack access to renewable surface water supplies.

The State of Colorado regulates groundwater withdrawals and well permitting within the Denver Basin aquifers through the Denver Basin Rules and the Statewide Nontributary Ground Water Rules, both of which became effective in 1986 following the passage of Colorado Senate Bill 5 (SB5, 1985). Under this legislation and its associated rules, the amount of water legally available to a landowner is determined by the aquifer boundaries below their property. Aquifer boundaries are determined based on aquifer thickness and a defined specific yield (or storage coefficient) for each aquifer. These parameters were established by the State groundwater hydrogeologist using the best data available at the time. The resulting maps are used by the State Engineer's Office to define the amount of water legally available for a given parcel.

To understand current water availability within the basin in Adams County, modeling was completed to evaluate water supplies in each aquifer using an expanded and more current set of geophysical log data. This model used PETRA geological software and was developed by identifying key geologic elevations from an extensive set of borehole geophysical logs. This process is like the one used by the Colorado Division of Water Resources to develop the SB5 dataset that defines legally available groundwater. Both analyses use the same formula to estimate available groundwater volume based on net sand, area of interest, and specific yield, and apply identical values for specific yield and area, however the Plan's analysis includes a slightly different data set and assumptions. Results were compared to the State's SB5 estimates, which reflect legally available water rights, to assess legal entitlements against another estimate of physically available supply. A comprehensive summary of the PETRA methodology is provided in the Groundwater Analysis Appendix.

Geophysical Logs

Geophysical logs are continuous recordings of the physical properties of subsurface rocks and fluids, collected by instruments lowered into boreholes (or narrow, deep holes drilled into the ground). These logs provide critical insights into geological formations, fluid content, and groundwater production potential. One of the oldest, most widely used, and valuable tools in hydrogeology is the resistivity log, which helps distinguish between hydraulically confining layers and water-bearing units such as sandstone.

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GROUNDWATER AREAS AND TECHNICAL CONSIDERATIONS

For the purposes of this study, Adams County was broken up into three distinct groundwater areas, each of which vary in terms of groundwater availability (Figure 28). Area 2 was the focus of this study since it is comprised primarily of unincorporated land where the main developable water resource is Denver Basin groundwater. The extent of Area 2 generally matches the Unincorporated Region defined in the Water Demands chapter, allowing for a direct comparison of supply and demand across this portion of Adams County. In Area 1, Denver Basin groundwater is less accessible to Adams County in general, because many water providers currently have legal rights to these supplies. Area 3 has little to no access to Denver Basin groundwater resources due to the aquifer extents.

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The following items were closely considered in the analysis of available groundwater in Area 2. More information on each can be found in the Water Supplies and Providers chapter of the plan.

- **Designated Basins** are geologically distinct alluvial groundwater basins that were created by the Colorado Ground Water Commission. Any well permitted (including deeper Denver Basin wells) within these basins is subject to additional laws outlined by the Commission. The two Designated Basins within Adams County are the Kiowa Bijou and Lost Creek Designated Basins (Figure 8).
- **Tributary, Non-Tributary, Not-Non-Tributary (Actual, and 4%) Groundwater Designations**. A detailed description of each can be found in the Groundwater Analysis Appendix.
- **Pre-213 Water Rights** that were administered by the State prior to the passage of Senate Bill 213 in 1973, which outlines regulations of groundwater withdrawals and defined tributary vs non-tributary groundwater rights. These water rights are legally separate from the SB5 water rights and need to be accounted for by removing their spatial acreage from the PETRA analysis.
- **Small capacity and exempt wells** that are permitted for domestic or similar uses throughout Area 2. See the details of this calculation in the Groundwater Analysis Appendix.

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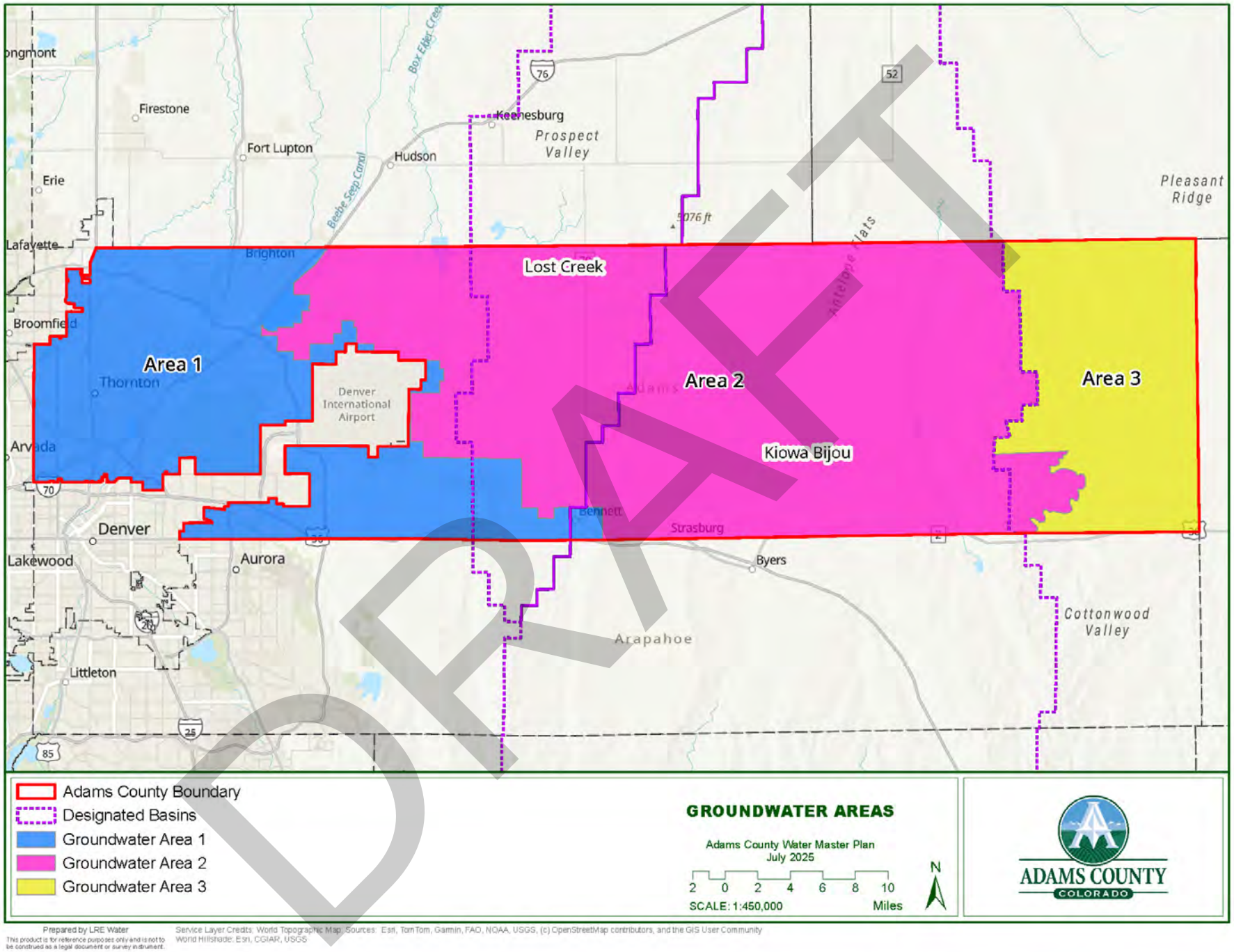

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Figure 28. Adams County Groundwater Regions, April 2025

GROUNDWATER ANALYSIS AREA 2 RESULTS

Based on the PETRA groundwater analysis, the total physically available groundwater from the Denver Basin in Area 2 is estimated at approximately **99,000 acre-feet per year over a 100-year planning horizon** (2025-2125). **When applying Adams County's more conservative 300-year planning rule** (Adams County – Subdivision Design, Improvements, and Dedication Ch. 5), **this estimate is reduced to about 33,000 acre-feet per year (over 2025-2325).** Approximately 11% of this water within the Denver and Arapahoe aquifers would require an augmentation or replacement plan prior to development. Additionally, while the estimates in Table 13 reflect the total volume of physically available water, **a portion of this supply may be economically infeasible due to cost of developing supply and water quality considerations**.

The volumes presented in Table 13 reflect groundwater considered reasonably accessible, meaning it could be developed without requiring an augmentation plan to permit a well.[6] This physically available supply represents only 41% of the legally available groundwater defined under the State's SB5 groundwater rules. The primary difference in results stems from a lower total net sand compared to SB5.[7] While the PETRA analysis approach provides a robust estimate of physically available groundwater, it remains a planning-level assessment, and actual groundwater volumes may vary from those presented in this Plan. Importantly, these findings do not undermine the validity of the SB5 dataset or the State's regulatory process, which remains a sound and defensible legal framework for groundwater management. However, the PETRA results suggest the SB5 framework may overestimate long-term water availability in some areas. This underscores the importance of regularly updating groundwater availability estimates using new and higher-resolution geophysical data, particularly in areas near aquifer boundaries or heavily developed subdivisions where the risk of localized depletion is greater.

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[6] *Each aquifer was assessed individually, with the Laramie-Fox Hills Aquifer identified as the largest contributor, making up over 56% of Adams County's physically available supply. The Denver, Upper Arapahoe, and Lower Arapahoe aquifers contribute approximately 16%, 22%, and 6%, respectively, based on the PETRA analysis. However, it is important to recognize that the cost of extracting and treating groundwater increases significantly with depth.*

[7] *For the analysis, net sand was estimated using resistivity measurements to distinguish sandy aquifer material from low-permeability layers like clay. While both approaches employ similar techniques, the analysis for the Adams County Water Master Plan incorporates a larger number of geophysical logs, improving spatial resolution across Adams County. The analysis also applied a 12 Ohm-m cutoff to define sand (a common industry standard). Colorado Division of Water Resources may have used a slightly different cutoff or interpretive method.*

Table 13. Comparison of Petra Computation of Physically Available Groundwater versus Denver Basin Rule Groundwater Computations (SB5) in Area 2

Name	Petra Groundwater Calculations (acre-ft/year)	Denver Basin Rule Computations (SB5 Groundwater Rule) (acre-ft/year)	% Physically Available vs Denver Basin Rules (acre-ft/year)
Denver Aquifer	15,700	19,900	79%
Upper Arapahoe Aquifer	21,200	40,000	53%
Lower Arapahoe Aquifer	6,200	21,500	29%
Laramie-Fox Hills Aquifer	55,800	157,200	36%
Total	**98,900**	**238,600**	**41%**

Note: All calculations in this table are based on the annual appropriation for the State defined 100-year aquifer life rule to compare SB5 quantities side by side. Estimates for a 300-year planning horizon are calculated as one-third of the 100-year values (e.g., total available supply is reduced from 98,900 to 33,000 acre-ft per year).

