2024

URBAN LANDSCAPE CONSERVATION TASK FORCE

FINAL REPORT

A REPORT FROM THE URBAN LANDSCAPE CONSERVATION TASK FORCE

DEVELOPED WITH SUPPORT FROM THE COLORADO WATER CONSERVATION BOARD - JANUARY 2024

REPORT DISCLAIMER

This report attempts to capture the final recommendations of the Task Force, as well as the breadth of group discussions that lead up to the final set of recommendations. As such, many opinions or assertions made during conversations (captured on pages 7 through 25) do not necessarily represent consensus thinking within the group, but derive from conversations over the course of the task force meetings. Conversely, the report's recommendations do represent the task force consensus and are found on pages ii, iii, 27, and 28. Assertions in the report that are not expressly framed as recommendations reflect opinions expressed by one or more task force members during discussion and should not be taken out of context.

STATE DISCLAIMER

The Urban Landscape Conservation Task Force (task force) was assembled and appointed by the Colorado Department of Natural Resources (DNR) and the Colorado Water Conservation Board (CWCB) under the direction of the Governor to provide input on various concepts around transformative landscape change. This report is not the work product or opinion of CWCB or DNR. Even as the CWCB led the task force process and meetings and recognizes the importance of these discussions, the views and final recommendations in the report are those of the task force and should not be construed to represent the state's position. The included recommendations are not prescriptive and do not direct state agencies, the legislature, or the governor. Instead, the report provides helpful context, discussion, and opinions with recommendations that can be referenced to support landscape transformation actions at several levels or scales. These include state, community, or even neighborhood scales.

This information can be used by local, state, and federal partners to inform planning efforts across Colorado. The CWCB is committed to continued work across all types of communities, including those which are disproportionately impacted. This also includes a commitment to ongoing meaningful consultation with tribal nations on water and climate change issues. Integrating Indigenous knowledge and multiple perspectives into state water planning can enhance and advance climate adaptation efforts. This commitment to collaboration is also embodied in the Colorado Water Plan which acknowledges the need for not just state action but local action, tribal coordination, and cross-sector leadership. By working together Colorado can realize a more sustainable and resilient future.

COLORADO
Colorado Water Conservation Board
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The task force was also supported by additional CWCB staff, including Kevin Reidy, Jeff Rodriguez, Sam Stein, Elizabeth Schoder, Vivian Pinelli, and Emily Adrid. Other agencies provided support including Scott Williamson (Department of Local Affairs), Susie Hagie (Colorado Department of Transportation), Rod Vanderwall (Department of Personnel and Administration), David Donnelly (Department of Regulatory Agencies) and Kelly Romero-Heaney (DNR). Special thanks to Jarrod Biggs who initially served on this task force as a representative for the City of Durango for the first meeting and the Drought Summit. Lastly, thanks to all the presenters (including task force members) who spoke across the meetings, including Peter Mayer (Water DM; Flume); Lindsay Rogers (WRA), Andrea Cole and Mark Mitisek (Dominion Water & Sanitation District), Dr. Aditi Bhaskar (CU Boulder), Aliyah Santistevan (Division of Water Resources, Division 1), Doug Jeavons (BBC Research and Consulting), and Iain Reed Hyde (Argonne National Laboratory). At times, task force members were supported by proxies that also helped contribute to this effort and are listed as follows: Allison Ebbets (Eagle River Water and Sanitation District), Jacob Stankich (ALCC), Rebecca Briesmoore (Colorado River Water Conservation District), Lindsay Rogers (WRA), and Adam Waters (Aurora Water).

GLOSSARY

For the purposes of this report, it is helpful to define the following commonly used terms. These definitions reflect the way the task force used these terms and will be helpful to read and understand the report.

Climate-adapted, appropriate, or water-wise landscapes: Living vegetation (ground cover and plants), including native and nonnative grasses and plants that can be maintained with minimal supplemental irrigation. There are other grass covers, native and other, such as Tahoma 31, blue grama, buffalo grass, and Dog Tuff™ Grass, that may provide similar benefits as traditional turf grass while requiring much less supplemental irrigation. Also referred to as "well-adapted," "sustainable," "resilient," "ColoradoScaping," or "regionally adapted landscapes"

Evapotranspiration Rates (ET): The United States Geological Survey defines evapotranspiration as the sum of all processes by which water moves from the land surface to the atmosphere via evaporation and transpiration (through plant material).

Gallons Per Capita Per Day (gpcd): The amount of water used per person per day. Currently there is not a Colorado standard for calculating gpcd, leading to potential data discrepancies.

Hydrozones: A hydrozone is a portion of the landscape area where plants with similar water needs are grouped. Hydrozone-based design encourages intelligent grouping of compatible plants; factoring water needs, soil characteristics, and microclimate to provide an optimal setting for successful establishment and long-term vigor.

Landscape Water Budget: A landscape water budget calculates the amount of water a landscape needs based on factors such as precipitation, evapotranspiration (ET), area size, and plant type. It identifies a percentage of irrigation water demand that should be the maximum amount of water applied to a landscape for the growing season.

Municipal water use: Municipal water use, often referred to as M&I water use, is water served by a municipal water provider and used by Coloradans in their homes, yards, businesses, and industry as well as by government for emergency services, public spaces (parks), etc.

Nonfunctional turf: A more detailed definition recommendation can be found on page 9, but generally refers to the location and vegetation type together (i.e. turf in medians is nonfunctional, and climate-adapted landscapes in medians are functional). Examples of nonfunctional turf in HB 22-1151 include medians, areas adjacent to open spaces or transportation corridors, areas sloped with more than a 25% grade, stormwater drainage and detention bases, commercial, industrial, or industrial properties (including local government, schools, and businesses), common elements in a common interest community, and portions of residential yards.

Tap Fees: Tap fees are the fees water providers apply to new water lines and meters (or taps) added to the system. These fees help offset the utility's costs to make the connection (the true tap fee). They also include higher costs for the demand placed on the system as it grows and ongoing capital improvement costs to maintain the system, treat water, etc. The latter is often referred to as plant investment fees, and other charges may be associated with a new tap. The term "tap fees" is being used throughout this report to broadly refer to these fees collectively.

Tiered Rate Structures: A water pricing mechanism using an increasing block rate structure where higher prices are assessed for increased water use as determined by set volumetric tiers or blocks of water usage (e.g. tier/block 1, 2, 3, etc).

Transformative Landscape Change: A movement coined in the 2023 Colorado Water Plan that focuses on the need for redesigning our landscapes using a variety of policy and design tools to reflect Colorado's climate. The idea has deep roots in Colorado, dating back to 1981 when Denver Water coined the term "xeriscape." Today, this type of landscape development, focused on native, low-water, and climate-adapted vegetation, is often referred to as "ColoradoScape," a term coined by the Town of Castle Rock, which is gaining traction as the term of art for the unique landscape aesthetic that suits Colorado's varied climate and water conditions.

Turf/Turf grass: High-water use, cool-season, or non-native ground cover that requires a high amount of supplemental irrigation to be maintained. Kentucky bluegrass is the most commonly used turf in Colorado. Also referred to as "water-intensive landscapes."

Turf removal and replacement: The removal of vegetation requiring high amounts of water to maintain. Replacement materials should consist of living, water-wise vegetation that requires less supplemental irrigation to maintain. Also referred to as "turf removal."

Water Budget Based Rates: The United States Environmental Protection Agency defines Water Budget Based Rates as a rate structure where households are given a water budget based on the anticipated needs of that household either by the number of people living in the house and/or property size.

Xeriscape: The concept created by Denver Water is based on seven principles, including planning and design, soil improvement, efficient irrigation, plant zones, mulches, turf alternatives, and maintenance. For more information, see Denver Water Xeriscape Principles.

TASK FORCE REPORT PREFACE

In January of 2023, Governor Jared Polis announced Colorado's Urban Landscape Conservation Task Force (ULCTF or task force hereafter) following the completion of the 2023 Colorado Water Plan. The announcement illuminated what those in the water industry have long known: nearly 40-50% of municipal-treated drinking water is used for outdoor irrigation in Colorado. Given a warming climate, recent back-to-back drought years, and the related impacts on major river systems like the Colorado River, that status quo is not sustainable. This has driven a collective reckoning that the time to rethink our landscapes is now, and that ColoradoScapes that can thrive on little to no supplemental irrigation will be an important part of the solution. There are also many ecosystem and community benefits beyond water savings that can be gained from thoughtfully transitioning landscapes to more climate-appropriate vegetation. The task force is one effort of many across Colorado seeking ways to reduce outdoor water use while keeping our urban environments resilient, productive, beneficial, and aesthetically pleasing.

The task force was convened by the Colorado Water Conservation Board with guidance from the Governor's office, who directed that the work of the task force be oriented around some key policy-related questions. These eight core questions are listed on page 6 of this report. The task force's mission, as defined during the first group meeting, was "working to identify opportunities that can provide sustained outdoor water savings in ways that support vibrant communities and avoid unintended consequences." In the end, the task force discussed an array of topics that directly addressed the original eight questions, but also extended into other areas. The breadth of these discussions and areas of consensus will be described in this report. Concepts that were generally supported by the task force are listed as recommendations. These recommendations are summarized on the following pages and are repeated starting on page 27.

Importantly, the task force members also noted four key issues that color the report's findings:

- **LOCAL AND STATEWIDE IMPACTS OF LANDSCAPE TRANSFORMATION** - Municipal water use is a small fraction (7%) of the total water use in Colorado, yet at the local level, outdoor water use can make up about 50% of a water provider's annual water demand. Meaningful shifts in outdoor water use at the local level can have major impacts that build resilience in a warming climate and add stability to local water resource portfolios. At the same time, conservation savings resulting from landscape transformation can encourage and advance creative and flexible partnerships needed for the state to address its water challenges. Transformative landscape change is also emblematic of the shared responsibility from all sectors and regions to adapt to hotter and drier conditions.

- **BENEFITS BEYOND WATER SAVINGS** - While the task force's mission statement centered on sustained water savings, many task force members noted that landscape transformation has myriad other values and benefits that are equally or, in some cases, more important than water savings alone. Examples from task force discussion can be found on page 2 (see section entitled Tomorrow's Landscapes).

- **POSITIVE TURF REPLACEMENT MESSAGING** - Task force members noted that mentioning "avoiding unintended consequences" in the mission statement of the task force frames turf replacement efforts as prone to negative impacts. They noted that the tone of the conversation should reflect the positive outcomes that are equally likely to arise from landscape transformation efforts.

- **SCOPE TOO LARGE FOR THE ALLOTTED TIME** - While the task force aimed to have 4-6 meetings over roughly one year, ultimately, there were seven meetings, including two public discussions (2023 Drought Summit; Colorado Water Congress Summer event). Even with additional meetings, many members felt that more time was needed to yield well-crafted recommendations.

Notwithstanding the notes above, the task force recommendations and discussions stand as a body of thought that can inform decision making. This report can also provide individual communities direction as they consider landscape transformation. This is not the last of these discussions. Rather, this is an important early milestone on the road toward true landscape transformation. The hope is that this report can help seed future conversations and continue to advance necessary landscape change. Building from these task force discussions and recommendations can help meet the goals of the Water Plan and help Colorado realize a resilient, water-secure, and vibrant future.

TASK FORCE RECOMMENDATIONS

The task force reached consensus on the following recommendations. These recommendations (also repeated on page 27) are supported by ***Areas to Research and Analyze*** as well as ***Complementary Efforts to Watch***, detailed on the following page and page 28. These recommendations provide solid direction for decision-makers or anyone curious about how to advance transformative landscape change in Colorado.

