



**COLORADO**

**Colorado Water  
Conservation Board**

Department of Natural Resources

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**TO:** Colorado Water Conservation Board Members

**FROM:** Greg Johnson, Water Supply Planning Section

**DATE:** November 20-21, 2019 Board Meeting

**AGENDA ITEM: 7. Statewide Water Education Action Plan (SWEAP)**

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**Staff recommendation:** This item is informational only, with no Board action requested.

**Background:**

Jayla Poppleton, the Executive Director of Water Education Colorado (WEco), will present a summary of the recently completed Statewide Water Education Action Plan (SWEAP), that WEco crafted with support from numerous stakeholders to help inform the implementation of Goal number 2 in chapter 9.5 of the Colorado Water Plan. A copy of SWEAP is attached, with hardcopies available at the meeting.



# Statewide Water Education Action Plan (SWEAP) 2020-2025



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### FOREWORD TO COME

- Inspire people around the role and value of education in addressing complex challenges
- Encourage a focus on making water relevant to where it touches lives
- Highlight role of education in equipping people for action/participation
- Empower participation by other educators as opposed to prescribing it
- Emphasize that this should not be viewed as WEco’s plan, but that WEco does intend to use it to guide vision for our work as well and to foster collective impact model for water education statewide
- ID specific actions WECo is planning to take

Prepared by Water Education Colorado under grant POGG12019-2021 from the Colorado Water Conservation Board  
Photo credit cover page Matt Cascade

# INTRODUCTION

## What is SWEAP?

The Statewide Water Education Action Plan (SWEAP) aims to guide water educators working individually and collectively to meaningfully realize a set of shared outcomes that align with the “Outreach, Education and Public Engagement” goals set forth in Ch. 9.5 of the Colorado Water Plan. Those goals focus on ensuring Coloradans have access to accurate information and are empowered to participate in stakeholder decision-making processes.

“Education, Outreach, and Innovation” is one of eight focus areas in the Colorado Water Plan (CWP) to ensure a sustainable water supply for Colorado’s growing population by 2050 in a way that respects and preserves the state’s diverse values.

SWEAP does not mandate local actions, rather addresses issues that have been obstacles to a coordinated, more consistently defined approach in which unique regional and local activities move toward similar outcomes and metrics to make progress on a statewide level.

## Colorado’s Diverse Water Education Community

This Plan recognizes that there are numerous organizations, agencies, and individuals that make up Colorado’s water education community. It is intended to help guide the efforts of all water educators in the categories described in the Colorado Water Plan (CWP) and more!

Each of these entities serves unique audiences, possesses distinct skills and expertise, and represents different perspectives relative to water. While this Plan does not outline, compare or contrast the numerous activities carried out by Colorado’s diverse group of water educators, it is

### **CWP Categories of Water Educators** (pp. 9-55 to 9-57)

**State agencies:** State agencies both provide education directly and fund the educational efforts of others

**Statewide NGOs:** Many statewide nonprofit organizations provide water education programming for a variety of target audiences

**Universities:** The involvement of institutions of higher education in water education includes research, programming for the greater community, and degree and certificate programs for water professionals

**Regional/local:** Water educators at the regional or local level include conservancy and conservation districts, water providers and utilities, nonprofit organizations, and community groups that reach a variety of audiences

**K-12:** Many regional and local water educators offer programs tailored to specific grades and teachers

intended to establish a common agenda that can be promoted through activities and projects that are customized for different audiences.

## **How to Use this Plan**

Statewide organizations can strengthen the work of local water educators by using this shared framework to mobilize funding and provide capacity-building opportunities where most needed. Water Education Colorado will use SWEAP to help guide a focused vision and strategy across Colorado, in partnership with the Colorado Water Conservation Board (CWCB) and other statewide organizations.

Water educators working at a regional, river basin (watershed), or local level can use this Plan to demonstrate how their actions align with statewide strategies and contribute to a statewide impact. In addition, the outcomes and strategies in SWEAP can be used to guide organizational strategic planning, program and curriculum development, and funding requests.

With youth audiences, the Colorado Department of Education and K-12 educators statewide can use SWEAP to guide professional development and the use of curriculum guides that help incorporate water literacy as part of implementation of Colorado Academic Standards.