4.2 WATER AVAILABILITY ASSESSMENT

As discussed above, the Denver Basin aquifer is considered a non-renewable source. Since widespread development began in the 1970s and 1980s, water levels in the Denver Basin aquifers have steadily declined. Site-specific aquifer properties and regional pumping patterns strongly influence the severity of decline. Some areas may show minimal change, while others (particularly those near aquifer boundaries or heavily developed subdivisions) could face significant drops. Studies by the USGS have documented regional declines of 0 to 20 feet per year. Data in the Groundwater Analysis Appendix reflect this range, though not all areas display consistent long-term trends. As such, reliance on this groundwater source carries inherent long-term sustainability risks.

In unincorporated Adams County, the estimated baseline water demand is approximately 38,430 acre-feet per year, with projected 2040 demand slightly lower at around 36,930 acre-feet per year (Table 12, Table 10). **Based on these estimates, Adams County appears to have sufficient groundwater reserves to sustain current and projected pumping levels for close to 300 years.** However, **as development continues and Adams County approaches full utilization of its available groundwater supply, key challenges must be carefully considered.** Key challenges to consider include changing aquifer conditions, declining well yields, increasing infrastructure costs, and the need for diversified water sources.

As water levels have declined in the Denver Basin, especially in the Denver Aquifer, **changing conditions have necessitated the drilling of deeper wells**. This **increases the cost of water production and reduces well reliability.** Further developing these resources will only exacerbate these challenges. Additionally, water quality issues vary widely depending on a number of site-specific conditions and are generally difficult to predict until a well is drilled and sampled. **Most contaminants of concern are from geologic sources and include manganese, radon, arsenic, selenium, and uranium.**. The presence of these constituents increases treatment complexity and cost, often requiring advanced processes such as reverse osmosis, ion exchange, or specialized filtration to remove contaminants and ensure regulatory compliance, placing additional financial and operational burdens on water providers. As a result, **development that depends on these supplies should be carefully evaluated to ensure both adequate and high-quality reliable water is available.**

Groundwater production in the Denver Basin varies not only by location but also significantly between aquifers. The Denver aquifer, which has the smallest footprint in Adams County, is shallow making it easier and cheaper to access but requires generally requires an augmentation plan and can be limited in production due to isolated sand deposits and unconfined conditions in some areas. The Arapahoe aquifer is divided into Upper and Lower sections in the western part of the county and remains undifferentiated in the east, requiring careful consideration in permitting and design due to varying access costs and legal requirements. The Lower Arapahoe aquifer generally has the least available water and lower, more variable production rates, attributed to its heterogeneous makeup with more shale beds and less connected sandstone units. The Laramie-Fox Hills aquifer, though the deepest and most expensive to access, has the largest water supply and footprint in the county, with generally good production potential from the Fox-Hills sandstone, despite some geological variability similar to the Lower Arapahoe. **Regardless of which Denver Basin aquifer is being considered, a site-specific investigation is strongly recommended to identify the most suitable location for groundwater production.**

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Chapter 5

WATER MANAGEMENT CHALLENGES AND STRATEGIES

Chapter Contents

While Adams County has sufficient water supply to meet demands, there are certain geographic areas of Adams County that are at greater risk to specific water availability and reliability challenges. These are likely to be exacerbated under conditions such as drought and population growth. Additionally, while Adams County is not a water provider, it recognizes that it has an important role in mitigating water management challenges, especially in unincorporated areas. This chapter summarizes the top water management challenges Adams County is likely to face now and into the future, as well as the top strategies Adams County can pursue to address risks associated with each challenge.

Chapter 5: Key Takeaways

10 Challenges

This planning process identified Adams County's top 10 water management challenges.

13 in 5 Years

This plan identifies 13 county-led strategies to initiate over the next five years to address these challenges.

Adams County has a particularly important role to play in unincorporated areas of the County served by non-renewable groundwater supplies that are at greater risk of having localized water availability and reliability challenges and where Adams County has direct land use authority.

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5.1 ADAMS COUNTY WATER MANAGEMENT CHALLENGES

To identify the top water management challenges in Adams County, the project team performed a risk and vulnerability assessment that leveraged the Water Demands and Water Availability results, as well as feedback gathered from water providers, the Technical Advisory Committee, and Adams County staff. The effort led to the identification of 10 water management challenges that synthesize over 40 identified risks. Together, the challenges aim to capture the primary water issues facing Adams County in terms of water supply, demand, and availability. More details about the risk and vulnerability assessment and challenge identification can be found in the Water Management Challenges and Strategies Appendix.

Risk

A specific condition, event, or factor that has the potential to negatively impact water systems, infrastructure, or communities. Risks represent vulnerabilities or threats that, if not addressed, could lead to service disruptions, environmental harm, public health issues, or economic losses.

Challenge

A broader systemic issue that encompasses a group of related or interconnected risks. Challenges present more complex problems that reflect higher-level concerns identified through the aggregation and analysis of individual risks.

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ADAMS COUNTY WATER MANAGEMENT CHALLENGES

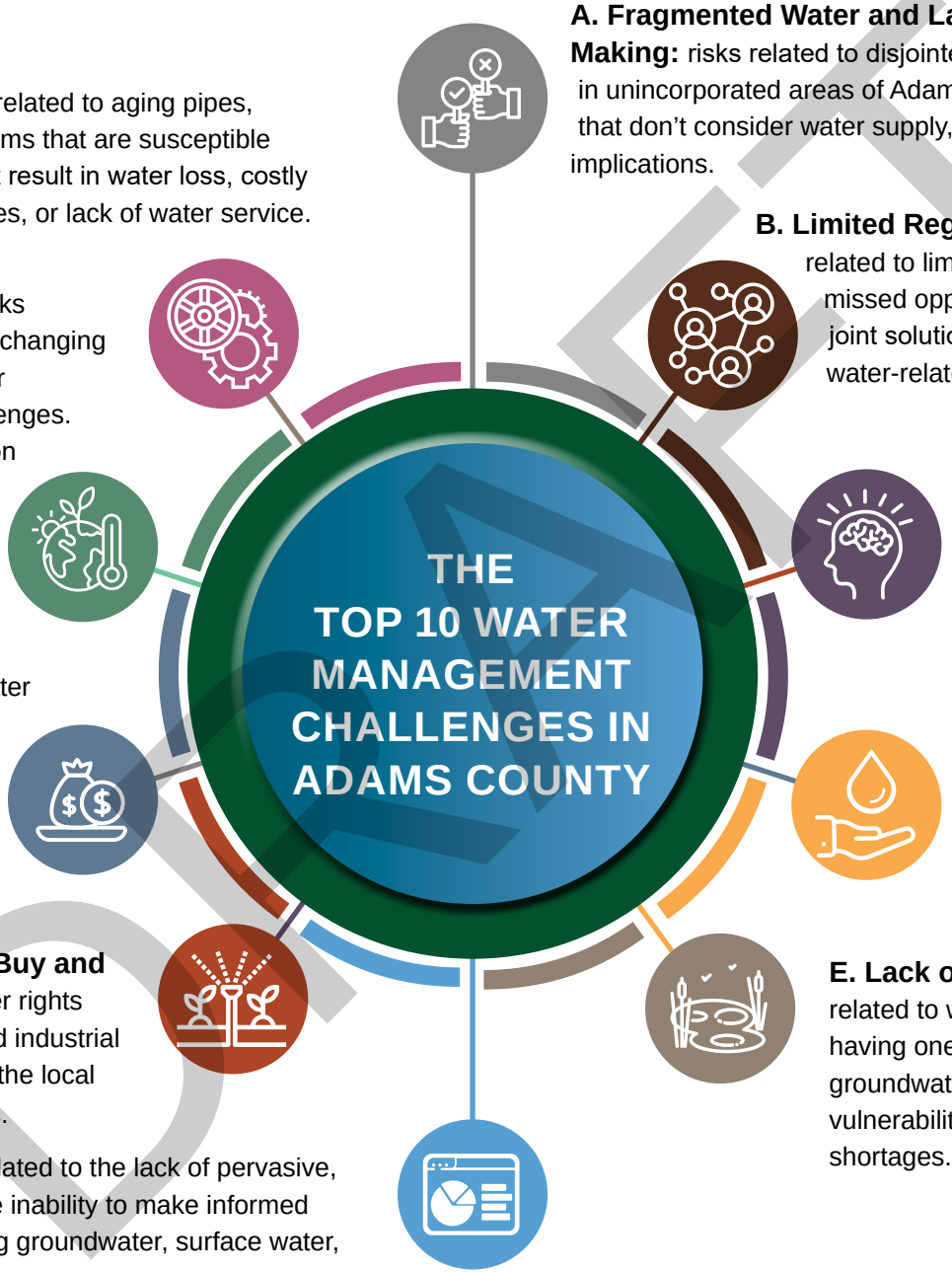
Aging Water Infrastructure: risks related to aging pipes, treatment plants, and distribution systems that are susceptible to leaks, breaks, and inefficiencies that result in water loss, costly infrastructure repair, water quality issues, or lack of water service.

Drought and Climate Change: risks related to hotter, drier conditions, with changing precipitation patterns resulting in water availability, reliability, and quality challenges. This challenge has a multiplier effect on all other challenges.

H. Water Provider Funding and Capacity Needs: risks related to water providers lacking sufficient funding to implement necessary infrastructure upgrades, threatening provider's ability to maintain water quality, adequate water supply, or reliability of water service.

G. Agricultural Water Transfer ("Buy and Dry"): risks related to the sale of water rights from agricultural lands to municipal and industrial uses that result in negative impacts to the local economy, food supply and ecosystems.

F. Water Data Availability: risks related to the lack of pervasive, high quality water data, resulting in the inability to make informed decisions for baselining and monitoring groundwater, surface water, and water quality.



A. Fragmented Water and Land Use Planning and Decision-Making: risks related to disjointed water and land use planning, especially in unincorporated areas of Adams County, that result in land use decisions that don't consider water supply, water demand, and water availability implications.

B. Limited Regional Coordination on Water: risks related to limited regional coordination resulting in missed opportunities to share resources, identify joint solutions, and create efficiencies in planning or water-related programming.