RECOMMENDATIONS TO ADVANCE

- **ADOPT TURF POLICY** - Support legislation prohibiting installations of nonfunctional water-intensive turf as defined by the task force in new and redevelopment and support local adoption of turf limitations.
- **SUPPORT TURF REPLACEMENT IN EXISTING DEVELOPMENT** - Continue state support and funding for voluntary turf removal replacement programs and projects, and support local implementation of turf policy and incentive programs.
- **PROMOTE IRRIGATION EFFICIENCY** - Require efficient irrigation design and equipment in new construction and promote efficient irrigation equipment, management practices, and maintenance across all landscapes, new and existing.
- **ADVANCE WATER AND LAND USE INTEGRATION** - Support integration of water supply and demand planning, land use and comprehensive planning, and implementation tools to further water efficiency efforts and support climate-appropriate landscapes.
- **IDENTIFY TARGETS** - Develop a Colorado-wide methodology for calculating outdoor water use targets that can be used at the local level to define water-wise landscapes and wasteful irrigation levels.
- **PARTNER WITH INDUSTRIES**- Collaborate with landscape professionals and businesses to advance landscape transformation solutions and build capacity.
- **USE PRICE SIGNALS** - Encourage pricing mechanisms such as conservation-oriented tap fees and water rates, water dedication policies, and water budgets to encourage and maintain affordability for efficient use and discourage inefficient outdoor water use.
- **ADDRESS EQUITY CONCERNS** - Incorporate equity into the development of outdoor water conservation policies, regulations, rate structures, fees, and programs to ensure water affordability for essential use and increase access to landscape benefits community-wide.
- **CREATE A MESSAGING CAMPAIGN** - Create educational resources and marketing campaigns with standardized messaging around the components and definitions of ColoradoScape, functional turf, nonfunctional turf, and climate-adapted vegetation to promote successful landscape transformation and ecosystem function.
- **SUPPORT STATEWIDE COLLABORATION** - Promote ongoing investments in water conservation that advance creative solutions and partnerships to address statewide water challenges alongside work to maximize municipal water portfolios and operational flexibility.

AREAS TO RESEARCH AND ANALYZE

The ideas around landscape transformation and turf replacement are quickly evolving as new information becomes available. Because of this, additional research and analysis could support many of the task force recommendations. The following list is not meant to be exhaustive, but are topics that were pulled out of task force conversations that may need additional exploration. The titles of each area are noted below with the full text appearing on page on the following page and on page 28.

- **Colorado Turf Totals**
- **Water Savings**
- **Turf Removal and Replacement Guides**
- **Turf Removal Impacts**
- **Understanding Land Use Codes**
- **Appropriate Vegetation**
- **New Development Cost Analysis**
- **Impacts of Water Conservation Tools**
- **Water Budget Advancement**
- **Equitably Distributed Landscapes**
- **Landscape Industry Development**

AREAS TO RESEARCH AND ANALYZE

The task force also identified several areas and ideas that may require additional understanding before advancing. The following topics could be eligible candidates for grant funding through CWCB's Water Plan Grant Program or other funding opportunities. In no particular order, the topics include:

- **Colorado Turf Totals**: Evaluate Geographic Information System (GIS) data across Colorado (locally and statewide) to determine the total amount of irrigable turf. Where feasible, analysis could apply nonfunctional turf definitions to mapping to better understand the potential for removal, water savings, and policy advancement.
- **Water Savings**: Study the potential and actual long-term and sustained water savings from turf removal and how human behavior impacts estimated savings.
- **Turf Removal and Replacement Guides**: Develop a step-by-step guide to implement best practices for turf installation and removal that can be tailored to all sectors and varying property sizes to improve knowledge accessibility. Separate guides could be available for residential do-it-yourself (DIY) efforts and water providers for a multi-pronged informational approach.
- **Turf Removal Impacts**: Research the known and unknown effects of accelerated and widespread turf removal on ecosystems, water quality, affordable housing, and existing inequities.
- **Understanding Land Use Codes**: Compile best practices and case studies of various municipal landscape codes and model codes from across Colorado that highlight how to reduce nonfunctional turf installation and eliminate antiquated policies such as minimum turf requirements in ways that help reduce barriers for local governments to help accelerate adoption.
- **Appropriate Vegetation**: Develop regional plant and grass lists with low-water use vegetation options for turf replacement.
- **New Development Cost Analysis**: Study the impacts on affordable housing resulting from potential cost shifts from new landscape standards in new construction and ways to mitigate any potential cost increases for new developments. Conduct a statewide demand analysis to understand the impact of tap fee and rate changes on individual systems and housing costs.
- **Impacts of Water Conservation Tools**: Analyze the effectiveness of different conservation tools and programs across customer classes and how they impact water use behavior to help improve understanding of the best practices to reduce outdoor water use. Learn from previous studies (i.e., The Alliance For Water Efficiency's 2019 Landscape Transformation Study) to evaluate different outdoor conservation efforts, compare and rank implementation difficulty, estimated costs, and potential water savings to help those implementing turf programs understand better where it is easier/harder to start.
- **Water Budget Advancement**: Identify if a standardized water budget calculation or tool could be developed for water providers and users.
- **Equitably Distributed Landscapes**: Realize opportunities where landscape restoration aligns with water-wise irrigation levels, enhanced community aesthetics, increased gathering and play areas, and the mitigation of heat island impacts.
- **Landscape Industry Development**: Find ways to include all industry professionals equitably and create pathways for increased education and training by evaluating certification opportunities for landscape professionals with a focus on efficient water management.

COMPLEMENTARY EFFORTS TO WATCH

The task force also noted a few efforts that were forthcoming that may inform this work and should be tracked. These included the:

- Colorado Springs Utilities Native Grass Guide for Installation and Maintenance
- Colorado Water Wise Municipal Best Practices Guide
- Colorado Water Conservation Board Colorado Water Plan Actions
- Department of Local Affairs Template Land Development Code
- New funding sources for the state's Turf Replacement Program
- Western Resource Advocates' Water Wise Landscapes: A Cost-Effective HOA Investment in Resilience

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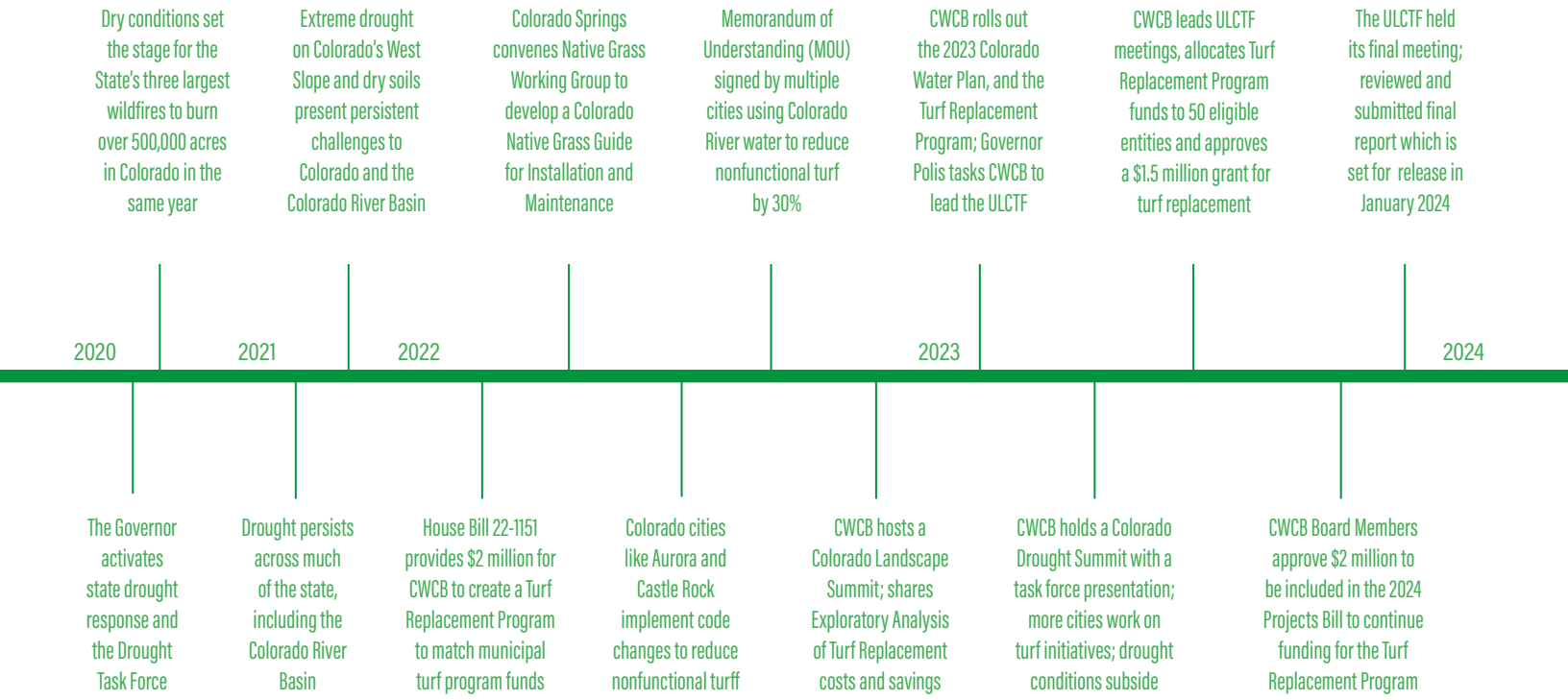
SECTION I

INTRODUCTION & TIMELINE

In January 2023, Governor Polis directed the Colorado Water Conservation Board (CWCB) to convene the Urban Landscape Conservation Task Force (ULCTF or task force hereafter) in conjunction with the release of the 2023 Water Plan and the launch of the state's Turf Replacement Program to holistically address transformational landscape change and "focus on advancing these efforts in ways that go beyond turf grass removal." The task force was charged with exploring practical tools to create both a paradigm and policy shift around how the state's urban landscapes look and function. In particular, the task force's efforts centered on addressing several key questions aimed at how to best reduce water-intensive turf, define nonfunctional turf, and how transformative landscape change can be sustained in ways that enhance community resilience, ecosystem services, and water security. These questions were developed with the guidance of the Governor's office, to specifically address topics where task force input could potentially help shape policy and result in specific and actionable recommendations. These core questions appear on page 6 of this report.

The 21-member task force includes thought leaders from eight water utilities, two water conservation and/or conservancy districts, two environmental non-governmental organization representatives, and several single seats. The CWCB convened the task force through a series of one-on-one interviews, eight meetings, and public panels at the Colorado Water Congress summer conference and the 2023 Colorado Drought Summit. Because of the diverse perspectives among the task force members, this report contains a range of information from consensus recommendations with broad agreement to experimental ideas that were discussed but warrant further research and analysis before implementation.

While the CWCB supported the task force and helped facilitate conversation, the opportunities, challenges, and recommendations identified in this report reflect those of the task force. As such, the discussions across task force meetings captured in this report and the resulting recommendations in this document are not state positions, nor are they meant to dictate state policy. Instead, the task force recommendations serve as guidance for thoughtful advancements in turf reduction, which can help advance transformative landscape discussions at various levels of government, in communities, or even in your own yards.



SECTION II

BACKGROUND & CONTEXT SETTING

CONTEXT FROM THE COLORADO WATER PLAN

The Colorado Water Plan lays out critical calls to action for sustaining vibrant communities by focusing heavily on municipal water conservation as the first tool to reduce indoor and outdoor water demands. It introduced the concept of "Transformative Landscape Change" as a way for urban and suburban communities to foster resilience to climate variability and buffer against the growing water demands of an expanding population. The Water Plan included a variety of future scenarios for the year 2050 where municipal water supply gaps of up to 740,000-acre foot-per-year could exist in hot and dry years. It called for a water conservation-first approach to address these water demands including building what the Water Plan defines as a "One Water Ethic" that invests in water conservation and tandem efforts to integrate land use planning and alternative water supplies (e.g., reuse, stormwater, etc.). The Water Plan notes that "Water should be included in every city and county's comprehensive plan in ways that embrace the One Water ethic and support inclusion in water and land use planning at the local level."(Colorado Water Plan, pg.178)

CWCB is working to advance Water Plan actions, including Action 1.7, which strives to "Identify turf replacement options that support transformative landscape change." Action 1.7 outlines the need to build the more climate-appropriate and sustainable landscapes of tomorrow today. While transformative landscape change has begun across Colorado to varying degrees, there is an understanding that many of these initiatives will take years to move from idea to implementation and scale up. What does continued transformational landscape change look like, and what are the right tools and responsible pathways that will help achieve that future vision? Those questions provide the backdrop to the task force.