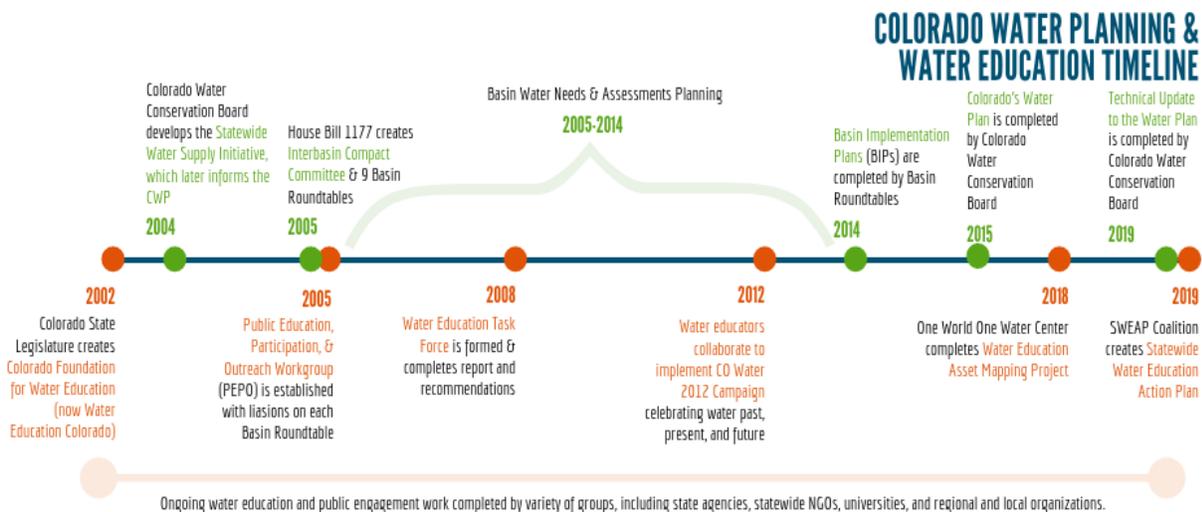
For the purposes of the Basin Roundtables and Colorado Water Plan itself, SWEAP outcomes and strategies can be incorporated into Education Action Plans and future iterations of Basin Implementation Plans and the CWP.

## BACKGROUND

### Water Education's Role in the Colorado Water Plan

Spurred by devastating droughts in the early 2000s, Colorado began a journey to define the impending water resource challenges of the 21st century and to identify strategies and decisive actions to address those challenges. The culmination of that effort was the Colorado Water Plan (CWP), which was adopted by the Colorado Water Conservation Board (CWCB) in 2015.

The state's water education community played an important role in the development of the CWP. They worked to educate the public about the role of the Basin Roundtables and created mechanisms for public input via the Public Education, Participation, and Outreach Workgroup (PEPO). The CWP includes water education as a core component of achieving water sustainability by 2050, as outlined in Chapter 9.5 of the CWP. Recognizing the important role of water education, each Basin Roundtable's Basin Implementation Plan (BIP) also includes long-term goals and strategies related to cultivating an educated and engaged citizenry.



### The Challenge of Sustainable Water by 2050

The Colorado Water Plan (CWP) projects a water supply shortfall of more than 500,000 acre-feet annually by 2050 if current trends continue. This supply gap is exacerbated by population growth and climate change. In addition to this growing water supply gap, the CWP describes the other "big water challenges facing Colorado" as:

- *Agricultural dry-up:* The purchase and permanent transfer of agricultural water rights to support growing communities threatens the state and rural communities with significant reductions in irrigated agriculture and local food production.
- *Critical environmental concerns:* The need to protect and restore water quality, watershed health, and ecosystem resilience in the face of increasing water demands and climate change is as critical as ever.

- *Variable climatic conditions:* Forecasts show Colorado could face diminished precipitation and shrinking water supplies as well as increased demand associated with hotter temperatures and a longer growing season.
- *Inefficient regulatory processes:* Lengthy, expensive and inefficient permitting processes have stalled water providers' ability to respond to changing conditions.
- *Increasing funding needs:* Absent adequate investment, Colorado cannot effectively address its environmental, recreational, agricultural, and community needs for water.

## A Comprehensive Solution that Recognizes Colorado's Values

The Colorado Water Plan (CWP) serves as a foundation for Colorado to address the state's core water values, as articulated by Gov. John Hickenlooper in the 2013 executive order directing the Colorado Water Conservation Board to develop the CWP:

- A productive economy that supports vibrant and sustainable cities, viable and productive agriculture, and a robust skiing, recreation, and tourism industry;
- Efficient and effective water infrastructure promoting smart land use; and
- A strong environment that includes healthy watersheds, rivers and streams, and wildlife

The CWP recognizes the availability and management of water as a far-reaching, interrelated system facing complex challenges. Therefore, the CWP outlines a comprehensive solution comprised of eight measurable objectives. SWEAP specifically addresses the "Education, Outreach, and Innovation" objective.

### **CWP Measurable Objectives** (pp. 10-5 to 10-7)

**Supply-Demand Gap:** Reduce projected 2050 municipal and industrial gap in water supply from as much as 560,000 acre-feet to zero acre-feet by 2030.

**Conservation:** Achieve 400,000 acre-feet of municipal and industrial water conservation by 2050.

**Land Use:** By 2025, 75 percent of Coloradans will live in communities that have incorporated water-saving actions into land-use planning.