C. Limited Water Knowledge and Expertise: risks related to Adams County's public, staff, or leadership lacking sufficient knowledge to make informed decisions or recommendations that pertain to water management issues.

D. Water Quality Impacts: risks related to local and watershed scale water quality impacts (e.g., wildfire, groundwater contamination) that threaten water supply.

E. Lack of Water Supply Diversity: risks related to water providers or self-supplied users only having one source of supply (e.g., non-renewable groundwater, wholesale water) resulting in increased vulnerability to drought, contamination, or water shortages.

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5.2 ADAMS COUNTY WATER MANAGEMENT STRATEGIES

Each of the 10 water management challenges can be addressed in multiple ways. To identify strategies to address each challenge, the project team leveraged results from the Water Demands and Water Availability, as well as gathered input from water providers, the Technical Advisory Committee, Adams County staff, and the public, with an eye towards strategies that Adams County can lead. Specifically, strategies focused on Adams County's potential role as:

Administrator: Adams County has regulatory authority over land use and zoning, public health and safety, certain infrastructure (e.g., roads), and more. In the context of this plan, Adams County's regulatory land use authority in unincorporated areas is particularly important, especially in areas reliant on non-renewable groundwater and in coordination with municipalities who are expected to see substantial growth in the coming decades. Additionally, Adams County has an opportunity to be a program administrator to advance water efficiency and conservation across the region.

Convener: Adams County has tremendous convening power and can bring together water providers, municipalities, and other stakeholders to discuss and address challenges.

Funder: Adams County can help secure or provide funding to regional projects that cross jurisdictional boundaries.

Partner: Adams County can partner directly with water providers and engage in formal agreements or strategies with municipalities and other organizations to advance water projects, plans, and policies across the region.

Supporter: Adams County can support water strategies that may be funded, managed, or implemented by different organizations through means such as sharing information, attending meetings, and contributing expertise and resources.

> **Strategy**
>
> A **strategy** is an implementable action that addresses one or more of the identified water challenges. Strategies can take many forms but can include programs, partnerships, plans, projects, or policies.

Through the engagement process, over 45 potential strategies were identified to address the ten challenges. These strategies were prioritized into 13 priority strategies and six additional opportunities, which focus Adams County's staff time and financial resources on the top issues facing Adams County.

- **Priority Strategy:** The most important strategies to initiate over the next five years (by 2030). These strategies include foundational and time-sensitive actions that are essential for Adams County to achieve, or start addressing, to mitigate the risks associated with the top water challenges in Adams County.
- **Additional Opportunity:** The additional strategy ideas proposed and vetted by Adams County staff and leadership, water providers, and the public. Additional opportunities include lower priory strategies and strategies that may require additional political will, funding, or technological advancements. As Adams County's context and conditions change, the list of additional opportunities can serve as a starting point for evaluating viable strategies to address the top ten challenges.

As part of the strategy prioritization process, not all challenges have priority strategies and/or additional opportunities. This is a byproduct of focusing on the top strategies given available resources and is not intended to diminish the importance of any one challenge.

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Table 14 and the following sections summarize the priority strategies to initiate over the next five years, organized by water management challenge. Additional implementation details for each priority strategy are provided in the Implementation Plan Appendix.

Table 14. Adams County Water Challenges and Priority Strategies

Challenge	Priority Strategy
A. Fragmented Water and Land Use Planning and Decision-Making	A1. Update water adequacy requirements/demand standards and improve related Adams County review processes A2. Continue to work with water providers on land use planning and forecasting A3. Update development codes to promote water efficiency in new development and redevelopment A4. Create a groundwater overlay district to support sustainable development in areas with non-renewable groundwater supply
B. Limited Regional Coordination on Water	B1. Expand participation in regional water management groups and planning processes B2. Establish an Adams County-led water efficiency program in partnership with water providers
C. Limited Water Knowledge and Expertise	C1. Dedicate Adams County staff to lead water efforts across Adams County C2. Pursue water training and education for Adams County staff and leadership
D. Water Quality Impacts	D1. Guide property owners to repair/replace septic systems and/or connect to local sewer systems
E. Lack of Water Supply Diversity	E1. Support and/or partner with providers to apply for grant funds for storage, reuse, and renewable supply development
F. Water Data Availability	F1. Require observation wells or participation in a shared groundwater monitoring program for developments using Denver Basin or designated basin groundwater
G. Agricultural Water Transfer ("Buy and Dry")	G1. Leverage innovative land use and water management tools to retain valuable agricultural land and businesses
H. Water Provide Funding and Capacity Needs	H1. Explore revitalization authorities to support water-related reinvestment

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WATER MANAGEMENT STRATEGIES BY CHALLENGE

Drought and climate change are universal challenges that compound all other risks throughout Adams County. Between 1990 and 2024, the average temperature in Adams County increased by 2.4°F. Rising temperatures contribute to longer growing seasons and higher evapotranspiration demands, both of which increase irrigation water demands and, in turn, the strain non-renewable groundwater supplies. Higher temperatures also result in a higher proportion of precipitation falling as rain instead of snow, which reduces the duration of the runoff season and impacts surface water supply. Compared to temperature patterns, precipitation totals in Adams County have been more variable, without a distinct increase or decrease in annual precipitation totals over the past 30 years. This is consistent with State modeling, which shows unclear projections for precipitation patterns and totals. Despite this variability in precipitation totals, models show that even moderate increases in precipitation are not enough to overcome the impacts from increased temperatures.

Like all of Colorado, Adams County will be impacted by these changes. Water demand analysis shows an estimated 15% increase in unincorporated Adams County demands in a hotter, dryer future climate (Table 12). As a result, drought and climate change will likely act as a multiplier to the effects of every other challenge identified in this plan. For example, drought and climate change have the potential to compound the need for more coordinated decision making and regional collaboration on water issues; increase the likelihood of water quality impacts on water supply; put additional pressures on agricultural lands; and elevates the importance of diversifying supplies and repairing aging infrastructure.

Due to the cross-cutting nature of drought and climate change, these issues are addressed within each challenge area rather than through standalone strategies, with a focus on promoting water efficiency, more resilient supply, and regional coordination. More detail on all strategies and challenges presented in this chapter are provided in the Implementation Plan Appendix.


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A. FRAGMENTED WATER AND LAND USE PLANNING AND DECISION-MAKING

Fragmented water and land use planning poses a significant challenge in Adams County, which has ten incorporated communities, over 80 individual water providers, and roughly 300 self-supplied users on domestic wells. While Adams County does not have land use authority in incorporated areas, it coordinates with municipalities on development and annexation matters in municipal planning areas. However, coordinated planning and forecasting on development potential and land use capacity often happen on an ad-hoc basis, and these analyses are not routinely maintained. Furthermore, water provider boundaries often differ from municipal boundaries, compounding the challenges of coordinating water and land use planning activities.

In unincorporated Adams County – where Adams County has land use authority – some areas are poised for development and intensification. Future unincorporated demands are estimated to be around 27,000 acre-feet per year and many of these areas are likely to depend on non-renewable groundwater supplies (Table 12, Table 10). Based on the Water Availability, it is expected that these non-renewable supplies can last about 300 years; however some of these wells will face water quality issues and water availability varies geographically within the aquifer (Figure 8; Table 9).

While the State of Colorado's Division of Water Resources is responsible for issuing well permits, legally available groundwater is defined as the total volume of water that can be appropriated over a 100-year period, not 300-year years. After a recent Supreme Court ruling, local jurisdictions have the option to extend this to 300 years (known as a "300-year rule"), however they are responsible to review to the higher standard. Adams County is one of a handful of counties across Colorado that has elected to include a 300-year rule as part of their water adequacy requirements – other counties include El Paso, Arapahoe, and Elbert. Adams County also has water adequacy standards for specific developments, requiring a certain volume of water depending on the type of development.

Electing a 300-year rule, as opposed to the standard 100-year rule, encourages municipalities, subdivisions, and water providers to pursue renewable water sources, creating more robust and sustainable long-term supplies. However, it can also create challenges. A 300-year rule reduces flexibility in water supply planning and requires staff to have the expertise to review water adequacy documentation against the more rigorous standard. For developers, it can pose a barrier by making it more difficult to demonstrate sufficient long-term water availability to support new housing or commercial development. Additionally, some developers currently use non-renewable Denver Basin groundwater to support early development, with the plan to gradually transition to renewable sources as funding becomes available.

While analyses from this plan support keeping Adams County's more rigorous requirements, there are opportunities to ensure staff has the appropriate resources and knowledge to review projects according to the higher standards. Additionally, ensuring the water adequacy requirements reflect Adams County demand will help make these requirements more meaningful and impactful. Additionally, updating development and building codes to ensure developments are "water smart from the start" can increase development efficiency, while also minimizing impacts on non-renewable groundwater supplies. Finally, continuing to work with providers to understand how actual development is impacting supplies will be a key for Adams County, to make informed decisions at the intersection of water and land use.

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5-04-05-06-04 PROOF OF ADEQUATE SUPPLY*

Prior to platting, the subdivider shall demonstrate that:

1. The water rights associated with the property are sufficient to serve the proposed subdivision based on the following standards:
   - 0.3 acre-feet per year per residence;
   - 0.05 acre-feet per year per 1,000 square feet of irrigated lawn, garden, or golf course;
   - 0.01 acre-feet per year per horse or similar livestock equivalent unit; and
   - Sufficient available water to supply the proposed non-residential uses based on the estimate from the subdivider of the proposed usage and analysis by Adams County.
2. The subject land is served by a groundwater supply which is sufficient based on its priority date within the Colorado System of Water Rights Administration, the required volume can be extracted from this water right, the capacity of the water supply is sufficient to ensure no water supply shortages will occur due to variations in the hydrologic cycle, the delivery of the water supply to the development is adequate, and the water supply is dependable in quantity and quality based on a minimum useful life of three-hundred (300) years. A minimum 300-year useful life means the water supply from both a static and dynamic basis will be viable for a minimum 300-year period. The static analysis shall include evaluation of the volume of water that is appropriable for the proposed subdivision. The dynamic analysis shall evaluate whether the appropriable water supply is sustainable for three-hundred (300) years, giving consideration to the location and extent of the aquifer, as well as impacts caused by both current and future pumping by others from the aquifer. This requirement applies to individual wells and special district service plans.