A MORE STRATEGIC APPROACH TO TURF GRASS

There is broad agreement within the task force that installing and maintaining large areas of water-intensive turf is unsustainable. High-water-use turf should be limited to areas that serve more than ornamental functions. While Colorado's Front Range typically receives about 15 inches of precipitation per year, the cool-weather turf grasses traditionally installed by default in lawns can demand 24-30 inches of irrigation per growing season. The practice of installing and maintaining high-water-use turf historically originated in wetter climates like the eastern United States and Europe, and it does not align with the water realities and climate of Colorado. Now is the time for Colorado to be more thoughtful about the vegetation installed in new development and redevelopment.

Articulating when turf is not serving any meaningful function (nonfunctional turf) can be difficult. It's often said that "you know it when you only step on it to mow it." Often, this means medians, tree lawns (right-of-way strips), and streetscapes (see page 9). Better defining which turf areas and types do not serve our communities and create an unnecessary drain on our water supplies will be essential to identifying how to address it. Understanding turf replacement/removal's true financial costs, water savings, tree canopy impacts, and additional benefits is critical. It is also important to understand how limiting turf installation and/or removing turf plays out economically at a range of scales, including for individual property owners, water providers, the community, and the state.

ONE WATER LEADERS

The Denver One Water Plan and Colorado State University (CSU) Spur Campus are excellent examples of actionable One Water planning, incorporating low-water vegetation into building design and holistic thinking. The U.S. Water Alliance's creation of One Water Leaders (OWLs) also emphasizes a national dialogue on integrating urban environment strategies that are multidisciplinary, flexible, and scalable. Sharing and incorporating best practices across all water uses is essential in uniting efforts to reach collective sustainability goals.

TOMORROW'S LANDSCAPE

One of the initial icebreaker questions the task force was asked was to explain their vision for a climate-adapted landscape. While removing nonfunctional turf and reducing outdoor water use is critical, the following principles should be incorporated into new installations and replacement landscapes that will help promote a statewide water stewardship ethic:

- Beautiful, diverse, and living
- Regionally and climate-adapted
- Resilient, long-lasting, and sustainable
- Multi-beneficial ecosystem services
- Equitably distributed

INCREASED WATER SAVINGS AND RESILIENCE

All water conservation efforts and subsequent water savings- big and small- add up to make a measurable and positive impact on existing and future water supplies. Creating and maintaining landscapes that use Colorado-appropriate vegetation and live within the hydrologic realities of the state is important regardless of water savings. That said, exploring the scales where transformative landscape change can be most impactful can offer some guidance in how to responsibly steward state investments and efforts.

- **STATE WATER USE** - From a statewide perspective, around 7% of Colorado's total water use is municipal use. Given that about 50% of that is used outdoors, roughly 3% of the state's total water supplies support municipal outdoor water uses, including trees, pools, parks, gardens, and landscapes with and without turf.

- **LOCAL WATER USE** - From a local and municipal water provider perspective, however, outdoor water use may account for 40-50% of a water provider's total annual demand, meaning changes in outdoor use patterns can have important local impacts on the need for developing new supplies and building climate resilience. Water providers like Denver Water and the City of Aurora have seen their gallons per capita per day (gpcd) drop by 36% over the last 20 years, in part due to outdoor water conservation efforts and changing development patterns.

The total potential water savings from turf removal depends on the amount of irrigated and nonfunctional turf in Colorado. There is uncertainty about these numbers, which casts some doubt on the true financial costs and water savings associated with turf removal. However, while the total water savings and costs are still being researched, there is consensus that one effective way to reduce water use and build the landscapes of tomorrow is to reduce new turf installation and accelerate the removal of water-intensive turf like Kentucky bluegrass.

A FULL TOOLBOX OF OUTDOOR CONSERVATION TOOLS

If the primary goal of transforming our landscapes is to reduce outdoor water demand, removing turf is one way to do that. Water savings are ultimately achieved by sustained reductions in irrigation, which often require irrigation system changes, selecting appropriate low-water replacement vegetation, managing control clocks and irrigation controllers, educating users, and maintenance schedules. Water conservation tools can help establish the importance of ethical water stewardship and emphasize the intent to use shared water sources efficiently with users. While turf removal and replacement is an essential piece of the puzzle, there are other helpful tools water utilities can use (i.e., tiered rates, water budgets, wastewater ordinances, proactive leak detection, irrigation audits, etc.)

▸ STATE TURF REPLACEMENT PILOT

Colorado's Turf Replacement Program was enacted through legislation in 2022 and CWCB launched the program in January 2023. The program made $1.5 million available for eligible entities to expand or pilot turf removal efforts and around $300,000 for new programs from third-party contractors, totaling approximately $1.8 million. There was high interest in the program across Colorado, and all funds were allocated within one year.

The 50 funding recipients either created turf rebate programs or focused on site-specific projects to maximize funds. Because funds were limited, creating turf rebate programs for homeowners was not always the most cost-effective path. Many municipal entities (e.g., water providers) focused on site-specific nonfunctional turf removal and replacement projects to maximize the investment and achieve larger water savings.

▸ BEYOND WATER SAVINGS

Replacing turf serves many purposes beyond water savings. Landscape transformation can support multiple community goals. While it's often thought of solely as a water conservation strategy, there may be other drivers for a community who wants to invest in turf replacement like supporting biodiversity and gaining ecosystem benefits. Landscape transformation can also support climate resiliency, offer native habitats for wildlife, support pollinators, help improve water quality, and potentially offer heat mitigation benefits. Communities may not always strictly be approaching this work from the lens of maximizing water savings. Community values, water security, municipal goals for related actions, funding sources and partnerships all play into how landscape transformation efforts will be shaped.

SNAPSHOTS OF APPROACHES OTHER STATES ARE TAKING

ARIZONA

The City of Phoenix has never offered rebates for turf removal, but water savings have increased dramatically. Even amidst population growth, water rates and free landscape workshops helped reduce turf on single-family properties. Water-intensive turfed properties went from 80% in 1970 down to about 14% in 2015 - reducing Phoenix's gallons per capita per day (gpcd) by about 30%.

NEVADA

The Southern Nevada Water Authority (SNWA) has paid their Las Vegas area customers to replace their lawns with low-water-use landscapes since 1999 and has replaced over 4,500 acres of turf. SNWA has spent more than $230 million on turf removal and replacement efforts, which has reduced water use from 340 gpcd to 220 gpcd.

A law enacted by the Nevada Legislature in 2021 will prohibit using Colorado River water delivered by Water Authority member agencies to irrigate nonfunctional grass, beginning in 2027. The AB356 law applies to Southern Nevada commercial, multi-family, government, and other properties. It does not apply to grass in single-family residences, like grass in front and back yards.

In December 2021, SNWA's Board of Directors approved a resolution to prohibit the installation of irrigated turf in new commercial and residential developments. Grass will still be permitted in schools and parks for community use and cemeteries. Estimates show that prohibiting grass in new developments will save approximately 27,000 acre-feet of water over the coming decades.

CALIFORNIA:

The Metropolitan Water District of Southern California has one of the largest cash-for-grass program in the country paying residents and businesses $2 per square foot of converted lawn. Under a new law signed by Governor Gavin Newsom in October 2023, public agencies, restaurants, corporate campuses, industrial parks, and certain other property owners will be prohibited from watering "nonfunctional turf" using potable water.

The new rules will be phased in starting on Jan. 1, 2027. Before it became law, the ban on watering "nonfunctional turf" was put in place as an emergency regulation during the June 2022 drought by the state Water Resources Board and was set to expire in June 2024.

UTAH

In Utah, 60% of residential water use goes to outdoor irrigation. The state recently made a one-time investment of $5 million to remove nonfunctional turf, followed by an annual $3 million commitment to continuing that work.

Most funds go to local water conservancy districts that manage landscape incentive programs, but only property owners that live in communities that have adopted qualifying landscape ordinances, submitted their Water Conservation Plans, and require converted areas to be retrofitted with drip irrigation are eligible.

Utah also provides about $250 million to accelerate secondary metering. That initiative has helped reduce water use by 20-30%.

FACTORS THAT IMPACT SAVINGS

Colorado's unique geography and climate make it difficult to compare turf removal and replacement efforts directly against other southwestern states. Looking to other states for water conservation ideas, best practices, and successes can be helpful but outcomes can vary. Some factors that tend to drive water savings potential are not the same in Colorado. Some factors that can impact total water savings include:

- Irrigation Months - States with year-round irrigation may have higher outdoor water demands than Colorado cities.
- Evapotranspiration (ET) Rates - States and areas with higher ET rates will need more water per square foot for outdoor irrigation than Colorado cities.
- Existing Water Usage - Other states or cities may have a higher gpcd water usage than Colorado cities. Similarly, the total municipal water usage could be larger or smaller than Colorado's.

Different drivers, including localized water scarcity, will influence the need for added water conservation efforts and guide investment decisions, especially where costs are high. A suite of conservation tools may take varying levels of investment and can complement efforts to drive down outdoor water use. Similarly, the states total municipal water usage could be larger or smaller than Colorado's.

THOUGHTFUL LANDSCAPE TRANSFORMATION

Any significant shift in historical landscape practices will have impacts that need to be identified and addressed. As Colorado accelerates landscape transformation, using appropriate replacement materials and updating irrigation behavior practices will matter as much as removing water-intensive turf. Some important considerations include:

Heat Island Effect: Removing turf or other water-intensive vegetation and replacing it with rock or other non-living material can lead to increased warming or the "heat island" effect. In lower-income communities without many trees and green spaces, that can exacerbate existing problems and create challenges for quality of life and health. To combat this, replacement materials that contribute to a living landscape should be prioritized. For example, setting an expectation for a minimum percentage of living ground cover replacement could help avoid creating landscapes void of vegetation that contribute to the heat island effect.

Tree Health: Tree canopy is an important tool to mitigate against urban heat islands. Many trees rely on the irrigation of turf grass to meet their water requirements, so removing turf must be accompanied by a concerted effort to support established and new trees. Maintaining tree health may require irrigation system modifications for turf replacement projects.

Defensible Spaces: Wildfire is a growing concern across Colorado, particularly in the wildland-urban interface. New and existing landscaping in and adjacent to these areas should be designed and maintained to establish defensible space. These areas may require some amount of irrigation.

Water Quality: Chemical application for the purposes of landscape transformation is a technique that can be contentious. Any change in chemical application warrants additional research into potential water quality and ecosystem impacts. While large parcel turf removal projects may require chemical applications by trained personnel, chemical, and fertilizer needs often decrease once replacement landscaping is established. Research suggests that transitions from high-water using cool-season turf to warm-season grass incur a net reduction in chemicals post-installation. And, importantly, a one-time application of chemicals to remove turf may be less than the sum of ongoing chemical applications to turf if chemicals are in regular use.

Abandoned or Under-Irrigated Landscapes: Lower-income communities already experience a lack of equitably distributed green space and trees. Colorado should leverage the shift in norms surrounding landscape change and prioritize the enhancement of living landscapes and tree coverage in these areas to address existing problems and improve quality of life and public health. While water savings have traditionally been the primary goal of landscape transformation, drought-resilient and attractive landscapes are also important; lower-income communities should have equitable access to healthy green spaces.

GARDEN IN A BOX

Resource Central's Garden In A Box program is one that helps provide low-water plants, with professionally designed planting layouts that utilities often subsidize the cost of to help encourage a shift to xeriscape 200 square feet at a time. Sometimes these gardens are actively being planted where the homeowner once had turf. Resource Central also offers participating utilities the choice to offer income qualified gardens to help provide opportunities for disadvantaged community members to add low-water green space back to their community.

SECTION III

TASK FORCE QUESTIONS & DISCUSSIONS

THE EIGHT QUESTIONS

In coordination with the Governor's office, the CWCB developed eight key questions for the task force to address. These questions were formulated to embody ongoing uncertainties and opportunities around transformative landscape change.

1 Technical Implementation and Capacity
Who does the work, and where can the most success be realized to advance the goals of landscape changes?

2 Defining Functional and Nonfunctional Turf
What definitions exist across Colorado, including in HB 22-1151, and how can we better refine the working criteria to align with what turfed areas are valued in Colorado to advance landscape transformation?

3 Land Use, Water & Development
How can land use and water utility policies support and/or incentivize sustainable new development and redevelopment with sustainable landscape standards?

4 Model Landscape Ordinances
How can water conservation-oriented ordinances become more effective and more widely applied?

5 Colorado Water Budget Landscape Standard
Could a low-water level irrigation benchmark help communities set better-defined targets for wise outdoor water use?

6 Equitable Transformation
What are the equity concerns related to landscape changes when considering rate structures, trees, accessible green spaces, and turf removal?

7 Water Affordability & Tap Fees
How can outdoor water conservation help control utility pricing, housing costs, and tap fees?

8 Resilient Funding for Drought
How will landscape transformation impact drought restrictions?

WORKING AT SCALE

In exploring who would advance a given concept the task force noted that there are various levels at which action takes place. In general, there are three main scales where Colorado landscape action can occur:

STATEWIDE/STATE
Where state laws, regulations, programs and policies drive change.

REGIONAL/LOCAL
Where local rules, processes and programs drive change most effectively.

NEIGHBORHOOD/INDIVIDUAL
Where individual behaviors and actions can have impact and advance change.

1 Technical Implementation & Capacity – Who does the work and how to support it?

This discussion captures a range of task force member conversations, opinions, and assertions. The actual recommendations on pages 27 and 28 reflect the ideas supported by the full consensus of the task force.

FRAMING

Whether local water providers and communities can implement turf removal programs technically has been a persistent question. This topic was presented to the task force to consider how best to direct resources and policy recommendations to maximize impact.

GENERAL TASK FORCE DISCUSSION

It is important to consider how different levels of government (including water providers and municipalities) can and should continue to support landscape transformation- through installation and retrofits- and fill current and potential gaps in capacity. Key discussion points follow:

- The landscape industry is a key transformative landscape change partner. There are varying certification programs across Colorado, and local and state investments in training can help drive change. Ensuring the landscape industry has the most up-to-date skills and knowledge in water management and landscape transformation and installation techniques will be critical for success.
- Solutions to help small landscaping and green industry businesses (who may lack the capacity) should be a priority, rather than only focusing on larger landscape companies. By working on solutions that every landscape professional can support, communities can shift the baseline standards for success regardless of the starting point of the community.
- Connecting directly with homeowners should be a priority for landscape professionals and water providers to help promote the beauty and benefits of sustainable Colorado landscapes and influence the products they purchase and the services they hire landscape professionals to perform.
- Preserving existing vegetation that uses less water should be considered in how Colorado develops and redevelops its landscapes.

OPPORTUNITIES

- The state should continue supporting capacity building for voluntary turf removal replacement at the local level through guidance, funding, and the development of resources that will accelerate both state and local outdoor water use reduction goals.
- Consider and explore which landscaper certification programs or training programs could be supported at scale to best create change. Find ways to include all industry professionals equitably and create pathways for training.
- Develop a step-by-step guide to implement best practices for turf installation and removal that can be tailored to all sectors and varying property sizes to improve knowledge accessibility. Separate guides could be available for a range of audiences, such as residential do-it-yourself (DIY) efforts and water providers for a multi-pronged informational approach.
- Conduct geospatial analysis of urban areas to identify turf areas to help water providers/cities identify possible retrofit sites.
- Funding could be put towards a study building on previous efforts (i.e., The Alliance For Water Efficiency's 2019 Landscape Transformation Study) that evaluates different outdoor conservation efforts that would compare and rank implementation difficulty, estimated costs, and potential water savings to help with those implementing turf programs to understand better where it is easier/harder to start.
- Target resources (i.e., funding, technical implementation support) to capacity-limited communities.

CHALLENGES

- Communities across Colorado differ in baseline capacity, technical implementation capabilities, political will, and access to sufficient resources to cover all needs and values.
- Tools and resources must be flexible enough to be useful for the various needs of communities and their stage of conservation program maturity.

2 Defining Functional and Nonfunctional Turf – What is it and where is it?

This discussion captures a range of task force member conversations, opinions, and assertions. The actual recommendations on pages 27 and 28 reflect the ideas supported by the full consensus of the task force.

FRAMING

House Bill 22-1151, known as the Turf Replacement Bill, and the Memorandum of Understanding signed by Colorado River Basin Municipal and Public Water Providers reference "nonfunctional" and "nonessential" turf. These terms seem intuitively clear, but on closer inspection, there is important nuance and variability in how they are understood and applied. The task force was asked to define these terms to clarify what turf grass should be targeted for removal/replacement.

GENERAL TASK FORCE DISCUSSION

A statewide standard definition of functional and nonfunctional turf will align the collective understanding around what "Transformative Landscape Change" entails and make landscape transformation more actionable. The description should be simple, general, and easy to understand. While the definition should be robust enough for establishing policy and local codes, it must also be flexible in the face of changing conditions. While it will still be important to maintain some functional turf (e.g., playing fields), a standard definition can help not only reduce existing turf but also help prevent it from being the default ground cover installed in new development. Key discussion points follow:

- Functional and essential turf should be defined first to identify what communities value in their landscapes. The definition of nonfunctional turf will follow and consist of everything not included in the essential definition. Once defined, areas can be prioritized.
- The definition should apply to new development, redevelopment, and retrofitted landscapes. Commonly agreed-upon nonfunctional turf areas such as medians, curbsides, parking lots, parkways, streetscapes, tree lawns, and 4:1 slopes should be prioritized and consistent.
- There should be an understanding of why the definition was created when applying it to policy or regulation. For example, the goal should be to save water and promote climate-appropriate, sustainable landscapes. That may have implications for determining whether incentive programs or regulations should also require irrigation changes.
- Nonfunctional turf applies to both the area and the vegetation type. The definition should not prohibit the opportunity to install and maintain native and climate-adapted turf grasses and trees that require less water than traditional cool-season turf and/or other high-water-use plant materials, even in areas considered nonfunctional.
- Minimizing high-water-using ground cover vegetation installation and maintenance should be a goal. What replaces water-intensive turf is critical, and the state and municipalities should work to ensure a better alternative is installed and maintained.
- Decreasing the amount of water needed to irrigate nonfunctional spaces can reduce demands as long as those irrigation reductions are made permanent.
- Consistent messaging across Colorado will help with behavioral change and the socialization of climate-adapted and low-water-use landscaping.
- A standardized definition for functional and nonfunctional turf can result in all Colorado communities operating with the same baseline understanding of nonfunctional turf removal and installation expectations. A common definition will also help lead to the understanding and potential analysis of how much turf can be removed from our existing landscapes and the potential for water savings.

OPPORTUNITIES

- Colorado should define and broadly use shared terminology, such as ColoradoScaping or water-wise landscapes, to refer to climate-appropriate and regionally adapted practices that reduce water use alongside other relevant benefits that devalue the use of nonfunctional turf.
- Understanding the location of priority areas and areas with a high prevalence of nonfunctional turf can drive legislation and policy about new development and redevelopment. Geospatial analysis should be used to understand the amount of irrigable turf in Colorado and be flexible enough to accommodate pending and evolving definitions of nonfunctional turf.

CHALLENGES

- A Colorado-wide definition may conflict with existing locally-developed definitions, requiring updates in the local application of such a definition.
- Colorado communities and their landscaping vary across the state and are in different stages of development. A standard definition should be flexible enough to accommodate different development and established communities to maximize the effectiveness of the definition.
- A statewide definition will have to link nonfunctional turf to irrigation changes and ongoing operations and maintenance to realize water savings. It is critical that irrigation systems and watering schedules be appropriate for vegetation.
- Keeping valuable trees alive that were previously dependent on turf irrigation is critical and should be addressed with related irrigation changes. Ultimately, irrigation systems and schedules should match vegetation needs.
- If the definition and designation lead to a significant increase in turf removal, chemical application for removal could become a water quality issue that should be considered. Opportunities for responsible turf replacement and disposal that protect soil health and sufficient coverage should be explored as efforts increase.

WORKING DEFINITION OF FUNCTIONAL & NONFUNCTIONAL TURF

Any turf removal or prohibition of turf installation should enhance our landscapes and be responsibly replaced with lower-water plant and climate-adapted plant alternatives with efficient, appropriate, and functional irrigation. Justification for and a working definition of what is considered functional and nonfunctional turf follows.

JUSTIFICATION

Colorado recognizes that there are some widely agreed upon practical benefits to turf in a landscape, and it is important to maintain these areas with efficient and well-managed irrigation systems. While some uses of turf are universally functional regardless of location, others are much more context specific and therefore this definition needs to be somewhat flexible. Defining functional and nonfunctional turf can assist in identifying priority turf removal strategies and developing recommendations for installation restrictions through land use codes in new development and redevelopment. The purpose of defining functional and nonfunctional turf is to:

1. Understand what Colorado values in turfed areas and where they are located.
2. Identify areas where irrigation to maintain healthy turf should be prioritized when hydrologic conditions change.
3. Provide consistent messaging across Colorado to mitigate confusion and generate increased buy-in.

FUNCTIONAL TURF

Live turf ground cover that is consistently used and maintained for active recreational purposes and formal or informal civic or community events, is important to maintaining quality of life standards, and is highly resistant to foot traffic.

NONFUNCTIONAL TURF

High-water use turf used for ornamental purposes rather than active human recreation and regular community gatherings, including:

- Areas with low human use relative to their irrigation and maintenance needs.
- Areas that are shaped or situated in a way that does not allow for efficient irrigation.
- Areas that are not safely accessible and are dangerous to service and maintain.
- Examples of nonfunctional turf include areas adjacent to a street, driveway, parking lot, frontage area, or medians. Regardless of location, turf is nonfunctional if it is not regularly used for civic, community, or recreational purposes.

The discussion surrounding functional and nonfunctional turf invites some amount of subjectivity. Clearly differentiating between the two will be useful if these definitions become prescriptive in policy or regulation. Within the definitions, there should also be a pathway for regulatory exemptions.

3 Land Use, Water & Development – How do we address new construction?

This discussion captures a range of task force member conversations, opinions, and assertions. The actual recommendations on pages 27 and 28 reflect the ideas supported by the full consensus of the task force.

FRAMING

As the urgent need to address Colorado's housing challenges looms, the task force was charged by the Governor with addressing the challenges of transformative landscape change, knowing that removing and replacing high-water turf grass will be a tool to help Colorado grow sustainably. Addressing turf installations in new development and redevelopment is at the critical nexus of land use planning, local control, and water and utility regulations. Discussions revolved around identifying ways to help better align water and land use policies and programs to avoid the concurrent installation and removal of nonfunctional turf in our landscapes.

GENERAL TASK FORCE DISCUSSION

There is an urgent need to align the drive to retrofit and replace nonfunctional turf with the reality that turf grass continues to be installed in yards, medians, and new development properties. Fostering sustainable development in Colorado means not defaulting to the traditional installation of high-water turf as a landscape material. To do this, land use planning codes, policies, and practices should align from the onset of development to achieve ColoradoScapes that are drought-resistant, native or well-adapted, consist of low-water vegetation, and maintain efficient irrigation. Landscape codes and ordinances should be updated to require that new construction includes climate-appropriate landscape standards and materials and maximum irrigation benchmarks across all sectors (i.e., private, public, HOA, single-family residents, commercial, etc.). Key discussion points follow:

- Limiting the installation of new nonfunctional turf is a "no/low regrets" strategy that will help reduce the water required for new development and, over time, decrease the need for funding turf replacement. The opportunity associated with limiting nonfunctional turf installation in new developments should be pursued regardless of whether turf replacement programs continue to be a focus.
- Limiting the installation of new nonfunctional turf can protect turf replacement and removal effort investments.
- Water budgets for new developments could be a helpful tool in developing landscape standards with reduced turf. Alternatively, developing a standard maximum percentage or square footage of turf grass installation would help reduce the reliance on nonfunctional turf.
- Local governments could require a permit for all landscape and irrigation installations.
- Developers may be more aware of the water limitations on new growth than prospective residents are and should message the developmental shift to residents.
- Retrofitting existing turf installation may result in higher water savings in more developed communities, and local governments and utilities should prioritize their investments accordingly.
- Water savings from turf removal and replacement differ from savings from installation prohibition. Turf removal and replacement efforts save water already in the system, and prohibiting installation helps to reduce future water demands.