*Adams County Development Standards and Regulations (June 2025)

DRAFT

STRATEGY A1. UPDATE WATER ADEQUACY REQUIREMENTS/DEMAND STANDARDS AND IMPROVE RELATED ADAMS COUNTY REVIEW PROCESSES

At the time of this plan's development, Adams County's water adequacy requirements include specific water demand requirements for certain types of development (e.g., residential, irrigated area), as well as a 300-year water supply rule for development dependent on groundwater supplies. While having water adequacy requirements is best practice, the structure of Adams County's requirements make it difficult for staff to review and enforce as the State does not review for 300 years of supply and therefore the responsibility falls Adams County staff. Updating the standards to include more specificity (e.g., specific non-residential requirements, multi-family requirements), in alignment with the Water Master Plan's water demand analysis, will increase the accuracy of the requirements. Additionally, while the results of this Plan's analysis point towards keeping the 300-year requirement, adding more specificity around what should be included to prove 300 years of supply will ensure staff has the appropriate information to evaluate the development application. Updates to Adam County's water adequacy requirements should happen in close coordination with outcomes of Strategy A4 and Strategy F1.

ADAMS COUNTY ROLE

Administrator

Convener

Funder

Partner

Supporter

RELATED ADVANCING ADAMS COMPREHENSIVE PLAN GOALS

- Goal NRE 2: Preserve and enhance surface and groundwater quality and ensure the long-term viability of groundwater supplies.
- Goal NRE 3: Proactively plan to adapt to climate change while mitigating its extent. Reduce vulnerability to, and protect people, property, and the environment from natural hazards.
- Goal NRE 4: Foster responsible resource use, from cradle to grave, including extraction, production, recycling, adaptive reuse, and disposal.
- Goal BEC 1: Support existing communities and accommodate growth and development that coordinates with local plans, is fiscally and environmentally responsible, and enhances the overall well-being of the community.
- Goal BEC 3: A built environment that meets the needs of the community while mitigating adverse impacts, recognizes known and unknown hazardous conditions, and responds to the increasing resource constraints going forward.
- Goal ED 3: Guide growth and development to targeted areas and provide compatible transitions between land uses.

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STRATEGY A2.
CONTINUE TO WORK WITH WATER PROVIDERS ON LAND USE PLANNING AND FORECASTING

Throughout the creation of this plan, 14 water providers that serve over 90% of Adams County's population and all of Adams County municipalities were engaged. A common theme amongst both providers and municipalities is the need for continued coordinated land use planning and forecasting to better understand current and future water demands as development continues throughout Adams County and annexations take place. This is especially true for the water providers that are serving unincorporated parts of Adams County and are likely to experience change in the next 15 years (Figure 24). Sharing modeling results from this plan with water providers who do not have future water demand estimates, as well as serving as a convener for future conversations around land use and its connections to water demands, will help all of Adams County better connect land use to water planning. This may include sharing information such as population forecasts, future land use maps, water data, and more.

ADAMS COUNTY ROLE

Administrator

Convener

Funder

Partner

Supporter

RELATED ADVANCING ADAMS COMPREHENSIVE PLAN GOALS

- Goal NRE 2: Preserve and enhance surface and groundwater quality and ensure the long-term viability of groundwater supplies.
- Goal NRE 3: Proactively plan to adapt to climate change while mitigating its extent. Reduce vulnerability to, and protect people, property, and the environment from natural hazards.
- Goal NRE 4: Foster responsible resource use, from cradle to grave, including extraction, production, recycling, adaptive reuse, and disposal.
- Goal BEC 1: Support existing communities and accommodate growth and development that coordinates with local plans, is fiscally and environmentally responsible, and enhances the overall well-being of the community.
- Goal BEC 3: A built environment that meets the needs of the community while mitigating adverse impacts, recognizes known and unknown hazardous conditions, and responds to the increasing resource constraints going forward.
- Goal ED 3: Guide growth and development to targeted areas and provide compatible transitions between land uses.

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STRATEGY A3. UPDATE DEVELOPMENT CODES TO PROMOTE WATER EFFICIENCY IN NEW DEVELOPMENT AND REDEVELOPMENT

Updating development codes to promote water-efficient development from the start is essential to sustainable water management. Code updates may take the form of updating requirements to promote water-wise landscapes or updating building codes to ensure installation of efficient plumbing fixtures. Prioritizing these changes as part of the current 2025 land use code update, and updating codes in the future as new best practices and technologies are identified, will ensure that developments are water efficient, resulting in lower water demand and less reliance on non-renewable groundwater supplies in unincorporated areas. Promoting water efficiency in new development was also identified as a key strategy in the Advancing Adams Comprehensive Plan (NRE 2.1.03 and NRE 2.1.04).

ADAMS COUNTY ROLE

Administrator

Convener

Funder

Partner

Supporter

RELATED ADVANCING ADAMS COMPREHENSIVE PLAN GOALS

- Goal NRE 2: Preserve and enhance surface and groundwater quality and ensure the long-term viability of groundwater supplies.
- Goal NRE 3: Proactively plan to adapt to climate change while mitigating its extent. Reduce vulnerability to, and protect people, property, and the environment from natural hazards.
- Goal NRE 4: Foster responsible resource use, from cradle to grave, including extraction, production, recycling, adaptive reuse, and disposal.
- Goal BEC 3: A built environment that meets the needs of the community while mitigating adverse impacts, recognizes known and unknown hazardous conditions, and responds to the increasing resource constraints going forward.

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STRATEGY A4. CREATE A GROUNDWATER OVERLAY DISTRICT TO SUPPORT SUSTAINABLE DEVELOPMENT IN AREAS WITH NON-RENEWABLE GROUNDWATER SUPPLY

Overall, Adams County has adequate water supply to meet demands, yet certain areas of Adams County may see significant declines in well yields and are at greater risk of having limited access to high-quality water in the future. Groundwater overlay districts can help protect and preserve non-renewable groundwater resources by establishing area-specific development standards, regardless of the underlying zoning. Groundwater overlay districts allow for more specific requirements where they are needed most, providing greater discretion to restrict development in areas without sustainable water supply. Additional requirements associated with a groundwater overlay district may include well monitoring or testing prior to development, more rigorous water demand standards, and additional or more specific documentation to prove adequate and reliable supply. Informed by this Plan's analysis, Adams County can determine the boundaries of the groundwater overlay, as well as which types of requirements are most suitable, to ensure adequate supply for developments that are dependent on non-renewable Denver Basin groundwater. Development of an overlay district should happen in close coordination with the outcomes of Strategy A1.

ADAMS COUNTY ROLE

Administrator

Convener

Funder

Partner

Supporter

RELATED ADVANCING ADAMS COMPREHENSIVE PLAN GOALS

- Goal NRE 2: Preserve and enhance surface and groundwater quality and ensure the long-term viability of groundwater supplies.
- Goal NRE 3: Proactively plan to adapt to climate change while mitigating its extent. Reduce vulnerability to, and protect people, property, and the environment from natural hazards.
- Goal NRE 4: Foster responsible resource use, from cradle to grave, including extraction, production, recycling, adaptive reuse, and disposal.
- Goal BEC 1: Support existing communities and accommodate growth and development that coordinates with local plans, is fiscally and environmentally responsible, and enhances the overall well-being of the community.
- Goal BEC 3: A built environment that meets the needs of the community while mitigating adverse impacts, recognizes known and unknown hazardous conditions, and responds to the increasing resource constraints going forward.
- Goal ED 3: Guide growth and development to targeted areas and provide compatible transitions between land uses.

ADDITIONAL OPPORTUNITIES

No additional opportunities were prioritized for this strategy.

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B. LIMITED REGIONAL COORDINATION ON WATER

Adams County is Colorado's fifth largest county by land area with a population of more than 500,000 residents. With Denver suburbs, as well as a robust agricultural economy, Adams County has a blend of urban and rural characteristics that make coordination, especially on topics like water, uniquely challenging. Adams County has over 80 different water providers – the sixth greatest number of water providers for any county in Colorado. The largest 15 of these serve most of Adams County's population, with the remaining providers serving an average population of just 530 people per system. While all the water providers face increasing challenges related to aging infrastructure, increasing regulatory standards, and costs of service delivery, many of the smallest providers lack resources to comprehensively address these challenges, and therefore stand to benefit from regional collaboration and problem-solving. Finding ways to improve efficiency and effectiveness of planning, water-related programming, infrastructure development and maintenance, and service delivery across jurisdictions and water providers can unlock opportunities to increase sustainable water management across Adams County. Longer-term, exploring opportunities for formal partnerships and potentially consolidated service delivery for interested entities could help water providers with limited resources remain viable into the future.

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STRATEGY B1.
EXPAND PARTICIPATION IN REGIONAL WATER MANAGEMENT GROUPS AND PLANNING PROCESSES

There are several groups that conduct regional water management pertinent to Adams County. For instance, the South Platte Basin Roundtable and the Metro Basin Roundtable convene regularly to facilitate regional discussions on water management issues and encourage locally driven, collaborative solutions. Currently, the Board of County Commissioners (BoCC) is tasked with participating in the Basin Roundtables. This strategy recommends broader, more intentional participation from Adams County, including from Adams County leadership (BoCC) and Adams County staff (both Community and Economic Development and Public Works). Active participation in these groups will help ensure Adams County-specific water management perspectives and needs are represented in regional discussions. Additionally, expanding participation across a variety of Adams County positions will increase the knowledge and expertise of relevant staff members and decision-makers, supporting Strategy C2. In addition to the basin roundtables, organizations like the Mile High Flood District conduct regional watershed planning and are important partners in addressing Countywide watershed issues, like stormwater management and water quality.

ADAMS COUNTY ROLE

Administrator

Convener

Funder

Partner

Supporter r

RELATED ADVANCING ADAMS COMPREHENSIVE PLAN GOALS

- Goal NRE 1: Facilitate the protection and restoration of natural areas and ecosystems to improve habitat connectivity, sensitive lands, and natural habitats while enhancing the quality of life and shaping urban areas.
- Goal NRE 2: Preserve and enhance surface and groundwater quality and ensure the long-term viability of groundwater supplies.
- Goal NRE 3: Proactively plan to adapt to climate change while mitigating its extent. Reduce vulnerability to, and protect people, property, and the environment from natural hazards.
- Goal NRE 4: Foster responsible resource use, from cradle to grave, including extraction, production, recycling, adaptive reuse, and disposal.
- Goal BEC 1: Support existing communities and accommodate growth and development that coordinates with local plans, is fiscally and environmentally responsible, and enhances the overall well-being of the community.
- Goal BEC 3: A built environment that meets the needs of the community while mitigating adverse impacts, recognizes known and unknown hazardous conditions, and responds to the increasing resource constraints going forward.
- Goal ED 3: Guide growth and development to targeted areas and provide compatible transitions between land uses.
- Goal ED 3: Guide growth and development to targeted areas and provide compatible transitions between land uses.