WATER DEDICATION POLICY

Water dedication requirements are policies that derive from Colorado's water adequacy statute (Colorado Revised Statue or C.R.S. §29-30-301, 304 and C.R.S. §30-28-136(h)(I) and (II)). Raw water dedication refers to rights to raw water or cash payments in lieu that developers must provide to a city or county to supply water to their new development. The dedication amounts are typically set at a defined number of acre-feet of water per acre of development, unit, or lot size. Cities and counties set these policies, and the level at which these are set can impact the types of installed landscapes.

- Restricting nonfunctional turf installation can benefit every Coloradoan as it can help conserve shared water resources. Landscapes that feature water-wise vegetation can help create visible examples of transformative landscapes, shift the new normal, help promote a water stewardship ethic, and push new development toward lower-water-using vegetation.

- If codes change to alter or reduce the dedication amount and the requisite amount of funding it requires, developers could save on the rights to water and use the savings to install lower water-use landscape alternatives, which do have a higher initial cost than high-water turf.

OPPORTUNITIES

- Landscape ordinance and turf retrofit programs should be implemented with consideration of other climate resilience and biodiversity goals (e.g., trees, shading, pollinators, stormwater, etc). Turf restrictions should be implemented to protect state and local investments in turf replacement. However, regardless of ongoing funding for turf replacement efforts, installing nonfunctional turf should be prohibited or restricted.

- Transformative landscape change goes beyond installation; maintenance and irrigation efficiency must be considered and incorporated into water-efficient designs for new development.

- Landscape costs resulting from new construction standards could impact affordable housing, and ways to mitigate increases in development costs should be explored.

- The state should promote and provide guidance on minimum regulatory standards for turf installation on new developments and redevelopment that municipalities and others can use to regulate nonfunctional turf installations.

CHALLENGES

- Striking a balance between state directives and local control.

- Collaboration will be necessary to reduce turf development by aligning goals across water providers, municipal land use planners, districts, and decision-makers. Water utilities cannot always affect land use codes, which means they need to work with the municipality or other local land use authority to ensure water conservation goals and land use planning work synergistically; however, these two groups may not fall under the same management or even have regular meetings.

- If landscape codes restricting new turf installation are tied to incentive funding (e.g., turf replacement rebates are only available in areas with nonfunctional turf limitations), some communities with lower capacity to create changes may be excluded from receiving seed funding.

- Many Colorado municipalities already support turf replacement, but passing code and ordinance language prohibiting installation is often a bigger hurdle.

- Landscape design and material may have an impact on housing development costs.

- Even though turf removal and replacement can provide public benefits beyond water savings, it can still be costly. That cost is borne by all Coloradans when turf removal is funded through state taxes, and/or utility customers may subsidize the cost of locally funded rebates and incentive programs. If water savings from turf removal avoid the need to develop new water supplies, storage, and infrastructure, it can result in fewer increases in water rates. However, if a city is growth-oriented, water reductions from turf removal may be applied to fuel more growth rather than reduce costs. The use of water savings from turf removal efforts will ultimately depend on a community's growth objectives.

- Utilities often bear the burden of running turf replacement rebate programs even when they have limited capacity, are not connected to municipal government, and lack an in-house landscaping and irrigation expert. This can result in inconsistent programs that are difficult to administer.

4 Model Landscape Ordinances – How do we advance them?

This discussion captures a range of task force member conversations, opinions, and assertions. The actual recommendations on pages 27 and 28 reflect the ideas supported by the full consensus of the task force.

FRAMING

The task force was asked to identify and evaluate existing model landscape ordinances and consider how model landscape ordinances could be actionable tools to address transformative landscape change.

GENERAL TASK FORCE DISCUSSION

Using landscape ordinances and more holistic land planning practices to implement and enforce water efficiency standards is one way to limit installations of new nonfunctional turf and water-intensive landscapes. Model landscape ordinances can offer a menu of options for a local government to choose from, but are only as valuable as what is adopted and implemented. The Colorado Department of Local Affairs (DOLA) has a DOLA Template Land Development Code that is currently being updated, and DOLA also works with communities on related issues. To better empower communities with capacity challenges to adopt or change code, the state should provide local governments with a guideline, general framework, funding opportunities, and or default language to assist with implementing mandatory landscape code changes. Key discussion points follow:

- New landscape ordinances could include efficient irrigation systems and maintenance schedules to ensure the correct amount of water is applied to landscapes.
- The DOLA Template Land Development Code is an important resource for local governments in Colorado for developing land use codes and could help reduce redundant or contradictory guidance.
- Any calculation for limiting turf by a certain percentage should account for the size of the lot. Maximum square footage limits for large properties should be incorporated so they cannot install excessive amounts of turf.
- There are several approaches to reducing outdoor water use (% turf grass maximums, hydro zones, max gallons/season/sq ft, water budgets), and their benefits should be balanced against administrative complexity.
- The state could direct local governments to update their landscape ordinances to reduce outdoor water use. This might be supported through the development of regional average supplemental water needs (volume/area) data for landscaped areas of a property. These can be used by local governments to establish water budgets for landscape plans and create a maximum limit of turf that can be installed in each sector.
- Mandating minimum turf requirements can create larger-than-needed irrigated areas and increase outdoor water use. Smaller lot sizes and denser development can reduce outdoor water demand.
- A model code is just a policy statement until local governments understand what the policies and standards actually achieve and how they work together to create more resilient landscapes.
- Additional exploration of the development and application of land use codes to reduce turf installation could offer guidance in informing adoptable guidance and practices at the local level.

OPPORTUNITIES

- Colorado should develop a broad understanding of local landscape ordinances and synthesize best practices and barriers for local governments to adopt them.
- Landscape ordinances and codes across the state should effectively limit turf installation, including restricting nonfunctional turf and eliminating antiquated policies such as turf minimum requirements.
- There could be a minimum standard for landscape ordinances across Colorado that local communities must adhere to that promotes water-wise installations. This might be supported through the development of regional average supplemental water needs (volume/area) data for landscaped areas of a property.

- Adopting regulations and codes that include a water element is often driven by including water conservation elements within an overarching Comprehensive Plan. Though advisory in nature, continuing to focus on water elements and conservation in Comprehensive Plans can drive the adoption of regulations and codes with more stringent water savings requirements.

CHALLENGES

- Any new state regulations could interfere with established community standards. The state should consider allowing for adoption flexibility to mitigate the burden of compliance.

- Required landscape ordinance minimums could burden communities with less political will and lower capacity for addressing water supply issues through land use restrictions.

- Each community is different in terms of how advanced their landscape codes are with regard to water efficiency. Given the range of starting points, immediate next steps for communities can vary widely, and the state should provide guidance.

5 Colorado Water Budget Landscape Standard – Could we establish a maximum gallons per square foot?

This discussion captures a range of task force member conversations, opinions, and assertions. The actual recommendations on pages 27 and 28 reflect the ideas supported by the full consensus of the task force.

FRAMING

The question of whether a Colorado Water Budget or establishing a maximum gallon per square foot (gpsf) irrigation limit is more desirable or useful for all existing and new properties was put before the task force for consideration.

GENERAL TASK FORCE DISCUSSION

The task force debated the framing of this question and felt it mixed two different topics. The core of this issue was that the term "water budgets'' encompasses a wide range of concepts. ***Educational Water Budgets*** can help customers understand their water use relative to a goal. ***Landscape Water Budgets,*** as seen in Denver Green Code, City of Aspen, City of Broomfield, provide a common definition of an efficient versus wasteful irrigation benchmark defined as a percentage of turf grass irrigation water requirement (IWR). The benefit of these benchmarks is that they create a more specific definition of a water-wise landscape and excessive irrigation. These definitions could eventually inform ***Water Budget Based Rate Structure*** development but should be well-established before doing so. Water budget based rate structures (seen in Greeley and Castle Rock) can build off a landscape water budget to reduce excessive irrigation through water pricing. This can be a cost-effective approach compared to enforcing watering rules but highly depends on water provider technology capacity and billing system requirements. At the same time, water budgets may not be the right approach for every water utility. Key discussion points follow:

- Considering a state-guided water budget methodology and/or maximum water allowance for landscapes could force a limit on irrigated turf while allowing for some flexibility in design choices that incorporate low-water landscape and turf within the water budget. The methodology for creating a water budget could be standardized statewide, while the individual budget for any one customer will vary based on local conditions.

A RANGE OF APPROACHES

Water budgets are one approach to achieving water savings and they can be used to create appropriate levels of outdoor water use. However, water budgets can be complex and data intensive.

Limiting nonfunctional turf installation appears to be the current prevailing approach partially because the administrative burden on water providers is smaller. Adopting a turf limitation, however, does not address excessive irrigation on the existing turf.

Water budgets have some advantages, including added design flexibility for customers and drought response as an alternative to watering day restrictions. Water budgets are a way to ensure that irrigation matches the landscape needs, regardless of vegetation type.

- Water budgets, especially if linked to tap fees and rates, can incentivize new and re-development to use climate-adapted landscaping that is appropriate for Colorado in lieu of large swaths of turf. Implementing water budgets for new construction also allows water users and developers to design their own landscapes within commonly established parameters.

- Water budgets paired with a conservation-oriented rate structure can financially discourage inefficient water use and encourage landscape transformation. The price signal from water budget based rates can drive water conservation through vegetation selection and irrigation behavioral change. Simple tiered rate structures can be effective and should identify a top tier representing an "excessive use" or "unsustainable use."

- The state could provide guidance on regionally appropriate gpsf for landscapes that could inform local landscape water budgets. A range of regional average plant irrigation requirements for low and medium water using vegetation as well as cool-season turf could be provided to communities to guide the development of an appropriate value.

- If zoning requirements allow for it, water budget based rates could be used to curb wasteful use that is prevalent in a small percentage of the highest water users. The highest water users may not typically respond to high-water bills but could respond to notifications or penalties when they exceed their allotted water budget. The highest water users and customer classes may vary between communities.

- Revenue from overuse in the highest billing tiers could offset the costs of retrofitting nonfunctional turf or other local water conservation programs. Water budgets and rebates can be customized by targeting customers with the highest water savings potential.

- Landscaping ET rates are typically based on cool-season turf. For the purposes of landscape transformation, any water budget calculation should be based on low-water use vegetation instead.

- Just because a property is larger does not mean they are entitled to more turf and more water use. Water budgets can be most effective when used with turf restrictions by limiting the amount of water-intensive vegetation on a property by percentage or square footage. Water budgets should avoid creating larger budgets for large lawns.

- Applying water budgets to new developments before existing landscapes are in place will help socialize the idea and facilitate community-wide adoption.

OPPORTUNITIES

- Develop a common methodology for calculating an irrigation target to define water-wise landscapes consistently. A water budget calculator that establishes a volume per area for various types of landscaping helps people understand what amount of irrigation is reasonable and still allows them to determine how to landscape their property. An upper limit to define water waste could also be calculated and defined as percentages of turf ET rather than gpsf to account for variation across communities.

- Fund a state-driven and utility-informed study and encourage information sharing on the value of water budgets and where they are already adopted in Colorado. Synthesizing available data can assist in marketing, education tools, and increased buy-in.

CHALLENGES

- Because the state does not administer utility billing, manage water meters, or set water rates, highly specific water budget recommendations from the state may be difficult to use at a local level. It may make more sense to set gpsf standards for outdoor irrigation to serve as guidance for local municipalities and water utilities to adhere to.

- Implementing some forms of water budgets can be complex and challenging and may require significant investments, capacity-building, updated metering, and sophisticated billing systems. Because of this, it may be more difficult for some water utilities to develop and implement.

- A standardized tool may not be able to account for regional climates, microclimate variability, altitude, etc. There may be room for some generalized standard targets that create a maximum gpsf for outdoor irrigation, but there is tremendous nuance in plant water needs in varying conditions. How will such a tool address climate/microclimate variability, altitude, aspect, etc.? There is room for some generalized targets that create a minimum standard (as in, no more than ever), but there is enormous nuance in plant water needs given microclimate conditions.

APPROACHES TO WATER BUDGETS

Typically, water budgets are determined locally to account for regional climates, microclimate variability, altitude, etc. Some options to approach this issue include:

- The State can establish conservation targets for outdoor water use (e.g., maximum gallons per square foot) for each region of Colorado that considers varying climates and ET rates.

- The State could base water budgets on the amount of supplemental water used by cool-weather turf and recommend a percentage (i.e., X% of 24" annually) that is appropriate for climate-adapted landscapes to account for different climate zones and ET rates. If Colorado experiences a wet period during growing seasons, this percentage may be more flexible than a fixed number.

- The State could impose default water budgets and set maximum outdoor water use per square foot standards similar to the City of Boulder (15 gallons per square foot annually) and Denver (10 gallons of potable water irrigation per square foot annually).

- The State could adopt the EPA's WaterSense Water Budget Tool approach (see formula below) to mandate regionally appropriate water budgets. The tool could be used to calculate the desired and allowable amount of water allocated for a landscape to develop tailored site-specific water budgets. The WaterSense Water Budget is designed to account for plant type, plant watering requirements, irrigation system design, and precipitation. The tool could produce regionally specific and comprehensive water budgets if the State establishes standardized limits for how much cool-weather turf properties can be maintained in different sectors.

Baseline = $ET_o \times A \times C_u$

ET_o = Local reference evapotranspiration (inches/month) ◀ *This could be adjusted to drive a shift to ColoradoScapes*
A = Landscaped area (square feet)
C_u = Conversion factor (0.6233 for results in gallons/month)

6 Equitable Transformation – What are the main equity concerns?

This discussion captures a range of task force member conversations, opinions, and assertions. The actual recommendations on pages 27 and 28 reflect the ideas supported by the full consensus of the task force.

FRAMING

Equity concerns are frequently cited in conversations on turf replacement, but the nature and scope of those concerns often vary from person to person. The task force was asked by the state to consider the major equity issues related to turf replacement and determine what tools are or could be available to reduce equity-related concerns.

GENERAL TASK FORCE DISCUSSION

Equity is threaded through many components of the conversation of turf replacement. Considering equity and affordability when addressing urban water conservation can help avoid unintended impacts to disadvantaged communities. Expanding the goals of transformative landscape change beyond just water savings to include things such as drought-resilient and attractive landscapes can help create pathways for low-income communities to access available opportunities for landscape change. For example, offering programs subsidizing water-wise gardens or regionally appropriate, climate-adapted, and low-water trees may build climate resilience and buffer heat island impacts. Equity issues occur and develop differently. Key discussion points follow:

- Decision-makers need to ensure large-scale turf replacement efforts are equitable and that landscape transformation provides an opportunity to enhance communities and ensure existing problems aren't exacerbated.
- The best landscape investments may not be turf removal programs for disadvantaged communities that don't have turf. Instead, those communities may need increased irrigation to expand or create climate-appropriate landscapes in their yards or in the parks they can access. Funding for municipal landscape restoration projects can help low-income community members obtain low-water trees or plants to add living materials to their communities. Such programs can potentially be subsidized by revenue earned from the highest water users in a community who may be wasting water.
- Disadvantaged communities often lack green spaces, resulting in quality of life and health-related issues. Heat island and climate-related issues are exacerbated by a lack of tree canopies and green spaces, and Colorado should remedy this by offering landscape restoration programs for income-qualified residents and disproportionately impacted neighborhoods.
- The cost of water can create landscape disparity across the state. Some communities are "green," while others are not, and any water conservation approaches should seek to reconcile these inequities. Communities should be strategic about where turf may be lacking or where additional greenspace may serve a function.
- The revenue generated from new tap fees could be partly used to assist in low-income turf replacement and landscape restoration projects.
- Communities can adopt minimum active green space standards to offset the potential removal of turf nonfunctional spaces.
- Decreased costs may be associated with the landscape maintenance of water-wise vegetation over time.
- Understanding the impact of rates and fees on lower-income communities and residents will allow decision-makers to make equitable decisions.
- Consider rebate programs for new and existing community developments that cannot pass new development landscape standards.
- Consider replacing grass with trees and shrubs, especially in areas with limited vegetation outside of grass.

OPPORTUNITIES

- Considering equity issues in policy and regulation development will allow for more water conservation participation.
- Fund studies on the opportunities for landscape restoration aligned with water-wise irrigation levels to enhance community aesthetics, increase gathering and play areas, and mitigate heat island impacts.

CHALLENGES

- Approaching landscape transformation in an equitable way may result in increased water use on specific properties and parcels to enhance community amenities. This could conflict with the primary goal of water savings.
- All residents and their financial realities must be considered when targeting water savings.
- If water savings are the primary goal of turf replacement incentive programs, low-income communities that lack large lawns may not be the prioritized recipients or able to take advantage of these programs.

7 Water Affordability & Tap Fees – Can conservation support affordable housing?

This discussion captures a range of task force member conversations, opinions, and assertions. The actual recommendations on pages 27 and 28 reflect the ideas supported by the full consensus of the task force.

FRAMING

The lack of access to affordable housing is a critical issue in Colorado today. New housing costs have increased alongside water and tap fees, which impact the cost of development. Water providers charge tap fees for new water lines and meters (or taps) added to the system. These fees help offset the utility's costs to make the connection (the true tap fee). They also include higher costs for the demand placed on the system as it grows and ongoing capital improvement costs to maintain the system, treat water, etc. The latter is often referred to as plant investment fees, and other charges may be associated with a new tap. Still, for this discussion, the term tap fees is being used to broadly refer to these fees collectively. The task force was asked to consider how water development costs affect the availability of affordable housing. The task force evaluated strategies, including tap fees, to reduce the cost of housing by changing how we design and develop communities to make them more water-conscious and less costly to consumers.

GENERAL TASK FORCE DISCUSSION

A fundamental goal of landscape transformation is reducing the water requirement for a property down to a targeted and appropriate level. Reduced tap fees for less water-intensive landscape design are one strategy that can help Colorado responsibly develop affordable housing and ensure new development is water-wise. Utilities set prices differently, with some tap fees based on meter size, some on the volumetric amount of water a new development will use, and some a combination of both. This creates a disincentive to use less water than the developer pays for because if developers are paying for the water either way, there is no need to invest in water-wise landscapes. Tap fees should be set to avoid this outcome and to incentivize water-smart landscape design. Driving landscape change through tiered tap fees based on future landscape water use during construction can help avoid excessive irrigation on newly installed turf. Basing tap fees across customer classes (i.e., CII, multi-family, single-family) on volumetric amounts based on a future allotted use allows more opportunities to assess, adjust, and incentivize conservation and efficiency. Volumetric and conservation-oriented tap fees can be designed to encourage landscape efficiency through developmental costs while discouraging the installation of nonfunctional turf. Key discussion points follow:

- Economic realities are already driving developers to think differently about how they build. Some developers naturally choose less water-intensive landscapes (i.e., lower amounts of turf in strategic locations) in parts of Colorado due to the high cost of water connections.
- Developers sometimes have to provide more water than needed because of the water adequacy rules that local governments require for new construction. Water dedication requirements could be modified for developers demonstrating lower anticipated water use.
- Tap fee rates are already helping to drive landscape development change, as expansive lawn development is not economically feasible.
- The prohibitive cost of large lawn development is helping to drive a market change towards more water-efficient, smaller lots, and density; code changes can also support denser development. Dense development can also allow developers to sell more properties on less acreage.
- Installing fewer water-intensive landscapes can result in savings from smaller tap fees. These savings could be passed on to reduce housing costs
- There could be a pathway to create demand-offset utility programs that use revenue from the highest tiers to offset the cost of lower-tiered water-efficient incentives. If deployed carefully, this could result in a net neutral development policy with the revenue from the excess water rate tier subsidizing responsible and affordable housing development.
- The state could support local water providers by subsidizing tap fee reduction costs for developing sustainable landscapes.
- An excessive outdoor water tier could be standardized across Colorado to facilitate and message a Statewide expectation for water conservation.

OPPORTUNITIES

- The state should fund a demand analysis to understand the impact of tap fee and rate changes on individual systems across Colorado.

- Water providers can tailor tap fees to anticipated individual water demand by volume to incentivize conservation and promote affordability. Rate structures can be used to provide ongoing support for this.

CHALLENGES

- The business model of water utilities inherently lacks significant flexibility, as roughly 95% of revenue goes to fixed costs. The revenue is required for operations, maintenance, and repaying incurred loan debts. Reducing tap fees to allow for affordable housing is often at odds with the standard business model.

- Water utilities have to balance water efficiency with revenue recovery. The costs of water supplies and water system operation are embedded in fee structures. If subsidies and incentives are offered for water-efficient outdoor development for affordable housing, the cost has to come from somewhere, and some water providers may not be equipped to absorb the cost.

- Although connection fees are one of many factors influencing the cost of housing, if they are uniformly raised too quickly, water rates can become too high and drastically increase housing costs.

8 Resilient Funding for Drought – Are there economic pathways for more effective drought restrictions?

This discussion captures a range of task force member conversations, opinions, and assertions. The actual recommendations on pages 27 and 28 reflect the ideas supported by the full consensus of the task force.

FRAMING

Irrigated turf has often been thought of as a drought resilience safety net, whereby in times of deep drought, watering restrictions can reliably reduce water use for a utility needing to preserve water in its reservoirs for essential services. As Colorado looks to shift away from relying heavily on turf grass for our landscapes, what will be the impacts from a drought resilience standpoint? Moreover, if outdoor water demand drops consistently, what impacts the bottom line for water providers, natural ecosystems in source water communities, and many more known and unknown stakeholders?

GENERAL TASK FORCE DISCUSSION

Drought has been a major issue in Colorado, and awareness and sensitivity to it have been elevated in the last few years. Various factors affect the way water providers declare drought, as decisions depend on local water supplies, conditions, and political will. The lack of uniformity can cause tensions if headwaters communities (typically on the West slope) are experiencing vastly different water conditions than receiving communities (typically on the Front Range). For example, drought declarations, regardless of location, can reduce flexibility for water providers to implement creative strategies to minimize regional impacts. Long-term water conservation investments can reduce the need for new supply, maintain system flexibility (the ability of a water provider to manage their supply during anticipated and unanticipated variability), and reduce impacts on headwaters communities and ecosystems. Building sustainable resilience is about implementing tactics that result in long-term water savings rather than just short-term demand reductions. Key discussion points follow:

- Shifting stage one drought restrictions into standard operations, such as voluntary reductions for outdoor watering, has been something some water providers across the state have successfully employed. Water providers could permanently limit the number of watering days per week, making the practice standard and not just a tool during water shortages. Permanent limits on watering days can reinforce a water conservation ethic in a community.
- Enforcing water budgets can help limit outdoor water use.
- While water budgets may not be the right approach for every water utility, research from the Alliance for Water Efficiency (2020) shows utilities with water budgets had among the most effective drought responses. Landscape water budgets can be reduced during drought response to meet outdoor watering restriction targets. Additional research may be needed to assess how other billing structures can similarly support drought response adjustments.
- Water budgets and other tiered billing structures that allocate a specific volume of water for outdoor use can be tied to drought management plans. If there is a need to reduce water demand by 20%, utilities can adjust water budgets and monitor meter reads to ensure compliance.
- Turf reductions achieved by limiting new turf installation and nonfunctional turf removal can be leveraged as a long-term investment in demand management that can reduce the need for reactive drought response measures and help communities be more drought-resilient.

DROUGHT RESILIENT LANDSCAPES

Long-term investments in water conservation can help to mitigate drought impacts. Climate-appropriate landscapes are one key to making cities drought resilient in ways that help cities save water and also help to maintain the ecosystem benefits of landscapes that can continue to thrive with less irrigation. Long-term investments in water-wise landscapes, irrigation efficiency, and behavior change can help cities reduce water use, while mitigating the need to declare drought.