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STRATEGY B2. ESTABLISH AN ADAMS COUNTY-LED WATER EFFICIENCY PROGRAM IN PARTNERSHIP WITH WATER PROVIDERS

Many larger water providers offer water efficiency programming to their customers. However, many Adams County community members, such as those served by smaller providers or those who receive water from a well, do not have access to water efficiency programs. Of Adam County's providers, over 80% do not have water efficiency programming, mostly due to resource limitations. This strategy focuses on exploring partnerships, funding mechanisms, and program structures to increase access to water efficiency programs across Adams County. Programming could be geared toward residential customers, commercial customers, or both. Additionally, programming could be targeted at market rate customers, income-qualified customers, or both. Examples of programming include, but are not limited to, water audits, irrigation assessments, high-efficiency toilet rebates, or turf replacement rebates.

ADAMS COUNTY ROLE

Administrator

Convener

Funder

Partner

Supporter

RELATED ADVANCING ADAMS COMPREHENSIVE PLAN GOALS

- Goal NRE 2: Preserve and enhance surface and groundwater quality and ensure the long-term viability of groundwater supplies.
- Goal NRE 3: Proactively plan to adapt to climate change while mitigating its extent. Reduce vulnerability to, and protect people, property, and the environment from natural hazards.
- Goal NRE 4: Foster responsible resource use, from cradle to grave, including extraction, production, recycling, adaptive reuse, and disposal.

ADDITIONAL OPPORTUNITIES

- Explore opportunities to support under-resourced water providers, such as through partnerships, joint projects, and/or consolidation of districts, services and/or infrastructure when applicable

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C. LIMITED WATER KNOWLEDGE AND EXPERTISE

Having the necessary information and expertise is critical to making informed decisions about water policy, programming, investments, and more. In Adams County, there are opportunities to enhance technical knowledge at all levels, including the public, Adams County staff, and community leaders. Feedback from water providers and the public point to an opportunity to enhance connections between water management and land use planning decisions. Increased knowledge will also mitigate impacts from other challenges, particularly those described in Fragmented Water and Land Use Planning and Decision-Making.

STRATEGY C1.
DEDICATE ADAMS COUNTY STAFF TO LEAD WATER EFFORTS ACROSS ADAMS COUNTY

There are several priority strategies in this plan that necessitate additional staff time and expertise. This strategy recommends dedicating staff resources (estimated to be at least one full-time equivalent (FTE) employee) to provide direct support of all strategies included in this plan.

Additional staff time and expertise may be met through the creation of a new position, reallocation of responsibilities and time for existing position(s), and/or consulting support. Leading Adams County's water efforts will require staff with the appropriate skill sets and expertise to accomplish the scope of work of these core strategies. However, additional staff resource(s) could also provide as-needed supplemental support for other strategies in this plan. The staff resource(s) could help to coordinate implementation efforts across the plan, providing a centralized infrastructure for implementation and plan monitoring and reporting.

Dedicating staff resources is not intended to be a replacement for comprehensive staff and leadership training and education (see Strategy C2)

ADAMS COUNTY ROLE

Administrator

Convener

Funder

Partner

Supporter

RELATED ADVANCING ADAMS COMPREHENSIVE PLAN GOALS

- Goal NRE 2: Preserve and enhance surface and groundwater quality and ensure the long-term viability of groundwater supplies.
- Goal NRE 3: Proactively plan to adapt to climate change while mitigating its extent. Reduce vulnerability to, and protect people, property, and the environment from natural hazards.
- Goal NRE 4: Foster responsible resource use, from cradle to grave, including extraction, production, recycling, adaptive reuse, and disposal.

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STRATEGY C2.
PURSUE WATER TRAINING AND EDUCATION FOR ADAMS COUNTY STAFF AND LEADERSHIP

To make better informed decisions about water and land use planning, Adams County staff and leadership can build in-house expertise by pursuing water management training for Adams County staff and leadership (e.g., BoCC and Planning Commission). Developing expertise across departments and at all levels — from frontline staff to decision-makers — will help elevate water literacy across the organization. It also strengthens organizational resilience by ensuring that knowledge and leadership don't rest with just one person or team. Training and education should focus on developing a standard baseline of knowledge of water management contexts and challenges for the State and Adams County and the nexus between land use planning and water management. Additional technical training may be useful for individual staff members, departments, and/or decision-making bodies that interface with communities served by non-renewable groundwater supplies.

ADAMS COUNTY ROLE

Administrator

Convener

Funder

Partner

Supporter

RELATED ADVANCING ADAMS COMPREHENSIVE PLAN GOALS

- Goal NRE 2: Preserve and enhance surface and groundwater quality and ensure the long-term viability of groundwater supplies.
- Goal NRE 3: Proactively plan to adapt to climate change while mitigating its extent. Reduce vulnerability to, and protect people, property, and the environment from natural hazards.
- Goal NRE 4: Foster responsible resource use, from cradle to grave, including extraction, production, recycling, adaptive reuse, and disposal.

ADDITIONAL OPPORTUNITIES

No additional opportunities were prioritized for this strategy.

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D. WATER QUALITY IMPACTS

Water quality issues present a growing challenge to water supply, both at the local level and across broader watersheds. In Adams County, oil and gas activities, landfills, industrial pollution, and stormwater runoff present potential sources of local groundwater and surface water contamination. More broadly, watershed threats such as wildfire impacts and the spread of invasive species can further degrade water sources, complicating treatment processes and straining already limited supplies. As Adams County continues to grow and groundwater levels decline, some water providers and self-supplied users may have to access deeper aquifers, like the Laramie Fox Hills Aquifer, that is estimated to make up 56% of Adams County's physical available supply. However, water quality tends to degrade in these deeper Denver Basin aquifers, due to increased mineralization and prolonged rock interactions over time. Lower water quality in basins will require increased treatment complexity, resulting in increasing future treatment costs. Strategies that maintain Adams County's water quality, across all sources of water supply, will ensure that available supplies can be safely used. This includes Strategy B1, E1, and F10.

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STRATEGY D1.
GUIDE PROPERTY OWNERS TO REPAIR/REPLACE SEPTIC SYSTEMS AND/ OR CONNECT TO LOCAL SEWER SYSTEMS

Septic systems are onsite wastewater treatment systems installed on properties that are not served by a wastewater utility. Aging septic systems that are not properly maintained pose a significant risk to local environmental health. Failing and malfunctioning systems can release contaminants into the soil and groundwater table, which can pose a significant risk to the long-term health of groundwater sources that are utilized across Adams County. Properly designed conventional septic systems need relatively little maintenance to continue functioning properly, but septic systems with advanced treatment components usually require more intensive maintenance to continue to remove contaminants as intended.

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Adams County Health Department has regulatory authority over the septic system permitting process for new septic systems and septic system repairs. Adams County Health Department also currently requires septic system use permits for property sales, changes of ownership, changes in property use (i.e., a residence to a business), addition of bedrooms, additions of separate “modular” homes, and other reasons deemed necessary by the Department. To obtain a use permit, the property owner must have their septic system inspected, and any significant deficiencies in the system must be repaired. In addition to this, Adams County Health Department also requires regular inspections and maintenance of most septic systems with advanced treatment components to ensure these systems are functioning as designed. Records related to septic system permitting, including inspection reports, can be found on the Health Department website.

While Adams County Health Department actively provides information about septic system maintenance and repair to homeowners, expanding the outreach efforts to property owners could help reduce the risk of groundwater contamination by a lack of maintenance. For example, regular septic tank pumping is essential to prevent premature system failure. Although this maintenance is expensive, it is typically far less expensive than repairing a septic system. Many homeowners may not be aware that this upkeep is necessary and therefore may neglect it. Informing homeowners that regular pumping can extend the life of their system, and save money overtime, may encourage more consistent maintenance and reduce the risk of groundwater contamination from failing septic systems.

Adams County can also play an elevated role during the review of development projects, encouraging connections to local wastewater services, even when not required. Furthermore, Adams County could coordinate with wastewater service providers and reach out to nearby property owners when service line expansions are in the planning stages, to encourage service connections and construction coordination. Strategy H1 may also be able to provide financial support to cover the costs of homeowners connecting to public water systems, when feasible.

ADAMS COUNTY ROLE

Administrator

Convener

Funder

Partner

Supporter

RELATED ADVANCING ADAMS COMPREHENSIVE PLAN GOALS

- Goal NRE 2: Preserve and enhance surface and groundwater quality and ensure the long-term viability of groundwater supplies.
- Goal NRE 4: Foster responsible resource use, from cradle to grave, including extraction, production, recycling, adaptive reuse, and disposal.
- Goal BEC 3: A built environment that meets the needs of the community while mitigating adverse impacts, recognizes known and unknown hazardous conditions, and responds to the increasing resource constraints going forward.

ADDITIONAL OPPORTUNITIES

No additional opportunities were prioritized for this strategy.

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E. LACK OF WATER SUPPLY DIVERSITY

Within Adams County, over 60% of water providers depend on groundwater resources and a sizable number receive water from a wholesale provider (Figure 12). Additionally, almost all self-supplied users are wholly dependent on groundwater. These water providers and users are particularly vulnerable to drought, changes in water administration rulings, contamination, and/or water shortages. For example, given current pumping rates, some areas of Adams County are already experiencing declining water levels of 30 to 100 feet per decade, bringing into question the long-term viability of the source of supply. Additionally, while the modeling results of this Plan point towards Adams County having adequate non-renewable groundwater supplies to meet demands, this is limited to 300 years of supply and will likely require drilling deeper wells into aquifers with poorer water quality. Strategic diversification of non-renewable supplies will increase Adams County's overall resilience. Additional strategies to support providers without diverse water supply include improving communication in times of shortage and preserving non-renewable supplies for areas that do not have alternative supply options.

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STRATEGY E1. SUPPORT AND/OR PARTNER WITH PROVIDERS TO APPLY FOR GRANT FUNDS FOR STORAGE, REUSE, AND RENEWABLE SUPPLY DEVELOPMENT

As development in Adams County continues, and water supplies become more constrained, new and innovative solutions will be required to diversify water supplies and to use current supplies more efficiently. Solutions like storage and reuse can improve the resilience of some systems. For example, one promising strategy for prolonging the usefulness of the Denver Basin aquifers is the adoption of aquifer storage and recovery (ASR). ASR is a water management technique that involves storing water in an underground aquifer during times of surplus (e.g., wet seasons) and recovering it for use during times of need (e.g., droughts or peak demand periods). Encouraging or incentivizing the retrofitting of existing wells with ASR capabilities could help recharge depleted aquifers, improve system resilience, and maintain groundwater availability for future generations.