WATER MOVES ACROSS THE STATE

Water moves across the state over the continental divide through some 27 ditches and tunnels to move 500,000 acre feet of water each year. About 80% of the state's water falls west of the continental divide, but 90% of the population lives east of the continental divide. As water moves across the state it often comes from headwaters communities. This water is used by agriculture, large industry, and municipalities for indoor and outdoor water demands. Because of this dynamic, drought conditions and drought restrictions can be impactful at the local, regional, and statewide level.

- Communication is crucial when piloting or implementing drought restrictions, and utilities should work to inform their customers about changes and updates.

- Necessary water restrictions during a drought will have fewer negative impacts on landscapes that are built to be drought-resilient and require less water.

OPPORTUNITIES

- Continue and support drought resilience conversations between the Western and Eastern Slope communities to promote collaboration and mutually beneficial coordinated action. For example, ongoing conversations and partnerships have resulted in positive actions to support voluntary releases to mitigate low flows and high temperatures. Those conversations should continue.

CHALLENGES

- Water utilities are partially funded by the sale of water and must plan for the impacts of conservation programs on system-wide demands.

- When drought restrictions are put in place, utilities can experience reductions in revenue, so there is an inherent disincentive to declaring drought early because it can often affect the utilities' bottom line.

- If outdoor watering is reduced significantly through turf removal, utilities will have less water savings potential during a drought and may need to adjust their operations accordingly. However, resilient landscapes achieved through water conservation efforts could reduce the need to respond to a drought actively.

SECTION IV

ADDITIONAL DISCUSSION AREAS

This discussion captures a range of task force member conversations, opinions, and assertions. The actual recommendations on pages 27 and 28 reflect the ideas supported by the full consensus of the task force.

In addition to the eight core questions, the task force also discussed a variety of subjects related to landscape water conservation, turf replacement, and landscape transformation. The themes emerging from these discussions are documented below. The ideas in this section do not necessarily represent recommendations with broad agreement. Rather, they are summaries of various topics that may warrant further discussion and investigation.

COMMUNICATION AND EDUCATION

Theme 1: Motivating Behavioral Change Through Consistent Messaging

All Coloradans play a role in stewarding shared water resources, but to effectively employ conservation tools, they must understand them. This requires good information, support, and clear communication.

To achieve Colorado's transformative landscape change goals, consistent and accessible communication should be provided to the public to raise collective awareness around the water-wise landscape options that can thrive in Colorado and the multiple benefits of these kinds of landscapes. Consistent messaging with standardized terminology is essential to help eliminate confusion and allow the public to understand what replacement materials and landscapes can look like. For example, even the word turf can be interpreted in many ways, including as other types of grass, including artificial, cool-season, warm-season, or native. Building a general understanding of what terms mean can promote action and local resource sharing. Enhancing water and landscape literacy through educational materials and engagement can increase buy-in and promote voluntary efforts to conserve water.

The state, local governments, and water utilities should collaboratively promote a One Water ethic to align messaging and mitigate confusion. A statewide messaging campaign could feature visual representations of turf replacement efforts and other outdoor water conservation tools to generate excitement and spur action.

Water users could also benefit from additional information about what constitutes reasonable outdoor water use, what climate-appropriate landscapes can achieve, and how to irrigate properly to the landscape's needs. It is also important to communicate the variables that can affect water-wise landscape efficiency to temper expectations and offer tools for improvement.

Theme 2: Explore Standardized Landscape Industry Education

The State Board of Landscape Architects regulates and licenses landscape architects; however, it does not regulate or require the registration of landscape architect firms, landscape designers, installers, or contractors. Water is a precious resource, and the state should explore the feasibility and effectiveness of requiring education about efficient and effective water use and licensing for professionals responsible for installing and maintaining landscapes and/or irrigation systems.

Learning the most effective ways to install, use, and manage irrigation systems in a water-wise manner is vital, and installers and users need to understand the tools they are using. The state could comparatively evaluate how existing landscape contractor training and certification materials promote water-wise landscaping best practices in order to assess the pros and cons of existing education and certifications. The evaluation can build on the work Western Resource Advocates has produced and can inform recommendations on how best to build landscape industry education resources and capacity in Colorado. The state could assemble a working group of water providers, landscape professionals, and water efficiency experts to help identify best practices to inform educational materials and potential certification requirements.

If the state finds uniform landscape certifications are a valuable tool, any requirement process should be phased in, accessible, bilingual, and attainable. Alternatively, the state could support the development of performance-based landscape maintenance contract templates incorporating water-wise best practices. A template could be developed in collaboration with resources from the Associated Landscape Contractors of Colorado's Sustainable Landscape Management and the Sustainable Landscape Community to integrate water-wise best practices into a contract template for commercial, multifamily, and HOA properties to evaluate and hire landscape contractors (see also *Homeowners Associations* under *Focus Areas for Target Action* on page 24).

Theme 3: Conservation Tools and Behavioral Data Analyses

A suite of complementary water conservation programs that address multiple end uses can help a water utility manage water demands. While not all water utilities have land use authority, they still have tremendous power in shaping how water is used and where it is applied through using conservation tools. While some water utilities are making great strides in water conservation efforts, significant opportunities for additional efforts exist around the state that can help move the needle on water savings. There is a need for a balanced and equitable approach across the state to accomplish common water conservation goals and reduce the projected gap between water supply and demand.

Various conservation strategies and tools can achieve water savings, and it is important to understand how they work, how they are received, the estimated cost, their potential return on investment, and the barriers to implementation. Tracking how conservation tools result in measurable savings and help facilitate behavioral change is vital to understanding what is effective and what should be funded moving forward. Gaining more insight into what policies or media campaigns can help move the needle for water savings statewide and regionally could be a tremendous asset for decision-making. The state, municipalities, and water providers would benefit from understanding what drives reluctance to embrace landscape transformation so that tailored education materials can help fill the gaps.

FOCUS AREAS FOR TARGETED ACTION

Theme 1: Native Grasses

Native grasses can serve as sustainable, cost-effective, low-water-use groundcover and comparable replacement material for nonfunctional turf. While native grass can sometimes be challenging to install and maintain, interest and information about using it is rapidly growing in Colorado. Work to understand how to leverage native grass installation is ongoing and led by the Native Grass Working Group. The group seeks to understand better grass types, improved installation techniques, establishment requirements, irrigation, and ongoing maintenance as it differs from traditional turf installations such as Kentucky bluegrass. As more is understood, there will be a need for information sharing and education to inform landscapers and the general public on the effectiveness, benefits, and requirements of using the low-water use alternatives.

Theme 2: Address Nonfunctional Turf

The state could use a standardized definition of nonfunctional turf to designate high-priority areas to limit installation and focus removal efforts. The designations should be statewide, comprehensive, and land-use-based rather than identifying specific sector restrictions. Defining where nonfunctional turf installation should not be allowed by specific areas (i.e., medians, right of ways, etc.) may be better than identifying which sectors must adhere to installation limitations.

Any state or local policy restricting turf installation should include language about matching appropriate irrigation to the landscapes so old water-intensive irrigation practices do not carry over with new vegetation and installation requirements. Any language around the restriction of nonfunctional turf installation should also promote the retrofitting of similarly established areas.

Theme 3: Identify and Work with the Highest Water Users

According to an Alliance for Water Efficiency (AWE) report, most water users irrigate with less water than a landscape requires, but around 13% excessively overwater. The state could work with water utilities to understand the highest water users and develop marketing strategies to target customers and areas with the most potential for water savings. Water utilities should work to understand effective tactics to encourage conservation with the largest water issues to build understanding and motivate behavioral change. If a high-water bill does not spur behavioral change, the state could provide guidance to utilities to develop a fine schedule to draw attention to the issue and provide support and guidance for updating landscapes and irrigation systems to become more sustainable.

Theme 4: Accelerate Replacement Efforts

Colorado communities are at different developmental stages, and imposing restrictions on new nonfunctional turf installation may ignore more developed areas with high potential for water savings. While limiting nonfunctional turf installation is important in all communities, water savings may be just as significant in turf replacement efforts for more developed communities with large amounts of nonfunctional turf. The nonfunctional turf definition could be applied to mandated retrofitting to increase water savings where development is either naturally densifying or slowing. Any state or local policy regulating retrofitting should include language about matching appropriate irrigation to the replacement landscapes so old water-intensive irrigation practices do not carry over with new vegetation and installation requirements. Retrofitting turfed areas that require high amounts of water could potentially help offset the cost of new developments, which could impact the availability of affordable housing.

Theme 5: Homeowners Associations (HOAs)

HOAs can be challenging when crafting policies to promote sustainable landscapes and regulate irrigated nonfunctional turf. However, HOAs are still a critical water-saving focus area as there are more than 10,000 HOAs in Colorado with an estimated 2.4 million residents. The large common areas and landscaping standards for residents are managed by HOAs, meaning the HOA managers are a key constituent that may need additional communication and educational resources about how to advance transformative landscape change. Given the large area of land these properties own and the number of residents, HOAs could help set landscaping and irrigation practices standards and significantly reduce the turf used for broad ground coverage. Where a municipality focuses turf removal efforts and other water conservation tools will largely depend on the customer class distribution, the most significant sectors, community benchmark goals, previous actions, and political will. HOAs should be part of the conversation, and local governments should explore ways to increase their involvement with transformational landscape change. Getting HOA boards supportive of turf replacement on their properties will be essential but challenging. The state could provide additional guidance, coordination, and incentives for HOAs to manage established common spaces' sustainability, replace nonfunctional turf, and update irrigation systems. HOA-specific education, resources, and outreach could be targeted to HOA board members and other decision-makers. Focusing on revising HOA landscape codes to eliminate turf minimums and promoting conservation-based landscape rules could also significantly reduce water use.

Theme 6: Metropolitan (Metro) Districts

As Colorado moves away from the standard HOA for detached housing, Metro Districts are becoming more prevalent. Metro Districts are quasi-governmental or quasi-municipal entities set up to assist in funding large residential construction projects that operate under Title 32 (Special Districts Act) and are largely the only tool to develop because of economic limitations. As Metro District water bills increase, they translate to homeowners, so there is an inherent incentive to limit outdoor irrigation to cut down on costs. The state should work to understand how best to incorporate Metro Districts into water conservation efforts.

TURF REPLACEMENT INCENTIVES

Theme 1: Continue State Funding for Turf Replacement

State investments in turf removal and replacement have helped spark more interest and uptake across the state. Continuing funding through a specific program with staff support or Water Plan Grants will be helpful to continue to advance these efforts. Programmatic adjustments could help target funding in ways that reinforce the connections between land use planning and water planning. For example, funding could help build capacity for implementing code changes, and/or funding could be linked to turf installation restrictions. The latter was done in Utah; however, 95% of Colorado's original turf replacement funding went to water utilities, and not all of them have the ability to make code changes because they lack land use authority. Funding could also be made available for irrigation system upgrades and ongoing maintenance, as irrigation management is critical in realizing water savings.

Theme 2: Provide Industry Tax Incentives for Low-Water Plant Sales

Providing a tax credit for Big Box Stores, Greenhouses, and other providers can help create market incentives for local stores to offer low-water plants and grasses and encourage turf replacement. A tax credit for water-wise vegetation can incentivize the installation of Colorado-appropriate landscapes (including native and other low-water-use grasses) and disincentivize water-intensive annuals and grass seed. Any action on regulations of plant sales should be preceded by significant research by an unbiased organization to identify barriers to greater availability of water-wise plants.

A tax incentive could be coupled with a state ColoradoScaping marketing campaign, including state outreach and signage to promote ***WaterSense Water-Smart Landscapes***. Promotional efforts would aim to partner with industry/businesses to help create market incentives for local stores to push low-water plants and encourage turf replacement (over higher water annuals and grass seed). Similar efforts have been made through the Environmental Protection Agency (EPA) WaterSense initiative for indoor fixtures and faucets. Lessons could also be learned from the Colorado Nursery and Greenhouse Association's ***Grown in Colorado*** campaign.

PLANT MATERIALS AND IRRIGATION

Theme 1: Influence Plant Materials Sold in Colorado

The default standard for municipal landscaping has been cool-season turf (i.e., Kentucky bluegrass), and gaining widespread acceptance and social buy-in for alternative materials will take some time. The state and local governments should consider building on the momentum, educating the public, and promoting the continued adoption of native and climate-adapted grasses.

To enable the widespread adoption of climate-adapted vegetation, the buying process for materials should be accessible and convenient. Native (e.g., blue grama, buffalo grass) and low-water-use grass (e.g., Dog Tuff™ Grass, Tahoma 31) installations that provide comparable aesthetic functions can be publicized and promoted through purchase incentives. There should be communication that planting, irrigation, and maintenance requirements must shift to help set expectations. The success of policy regulating the purchase of inefficient appliances and promoting WaterSense standards (C.R.S. §6-7.5) proves the state has the tools to influence the market (see efficiency standards). The state could require retailers and distributors to include informational tags indicating water requirements and product care instructions. More research could help understand how education materials and training might influence how year-round and seasonal staff at retailers and nurseries sell and promote water-wise vegetation and maintenance components.

While the development of plant lists has proliferated across Colorado's Front Range, foothills, and plains, other regions of the state have different climate realities and vegetation needs. The state could help fund the development of a regional plant list incorporating appropriate irrigation requirements in areas without the resources. Developing plant lists for other parts of the state can help accelerate the adoption of water-wise landscape policies and support and complement market shifts.

Theme 2: Create Statewide Irrigation Standards

If irrigation system design and scheduling do not match landscape watering needs, over-watering can result. Functional turf can also benefit from more efficient irrigation systems to mitigate unnecessary over-watering.

While irrigation best practices are well known, water providers and municipalities have varying rules for irrigation and landscaping. To ensure landscapes operate with well-designed and managed irrigation systems appropriate to the irrigated landscape, the state could develop an irrigation standard incorporating water-wise equipment, scheduling, installation, and maintenance guidance. The state could collaborate with water providers, landscape professionals, and water efficiency experts to identify, adapt, or develop a model irrigation policy, such as the Irrigation Association's previous efforts.

To promote standardized irrigation practices, the state could offer guidance on water waste ordinances, outdoor watering schedules with seasonal adjustments, smart irrigation controllers, rain gauge and moisture sensors, flow meters and master valves, limited application rates, separate irrigation meters for large irrigated area, standards for spray sprinklers, consistently scheduled audits, and required maintenance. The state could standardize irrigation requirements in new construction. Colorado could expand appliance standards for irrigation components to include smart controllers, rain and moisture sensors, flow meters, and master valves. The state could require retailers and distributors to include informational tags on all irrigation products to encourage efficient usage beyond what WaterSense evaluates. Retailers and distributors should be educated on the products and related maintenance to inform the customer better.

Separate irrigation meters should be normalized for larger irrigated areas for easier leak detection and to mitigate unnecessary water use. The state could invest in the more widespread use of submetering and prioritize installation on larger properties. Recommendations for submetering could be helpful for communities that do not have specific irrigation requirements.

SECTION V

GENERAL AREAS OF AGREMENT & RECOMMENDATIONS

GENERAL POINTS OF AGREEMENT

The task force had many areas of general agreement. These are predicated on the facts that population growth, long-term warming, and drying trends known as “aridification,” major wildfires, and multi-year droughts collectively impact Colorado’s water system and present unique challenges and opportunities. Additionally, Colorado’s built landscapes have been traditionally dominated by water-intensive turf, and will continue to require increased irrigation due to higher evapotranspiration rates as temperatures rise, resulting in higher outdoor water demand as irrigation seasons expand and deepen and people irrigate earlier and longer. For all of these reasons and more, the task force generally agrees that:

- The potential impact of reduced outdoor irrigation is significant to the local water supply even as it is a smaller percentage of total state water use. Outdoor water savings may be more complicated to measure than indoor savings, but there is growing interest in advancing this work.
- Continued reductions in indoor and outdoor water use are a key way to stretch available water supplies further.
- While not the only outdoor water conservation tool, limiting turf installation and accelerating widespread turf removal are important when considering water security and resilience for individual water utilities and municipalities.
- Actual water savings from turf removal will depend on replacement landscape material, appropriate irrigation, human behavior, and ongoing maintenance.
- Colorado must address landscape installation practices, irrigation efficiency, and low-water replacement vegetation alongside turf replacement and installation to decrease water used for outdoor irrigation.
- Conservation and sustainable land use practices that reduce outdoor demands can delay, reduce, or replace the need for new supplies, storage, and other infrastructure and allow for continued growth.
- Municipal water conservation efforts can take pressure off the agricultural community, avoid buy and dry (buying up agricultural properties for water rights), reduce the need for water transfer projects and the impacts on Western Slope communities, and help protect shared environmental water resources.
- Landscape transformation is an essential strategy for increasing resilience and water security in Colorado, and progress should be valued over perfection as we explore effective pathways to landscape transformation.

Recommendations and discussions within this document can be moved forward incrementally and on different scales. While the recommendations are not necessarily prescriptive, the suggestions are thoughtful insights into how Colorado can achieve common transformational landscape goals.

TASK FORCE RECOMMENDATIONS

While the full compendium of this report is useful, the task force reached consensus on the following recommendations. The task force recommendations are supported by ***Areas to Research and Analyze*** as well as ***Complementary Efforts to Watch***, detailed on the following page. These recommendations provide solid direction for decision-makers or anyone curious about how to advance transformative landscape change in Colorado.

RECOMMENDATIONS TO ADVANCE

- **ADOPT TURF POLICY** - Support legislation prohibiting installations of nonfunctional water-intensive turf as defined by the task force in new and redevelopment and support local adoption of turf limitations.
- **SUPPORT TURF REPLACEMENT IN EXISTING DEVELOPMENT** - Continue state support and funding for voluntary turf removal replacement programs and projects, and support local implementation of turf policy and incentive programs.
- **PROMOTE IRRIGATION EFFICIENCY** - Require efficient irrigation design and equipment in new construction and promote efficient irrigation equipment, management practices, and maintenance across all landscapes, new and existing.
- **ADVANCE WATER AND LAND USE INTEGRATION** - Support integration of water supply and demand planning, land use and comprehensive planning, and implementation tools to further water efficiency efforts and support climate-appropriate landscapes.
- **IDENTIFY TARGETS** - Develop a Colorado-wide methodology for calculating outdoor water use targets that can be used at the local level to define water-wise landscapes and wasteful irrigation levels.
- **PARTNER WITH INDUSTRIES**- Collaborate with landscape professionals and businesses to advance landscape transformation solutions and build capacity.
- **USE PRICE SIGNALS** - Encourage pricing mechanisms such as conservation-oriented tap fees and water rates, water dedication policies, and water budgets to encourage and maintain affordability for efficient use and discourage inefficient outdoor water use.
- **ADDRESS EQUITY CONCERNS** - Incorporate equity into the development of outdoor water conservation policies, regulations, rate structures, fees, and programs to ensure water affordability for essential use and increase access to landscape benefits community-wide.
- **CREATE A MESSAGING CAMPAIGN** - Create educational resources and marketing campaigns with standardized messaging around the components and definitions of ColoradoScape, functional turf, nonfunctional turf, and climate-adapted vegetation to promote successful landscape transformation and ecosystem function.
- **SUPPORT STATEWIDE COLLABORATION** - Promote ongoing investments in water conservation that advance creative solutions and partnerships to address statewide water challenges alongside work to maximize municipal water portfolios and operational flexibility.

AREAS TO RESEARCH AND ANALYZE

The ideas around landscape transformation and turf replacement are quickly evolving as new information becomes available. Because of this, additional research and analysis could support many of the task force recommendations. The following list is not meant to be exhaustive, but are topics that were pulled out of task force conversations that may need additional exploration. The titles of each area are noted below with the full text appearing on page on the following page.

- **Colorado Turf Totals**
- **Water Savings**
- **Turf Removal and Replacement Guides**
- **Turf Removal Impacts**
- **Understanding Land Use Codes**
- **Appropriate Vegetation**
- **New Development Cost Analysis**
- **Impacts of Water Conservation Tools**
- **Water Budget Advancement**
- **Equitably Distributed Landscapes**
- **Landscape Industry Development**

AREAS TO RESEARCH AND ANALYZE

The Task Force also identified several areas and ideas that may require additional understanding before advancing. The following topics could be eligible candidates for grant funding through CWCB's Water Plan grant program or other funding opportunities. In no particular order, the topics include:

- **Colorado Turf Totals**: Evaluate Geographic Information System (GIS) data across Colorado (locally and statewide) to determine the total amount of irrigable turf. Where feasible, analysis could apply nonfunctional turf definitions to mapping to better understand the potential for removal, water savings, and policy advancement.
- **Water Savings**: Study the potential and actual long-term and sustained water savings from turf removal and how human behavior impacts estimated savings.
- **Turf Removal and Replacement Guides**: Develop a step-by-step guide to implement best practices for turf installation and removal that can be tailored to all sectors and varying property sizes to improve knowledge accessibility. Separate guides could be available for residential do-it-yourself (DIY) efforts and water providers for a multi-pronged informational approach
- **Turf Removal Impacts**: Research the known and unknown effects of accelerated and widespread turf removal on ecosystems, water quality, affordable housing, and existing inequities.
- **Understanding Land Use Codes**: Compile best practices and case studies of various municipal landscape codes and model codes from across Colorado that highlight how to reduce nonfunctional turf installation and eliminate antiquated policies such as minimum turf requirements in ways that help reduce barriers for local governments to help accelerate adoption.
- **Appropriate Vegetation**: Develop regional plant and grass lists with low-water use vegetation options for turf replacement.
- **New Development Cost Analysis**: Study the impacts on affordable housing resulting from potential cost shifts from new landscape standards in new construction and ways to mitigate any potential cost increases for new developments. Conduct a statewide demand analysis to understand the impact of tap fee and rate changes on individual systems and housing costs.
- **Impacts of Water Conservation Tools**: Analyze the effectiveness of different conservation tools and programs across customer classes and how they impact water use behavior to help improve understanding of the best practices to reduce outdoor water use. Learn from previous studies (i.e., The Alliance For Water Efficiency's 2019 Landscape Transformation Study) to evaluate different outdoor conservation efforts, compare and rank implementation difficulty, estimated costs, and potential water savings to help those implementing turf programs understand better where it is easier/harder to start.
- **Water Budget Advancement**: Identify if a standardized water budget calculation or tool could be developed for water providers and users.
- **Equitably Distributed Landscapes**: Realize opportunities where landscape restoration aligns with water-wise irrigation levels, enhanced community aesthetics, increased gathering and play areas, and the mitigation of heat island impacts.
- **Landscape Industry Development**: Find ways to include all industry professionals equitably and create pathways for increased education and training by evaluating certification opportunities for landscape professionals with a focus on efficient water management.

COMPLEMENTARY EFFORTS TO WATCH

The task force also noted a few efforts that were forthcoming that may inform this work and should be tracked. These included the:

- Colorado Springs Utilities Native Grass Guide for Installation and Maintenance
- Colorado Water Wise Municipal Best Practices Guide
- Colorado Water Conservation Board Colorado Water Plan Actions
- Department of Local Affairs Template Land Development Code
- New funding sources for the state's Turf Replacement Program
- Western Resource Advocates' Water Wise Landscapes: A Cost-Effective HOA Investment in Resilience

CONCLUSION

When the task force was created, the intent was to find ways to achieve water savings through transformative landscape change beyond turf removal. Task force members contributed ideas and integrated other important goals to improve the urban environment and holistically address water savings, equity issues, and climatic changes. The topics the task force tackled are complicated, fluid, and interconnected, and significant progress was made in a short amount of time. The report ultimately represents an amalgamation of thoughts and highlights agreed-upon recommended pathways to advance and achieve sustainable and resilient landscapes across Colorado.

Task force discussions and the subsequent recommendations, alongside the ***Areas to Research and Analyze*** and the ***Complementary Efforts to Watch***, can inform methodical landscape transformation in Colorado. As transformative landscape efforts continue, new knowledge will be gleaned, and additional ideas and strategies will naturally develop. In other words, discussions around accelerating meaningful and responsible landscape transformation should not conclude when the task force does.

A REPORT FROM THE URBAN LANDSCAPE CONSERVATION TASK FORCE

DEVELOPED WITH SUPPORT FROM THE COLORADO WATER CONSERVATION BOARD - JANUARY, 2024

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