That said, while new strategies like ASR improve overall resilience, new water resilient infrastructure and projects are expensive. Many providers face financial barriers including the need to invest in aging infrastructure and the need to comply with new State and federal regulations. Grant funding can provide support for programs and projects focused on diversifying water supplies and water efficiency. While Adams County may not be a financial backer for these projects, Adams County could support providers by partnering on grant applications, with the level of support ranging from providing a letter of support to co-sponsoring a grant application. This could be especially beneficial for smaller systems with limited staff and capacity and/or for single projects that support multiple providers.

ADAMS COUNTY ROLE

Administrator

Convener

Funder

Partner

Supporter

RELATED ADVANCING ADAMS COMPREHENSIVE PLAN GOALS

- Goal NRE 2: Preserve and enhance surface and groundwater quality and ensure the long-term viability of groundwater supplies.
- Goal NRE 3: Proactively plan to adapt to climate change while mitigating its extent. Reduce vulnerability to, and protect people, property, and the environment from natural hazards.
- Goal NRE 4: Foster responsible resource use, from cradle to grave, including extraction, production, recycling, adaptive reuse, and disposal.

ADDITIONAL OPPORTUNITIES

- Support providers in identifying additional supplies, with a focus on renewable supplies, reuse, and large regional projects that reduce competition for native supplies
- Support water shortage/drought response plans and emergency water connections for water providers across Adams County

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F. WATER DATA AVAILABILITY

A lack of accessible, high-quality water data presents a substantial challenge for accurately baselining and monitoring both water supply and quality - including groundwater and surface water. This challenge is particularly impactful for communities and water providers reliant on non-renewable groundwater, as it makes it difficult to monitor and regulate unsustainable groundwater pumping. Site-specific aquifer properties and regional pumping patterns strongly influence the severity of aquifer decline. Overtime, some areas of Adams County could show minimal change to aquifer levels while others may experience sharp drops. While the groundwater analysis performed for this Plan can serve as a starting point, developing a long-term, consistent groundwater monitoring program is essential to inform planning decisions. Access to high-quality groundwater quality and quantity data would also support the implementation of Adams County's 300-year rule. Finally, widespread access to this data would benefit smaller providers who lack the resources to monitor groundwater on their own.

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STRATEGY F1.
REQUIRE OBSERVATION WELLS OR PARTICIPATION IN A SHARED GROUNDWATER MONITORING PROGRAM FOR DEVELOPMENTS USING DENVER BASIN OR DESIGNATED BASIN GROUNDWATER

Currently, Adams County does not require new developments to install groundwater observation wells, nor is there a regional groundwater monitoring program in place. As Adams County continues to grow, new developments reliant on non-renewable groundwater will increase the strain on groundwater resources.

Aquifer decline varies across Adams County, highlighting the need for a robust, long-term groundwater monitoring program. This could include retrofitting and regularly measuring existing wells, requiring monitoring wells for new developments that rely on Denver Basin groundwater, and publishing Adams County-led groundwater reports. Better data would help identify areas at risk of depletion, support smaller providers in demonstrating supply viability, and inform decisions like enforcing the 300-year rule. Updates to any requirements associated with this strategy should happen in close coordination with the outcomes of Strategy A4.

ADAMS COUNTY ROLE

Administrator

Convener

Funder

Partner

Supporter

RELATED ADVANCING ADAMS COMPREHENSIVE PLAN GOALS

- Goal NRE 2: Preserve and enhance surface and groundwater quality and ensure the long-term viability of groundwater supplies.
- Goal NRE 3: Proactively plan to adapt to climate change while mitigating its extent. Reduce vulnerability to, and protect people, property, and the environment from natural hazards.
- Goal NRE 4: Foster responsible resource use, from cradle to grave, including extraction, production, recycling, adaptive reuse, and disposal.

ADDITIONAL OPPORTUNITIES

No additional opportunities were prioritized for this strategy.

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G. AGRICULTURAL WATER TRANSFER (“BUY AND DRY”)

The sale of water from agricultural lands to support municipal growth can negatively impact the agriculture economy, availability of local food supply, and ecosystem health, especially when residual agricultural land is not revegetated. Continued growth and development across the Front Range and scarcity of new water supplies is putting pressure on all irrigated agricultural land, both in and outside of Adams County (Figure 23). These pressures lead to water rights transfers from agricultural to municipal uses, which is commonly referred to as “buy and dry.” According to the Baseline Report, the percentage of irrigated land in Adams County declined by 52% between 1987 and 2020. Based on this plan’s analysis strained agricultural areas are projected to experience a 40% reduction in irrigated acreage by 2040 (Table 9). With continued growth and increased water availability concerns, pressure for agricultural water transfers will continue, which could lead to declines in land used for agricultural purposes both in Adams County and surrounding areas.

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STRATEGY E1. LEVERAGE INNOVATIVE LAND USE AND WATER MANAGEMENT TOOLS TO RETAIN VALUABLE AGRICULTURAL LAND AND BUSINESSES

Adams County's zoning map defines three agricultural zone districts (A-1, A-2, and A-3) and the associated standards define the purpose, permitted uses, and development standards for each agricultural zone district. These zone districts support limited rural development and agricultural operations, but more can be done to proactively strengthen and conserve the viability of Adams County's prime/productive agricultural lands, especially irrigated agriculture in areas with adequate water resources. This strategy begins with identifying prime, productive, and historic agricultural areas within Adams County. Next, it involves evaluating land use tools such as conservation easements, overlay zoning, and/or a transfer of development rights (TDR) program to redirect future growth and development away from vital agricultural areas so that they can be conserved for agricultural uses long-term.

It also focuses on updating Adams County's Development Standards and coordinating with municipalities on land use regulations to expand market pathways for agricultural producers, making it easier for producers to access farm stands and markets and engage in agritourism activities. Updates to Adams County's Development Standards could also simplify pathways for renewable energy production on agricultural lands, such as agrivoltaics developments, providing agricultural producers with opportunities for diversified income. Finally, the process of identifying prime and historical agricultural areas, may also help unearth opportunities to explore Cooperative Water Sharing Agreements (CWSAs) and connect different water users.

Importantly, Adams County has already done some of this work. Through a partnership between Adams County and City of Brighton, the Historic Splendid Valley is an area focused on preserving farmland and creating closer connections between people, farming, and nature. Through the District Plan, the partners are working to preserve agricultural land and heritage, encourage local food production, and promote agritourism. The District Plan identifies land use tools such as cluster development standards, TDR program development, conservation easements, zoning overlays, design guidelines, and historic preservation as ways to support the area's agricultural heritage and goals.

ADAMS COUNTY ROLE

Administrator

Convener

Funder

Partner

Supporter

RELATED ADVANCING ADAMS COMPREHENSIVE PLAN GOALS

- Goal NRE 1: Facilitate the protection and restoration of natural areas and ecosystems to improve habitat connectivity, sensitive lands, and natural habitats while enhancing the quality of life and shaping urban areas.
- Goal NRE 4: Foster responsible resource use, from cradle to grave, including extraction, production, recycling, adaptive reuse, and disposal.
- Goal BEC 1: Support existing communities and accommodate growth and development that coordinates with local plans, is fiscally and environmentally responsible, and enhances the overall well-being of the community.
- Goal ED 3: Guide growth and development to targeted areas and provide compatible transitions between land uses.
- Goal CH 1: Ensure agriculture is supported with adequate allocation of area for future land uses and zoning, preservation practices, economic development, access and distribution, and technological innovations.

ADDITIONAL OPPORTUNITIES

No additional opportunities were prioritized for this strategy.

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H. WATER PROVIDER FUNDING AND CAPACITY NEEDS

Water providers are increasingly strained by major challenges such as aging infrastructure, the need to comply with new and complex regulations (e.g., Lead and Copper Rule Improvements, Maximum Contaminant Levels for PFOA and PFOS), and the need to deliver programming (e.g., education, water efficiency studies) with limited resources. In some cases, these needs are outpacing the capacity and funding available to water providers, putting pressure on their ability to maintain high-quality and reliable water services. Of the providers surveyed, many expressed that Adams County could assist providers through technical support and implementation of financial assistance programs (see the Engagement Summary Appendix). A majority of the surveyed providers voted that an expansion of the Low Income Energy Assistance Program (LEAP) to include water affordability assistance would benefit providers and members of the community (see Strategy B2). Others indicated that securing additional funding for water projects would be beneficial (see Strategy E1).

STRATEGY H1. EXPLORE REVITALIZATION AUTHORITIES TO SUPPORT WATER-RELATED REINVESTMENT

In 2024, Colorado approved House Bill 24-1172, which allows counties to establish revitalization authorities. These authorities provide the opportunity to use tax increment financing (TIF), along with private financing, to support county revitalization projects. Revitalization authorities and TIF are tools that have been successfully used in municipalities in Colorado – expanding them for county use provides a new opportunity for Adams County to coordinate with water providers and other jurisdictions and special districts to create Adams County revitalization plan(s) to drive reinvestment, especially in unincorporated areas. This could include upgrading aging water treatment and distribution infrastructure, supporting transitions away from individual wells and/or septic systems, and even supporting water efficiency for agricultural and other large water users.

ADAMS COUNTY ROLE

Administrator

Convener

Funder

Partner

Supporter

RELATED ADVANCING ADAMS COMPREHENSIVE PLAN GOALS

- Goal BEC 1: Support existing communities and accommodate growth and development that coordinates with local plans, is fiscally and environmentally responsible, and enhances the overall well-being of the community.

ADDITIONAL OPPORTUNITIES

- When data are available, support water providers to encourage conservation-oriented tap fees for new development.

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I. AGING WATER INFRASTRUCTURE

Aging infrastructure presents a challenge to most water providers, and can lead to water loss, costly infrastructure failures, and water quality issues. When surveyed, 68% of Adams County water providers that responded indicated that aging infrastructure was one of their top risks, with the impacts of the risk compounded by rising costs for infrastructure replacement and development (see the Engagement Summary Appendix). Mobile home communities, manufactured home communities, and smaller water providers are particularly susceptible to this challenge. Smaller systems have significant financial constraints and require efficient planning for long-term infrastructure improvement costs. Smaller water providers also have limited staff capacity and often do not have the resources to develop long-term planning documents like a capital improvement or emergency preparedness plan. As financial and infrastructure challenges continue, supporting these smaller providers will be particularly important for sustainable water management in the future.

While Adams County recognizes the importance of this challenge, no priority strategies were identified; however, the related Strategy H1 could provide funding for projects aimed at replacing aging infrastructure and supporting smaller providers.

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ADDITIONAL OPPORTUNITIES

- Enhance/improve coordination processes to align water infrastructure improvements with Adams County capital improvements
- Explore opportunities for Adams County to coordinate water emergency preparedness and response planning and activities (e.g., cybersecurity, terrorism, emergency water shutoffs/water distribution programs, etc.)

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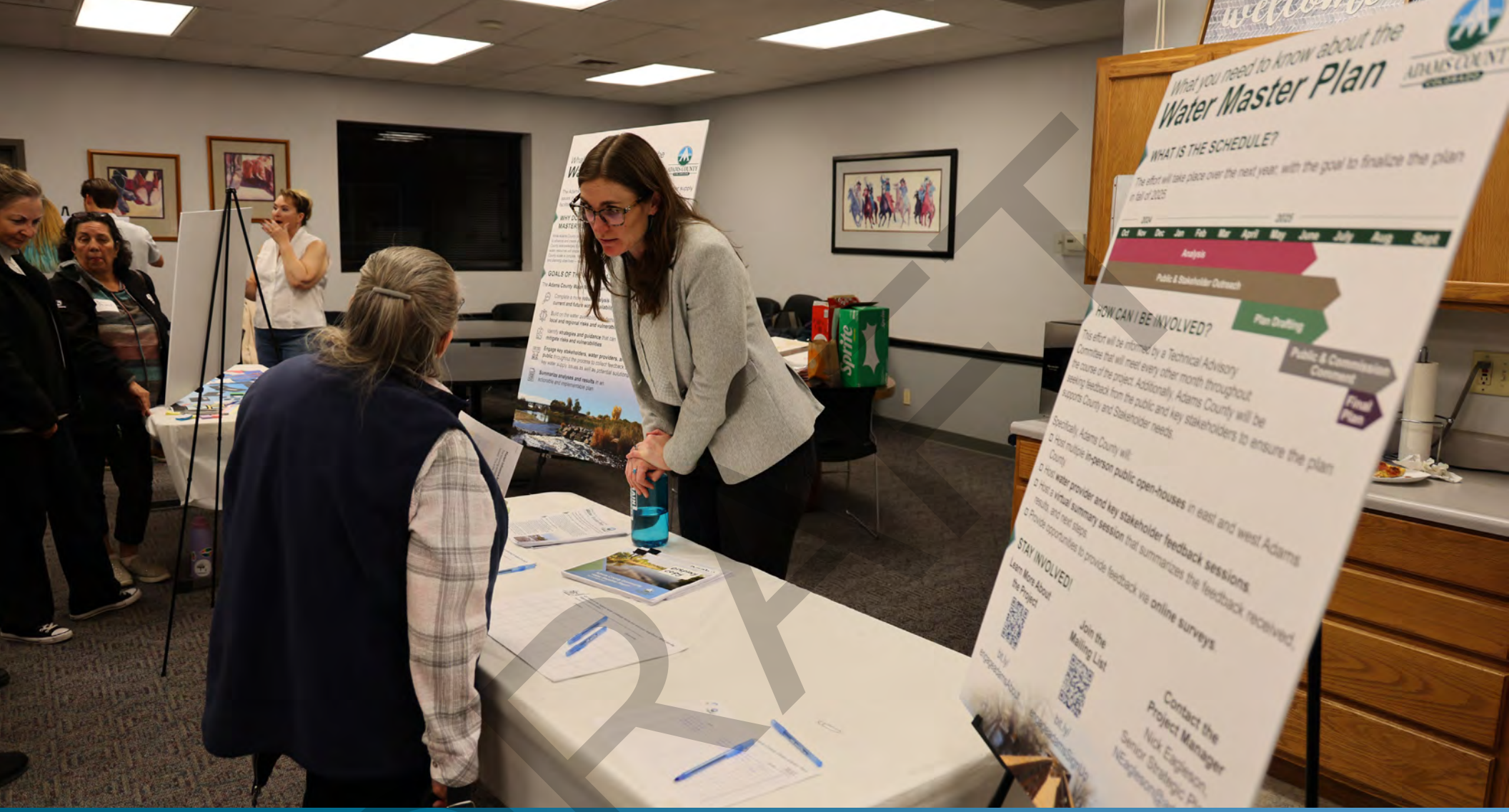

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Chapter 6

IMPLEMENTATION NEXT STEPS

Chapter Contents

The Adams County Water Master Plan identifies 13 priority strategies to be initiated over the next five years. The table outlines strategies identified for initiation in Year 1, emphasizing the importance of getting them underway based on factors highlighted in Table 11. Strategies are listed in the order they appear in the plan, not by implementation priority, which may shift over time as needs evolve. Implementation details can be found in the Implementation Plan Appendix.

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6.1 RESOURCES TO SUPPORT PLAN IMPLEMENTATION

Adams County has a critical role to play in bringing the Water Master Plan to life by committing internal resources and aligning institutional priorities to support implementation. Adams County can harness its own resources to support implementation in several ways, including:

- Reallocating staff time and responsibilities to prioritize water strategy implementation across departments.
- Aligning water strategy priorities with annual Adams County budget and Capital Improvement Plan cycles.
- Hiring or procuring the necessary expertise to support plan implementation.
- Reviewing and updating Capital Improvement Plan (CIP) criteria to reflect water-related goals.

Table 15 Legend

Table 15 provides a high-level estimate of staffing requirements, upfront investment, and ongoing investment necessary to support each strategy.

Staffing Requirement: identifies how much staff time a strategy may require. Staff time may be met between some combination of reallocating responsibilities of existing staff, procuring consulting services, or hiring additional employees..

- Low: Would require 0-0.25 FTE
- Medium: Would require .25-1 FTE
- High: Would require >1.0 FTE

Upfront Investment: identifies how much initial investment a strategy may require (e.g., capital improvement, procurement of supplies.

- None: no expected ongoing annual cost
- Low: Some upfront investment, less than $10,000
- Medium: Upfront investment between $10,000-$50,000
- High: Upfront investment greater than $50,000

Ongoing (Annual) Cost: identifies any ongoing annual costs beyond the upfront investment cost (e.g., annual program funding requirements).

- None: No expected ongoing annual cost
- Low: Some ongoing cost, less than $10,000
- Medium: Ongoing cost between $10,000-$50,000
- High: Ongoing cost greater than $50,000

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Table 15. Resource Requirements by Strategy

Strategy	Year 1 Priority	Staff Requirement	Upfront Investment	Ongoing Annual Cost
Strategy A1. Update water adequacy requirements/demand standards and improve related Adams County review processes	Y	👤👤👤	$$$	-
Strategy A2. Continue to work with water providers on land use planning and forecasting	Y	👤👤	-	-
Strategy A3. Update development codes to promote water efficiency in new development and redevelopment	Y	👤👤	$$	-
Strategy A4. Create a groundwater overlay district to support sustainable development in areas with non-renewable groundwater supply	N	👤👤👤	$$	-
Strategy B1. Expand participation in regional water management groups and planning processes	N	👤	-	-
Strategy B2. Establish an Adams County-led water efficiency program in partnership with water providers	N	👤👤👤	$$$	$ $ $
Strategy C1. Dedicate Adams County staff to lead water efforts across Adams County	Y	👤👤👤	-	-
Strategy C2. Pursue water training and education for Adams County staff and leadership	Y	👤	$	$
Strategy D1. Guide property owners to repair/replace septic systems and/or connect to local sewer systems	N	👤	$	$
Strategy E1. Support and/or partner with providers to apply for grant funds for storage, reuse, and renewable supply development	Y	👤	-	-
Strategy F1. Require observation wells or participation in a shared groundwater monitoring program for developments using Denver Basin or designated basin groundwater	N	👤	$$	$
Strategy G1. Leverage innovative land use and water management tools to retain valuable agricultural land and businesses	N	👤👤👤	$$$	$ $
Strategy H1. Explore revitalization authorities to support water-related reinvestment	Y	👤👤👤	$$$	$

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6.2 KEEPING THE WATER MASTER PLAN UP TO DATE

Maintaining an up-to-date Water Master Plan is essential to ensure this Plan will remain relevant, actionable, and aligned with the latest data, community priorities, and funding opportunities. It is recommended that the analysis for this Plan, and a comprehensive review of strategies and implementation progress, is revisited every five years[8], with a more detailed review occurring every 10 years, ideally in alignment with comprehensive plan updates.

6.3 TRACKING AND REPORTING

Additionally, it is recommended that Adams County staff prepare an annual update to the Board of County Commissioners and Planning Commission to report on implementation progress and key outcomes from the year prior. Updates should include a summary of:

1. Priority strategies in focus for the previous year
2. Key implementation steps taken to advance priority strategies
3. Any major "wins" or lessons learned
4. Priority strategies in focus for the upcoming year
5. Any additional opportunities to consider elevating to priority strategy for the upcoming year

Major implementation wins and success stories can also be reported to the public through the Sustainability Plan Annual Report, the Adams County Annual Report, or via the Adams County website.

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8 SB24-174 legislation requires the analysis associated with water elements of comprehensive plans be reviewed every five years.

6.4 LIVING PLAN

In addition to periodic, holistic updates, this plan can be viewed as a living document, with the ability to adapt priority strategies and strategy details as implementation unfolds. For instance, some of the **additional opportunities** identified within each challenge may be elevated to "priority" status over the next five years to take advantage of new funding opportunities, changes in regional or Adams County priorities, or other contextual factors. The **strategy implementation action plans** outlined in the Implementation Plan Appendix are also designed with flexibility in mind. Each priority strategy has a detailed implementation plan that provides examples of the desired outcome for the strategy and a high-level roadmap for implementing the strategy. However, there are many ways to implement priority strategies in this Plan, and lead implementers are encouraged to adapt the implementation details as needed.

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APPENDICES

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GLOSSARY OF KEY TERMS

Alluvial Groundwater

Water stored in permeable materials such as sand and gravel adjacent to rivers. This groundwater is hydrologically connected to surface flows, meaning streamflow directly contributes to aquifer recharge and, conversely, groundwater pumping can deplete nearby surface water. See also: tributary groundwater.

Augmentation Plans

In an over appropriated system, a court-approved augmentation plan is required to get a well permit for withdrawal of tributary (stream-connected) groundwater or to obtain a new surface diversion. Augmentation plans allow for out-of-priority diversions by providing replacement water in terms of time, place, quantity, and quality (Kurath, 2015; Colorado State University, 2023).

Beneficial Use

As defined by the 1969 Water Right Determination and Administration Act - *Beneficial use is the use of that amount of water that is reasonable and appropriate under reasonably efficient practices to accomplish without waste the purpose for which the appropriation is lawfully made (C.R.S. 37-92-101 et seq.).* This definition is purposely flexible to allow for a variety of uses. Common beneficial uses include (Colorado State University , 2023):

- Augmentation
- Fish and Wildlife Culture
- Power Generation
- Colorado Water Conservation Board Instream Flows and Natural Lake Levels
- Flood Control
- Recreation on Reservoirs
- Commercial
- Industrial
- Recreational In-Channel Diversions
- Domestic
- Irrigation
- Release from Storage for Boating and Fishing
- Dust Suppression
- Mined Land Reclamation
- Snowmaking
- Evaporation from a Gravel Pit
- Municipal
- Stock Watering
- Fire Protection
- Oil and Gas Production
- Water Storage

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Buy and Dry

The sale of water rights from agricultural uses to other, most often municipal, uses that results in the "dry up" of agricultural lands.

Colorado Ground Water Commission (CGWC)

Regulatory and adjudicatory body authorized by the General Assembly to manage and control groundwater within the eight Designated Groundwater basins in eastern Colorado. Under Title 37, Article 90 of the Colorado Revised Statues the CGWC has authority to adjudicate water rights and issue large capacity well permits. The CGWC also has authority to create Ground Water Management Districts within predetermined designated groundwater basins. The CGWC has delegated most of its functions to the State Engineer. However it has not delegated determination of designated groundwater basins, creation of management districts, adoption of policy, or approval of variances from rules (Colorado Division of Water Resources, 2023).

Conditional Water Right

A water right appropriation that has started but has not been finalized. The owner has the right to use the water as outlined in the decree but has not actually put the water to beneficial use. To make conditional water right absolute, water must be put to a beneficial use. Proof of use must be provided to the Colorado Water Court (Kurath, 2015).

Conjunctive Use

The coordinated management of surface water and groundwater supplies to optimize water availability, reliability, and long-term sustainability. For example, a water provider may utilize surface water supplies when available (e.g., during spring runoff) while relying on groundwater during dry periods, droughts, or when surface water supplies are limited.

Consumptive Use

The portion of water that is diverted from a source and not returned to the original system because it is fully consumed through processes such as evaporation, plant uptake (transpiration), incorporation into products, or human use.

Designated Groundwater Basin

Designated Groundwater Basins (Designated Basins) are areas in the eastern plains of Colorado with very little surface water where users rely primarily on groundwater as their source of water supply. Designated groundwater rights are administered separately from water rights outside of the Designated Basins (DWR, 2023).

Small capacity wells within the Designated Basins, consisting of those domestic, livestock watering, commercial, monitoring and observation, and firefighting wells that qualify under section C.R.S. 37-90-105 are permitted and administered by the State Engineer (DWR, 2023).

Direct Potable Reuse (DPR)

Reclaimed water treated with advanced treatment processes to drinking standards, allowing it to be directly integrated into the potable water supply without an environmental buffer.

Domestic and Non-Residential Demands

Water used for residential, commercial, industrial, and institutional purposes.

Domestic Wells

Wells permitted for household use with limited outdoor irrigation.

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Exempt Wells

Small-capacity wells used for domestic, stock-watering and low-intensity commercial uses in locations where other supplies are not available.

Firm Yield/Water Source

The maximum consistent flow rate or amount of water that can be reliably provided from a water source regardless of drought or other conditions.

Fully Consumable

Water that is allowed to be reused for irrigation, augmentation, or municipal purposes.

Geologic Confining Unit

A layer of impermeable material that prevents movement of groundwater, acting as a barrier between aquifers.

Geophysical logs

Continuous recordings of the physical properties of subsurface rocks and fluids, collected by instruments lowered into boreholes.

Ground Water Management Districts

Local districts with additional administrative authority that manage water in designated groundwater basins. Ground Water Management Districts are created by the Colorado Ground Water Commission (Colorado State University, 2023).

Incorporated Areas

City or town that has its own local government.

Indirect Potable Reuse (IPR)

A water reuse process in which treated wastewater is returned to the natural water cycle — such as through groundwater recharge or surface water augmentation — before being withdrawn, treated again, and used as drinking water. This method involves an environmental buffer between the wastewater treatment and potable use, providing additional natural filtration and time for monitoring.

Junior and Senior Water Rights

A water right's priority is determined by the date of appropriation, or the date on which that water right was first put to a beneficial use. The earlier the date, the more senior the water right.

Native flow

A term used to describe the water that flows down a river.

Net Sand

total thickness of water-bearing sand layers within each recognized aquifer.

Non-potable Reuse

Treated wastewater repurposed for uses not involving human consumption, such as landscape irrigation, industrial processes, and agricultural applications.

Non-Renewable Water Supply

Water that is not replenished naturally through the hydrologic cycle on human time scales.

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Non-tributary Groundwater

Water outside of a designated groundwater basin, the pump of which will not materially impact a surface stream in 100 years at a rate greater than 0.1 percent of the annual rate of withdrawal. Non-tributary groundwater is allocated and administered as non-tributary of Denver Basin groundwater (Water Education Colorado, 2021).

Not Non-Tributary Groundwater

The legal classification of the water as either non-tributary or not non-tributary determines whether pumping must be augmented to protect senior surface water rights. Not non-tributary groundwater (such as the Dawson Aquifer in parts of western Adams County) does require augmentation to offset impacts on nearby surface streams.

Public Water Systems

As defined by the Colorado Department of Health and the Environment (CDPHE), any system that provides water for human consumption through pipes or other constructed conveyances has at least 15 connections, or regularly serves at least 25 individuals daily for at least 60 days of the year.

Pre-213 Water Rights

Rights that were administered by the state prior to the passage of Senate Bill 213 in 1973, which outlines regulations of groundwater withdrawals and defined Tributary vs Non-Tributary groundwater rights.

Prior Appropriation Doctrine

Legal principle that governs Colorado's water rights systems. Within the doctrine more senior water rights have priority to divert and use water before users with more junior water rights. A water right's priority is determined by the date of appropriation, or the date on which that water right was first put to a beneficial use. The earlier the date, the more senior the water right.

Return Flows

The portion of water that, after being diverted for use (such as irrigation or municipal supply), is not consumed and returns to the surface water or groundwater system. This water can re-enter streams, rivers, or aquifers and may be reused by other water users downstream. Return flows are a critical part of Colorado's water supply and water rights system.

Specific Yield

Ratio of the volume of water that drains from a saturated soil compared to the total volume of the material.

Sustainable Water Management

Managing water supply and demand while jointly considering water availability and reliability in a way that meets current needs without compromising the ability to meet future demands. It considers the entire water cycle, including supply, use, treatment, and return flows.

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Tributary Groundwater

Groundwater that is connected to a natural stream either through surface or underground flows and is recharged from precipitation, including seasonal runoff from snowmelt and irrigation return flows. All groundwater in Colorado is assumed to be tributary unless shown to be non-tributary to a surface stream. Colorado's prior appropriation system regulates tributary groundwater (Water Education Colorado, 2021).

Renewable Water Supply

Water resources that naturally replenish through the hydrologic cycle or run off (e.g., rain, snowmelt, etc).

Replacement Plan

Replacement plans are like augmentation plans. Within Designated Ground Water Basins, replacement plans are approved by the Ground Water Commission to protect existing water rights by replacing water that is depleted by any new well activity (Colorado Division of Water Resources, 2020).

Return Flow

Water that returns to surface or groundwater after human use (Texas A&M, 2023)

River Basins

An area of land that drains all the streams and rainfall to a common **outlet (Water Science School, 2018).**

Self-Supplied Users

Users that rely on privately held groundwater wells rather than municipal water systems.

Transbasin Water

Imported water diverted from one river basin to another to meet the demands of areas with limited local water resources. Transmountain diversions are a specific type of transbasin that crosses a mountain range – in Colorado this is most commonly the Continental divide.

Unincorporated Areas

Areas that are not apart of a City or Town. Usually governed by the county.

Water Adequacy

The ability to reliably meet water demands over a certain time frame.

Water Availability

The consideration of if high-quality water is feasibly available and accessible for beneficial use.

Water Divisions

The Colorado Division of Water Resources Division Offices are located in the seven major river basins throughout the state. Adams County is in the South Platte River Basin or Division 1.Division Offices employ Water Commissioners to ensure that the water rights priority system is followed, enforcing the decrees and water laws of the State of Colorado. Other Division Office staff manage use and measurement rules to ensure that Colorado remains in compliance with interstate and interbasin agreements. Hydrographers in these offices measure streamflow and reservoir levels and manage the statewide satellite monitoring system. Hydrogeologists analyze well logs and measure well levels to determine aquifer characteristics, while Dam safety engineers verify the safety of Colorado's dams and inspect dam construction projects. (Colorado Division of Water Resources, 2023)

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Water District

To help with administration and enforcement, within each Water Division in Colorado are water district. For example, with in the South Platte Water Division there are 15 different water district.

Water Reliability

The consideration of if water is consistently physically and legally available for beneficial use.

Wholesale Water

Water that is contracted or purchased from large regional suppliers, such as water conservancy districts or major utilities.

100- year Aquifer Life Rule

A permitting requirement that limits property owners to withdraw a specified volume of groundwater over a 100-year period, based on the saturated thickness of the aquifer beneath their land

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REVIEW NOTE: APPENDIXES ARE FOR STAFF AND ARE NOT INCLUDED IN THIS DRAFT VERSION OF THE PLAN.

I. WATER DEMAND ANALYSIS

Detailed summary of the water demand analysis described in the Water Demand chapter. Includes more information on the approach, data used, and QC process.

II. GROUNDWATER ANALYSIS

Detailed summary of the PETRA groundwater analysis used to complete the water availability assessment. Includes more information on the approach, data used, and QC process.

III. WATER MANAGEMENT CHALLENGES AND STRATEGIES

Detailed summary of the Risk and Vulnerability assessment that led to the development of the 10 water related challenges, as well as the process for identifying the 13 priority strategies included in the plan.

IV. ENGAGEMENT SUMMARY

Detail summary of all engagement events that informed all aspects of the plan.

V. IMPLEMENTATION PLAN

Implementation details including timeline, resources needs, action plans, relevant examples from other communities, and staffing details to support the implementation of the priority strategies identified in the plan.

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