**Agriculture:** Agricultural economic productivity will keep pace with growing state, national, and global needs, even if some acres go out of production.

**Storage:** Attain 400,000 acre-feet of water storage in order to manage and share conserved water and the yield of identified projects and processes by 2050.

**Watershed Health, Environment, and Recreation:** Cover 80 percent of the locally prioritized lists of rivers with stream management plans, and 80 percent of critical watersheds with watershed protection plans, all by 2030.

**Funding:** Investigate options to raise additional revenue in the amount of \$100 million annually (\$3 billion by 2050) starting in 2020.

**Education, Outreach, and Innovation:** Significantly improve the level of public awareness and engagement regarding water issues statewide by 2020, as determined by water awareness surveys, and engage Coloradans statewide on at least five key water challenges (identified by CWCB) that should be addressed by 2030.

## How Water Education Advances the Colorado Water Plan

The Colorado Water Plan's (CWP) success depends upon an educated citizenry that is actively engaged in discussing, funding, and implementing balanced water solutions. This dynamic relies upon robust, sustainable water education that focuses on and delivers the following education objective identified in the CWP:

- Significant improvement of public awareness and engagement regarding water issues statewide by 2020\*, as determined by water awareness surveys.

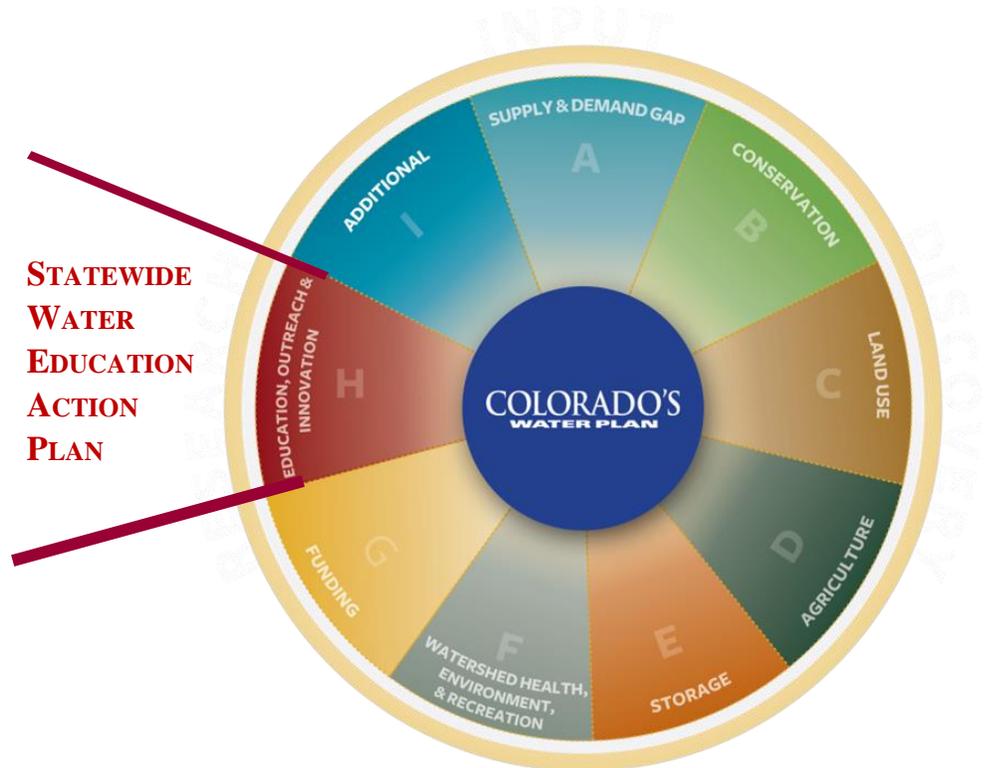
*\*SWEAP was completed in 2019; as a result, SWEAP's target for this objective has been extended to 2025.*

## A Plan for Water Education

In Chapter 9.5, the Colorado Water Plan (CWP) calls for the creation of "a data-based water education plan" as one of three critical actions to achieve the measurable objective. SWEAP is that plan.

Further, the CWP requires that the plan be based on an assessment of water education so that it "addresses critical gaps in water education, advances efforts in the Colorado Water Plan, and supports Basin Roundtable work." While the state has not completed the statewide assessment contemplated in the CWP, an important corollary was accomplished when the One World One Water Center completed the "2018 Water Education Asset Map."

In addition to reviewing the results of the 2018 Asset Map and other early reports, the SWEAP drafting process included an analysis informed by more than 60 water industry and water education experts. Systems-thinking materials developed by ThinkWater were also considered, as were past survey instruments used to measure Coloradan's attitudes, perceptions, values, and knowledge of water and water issues.

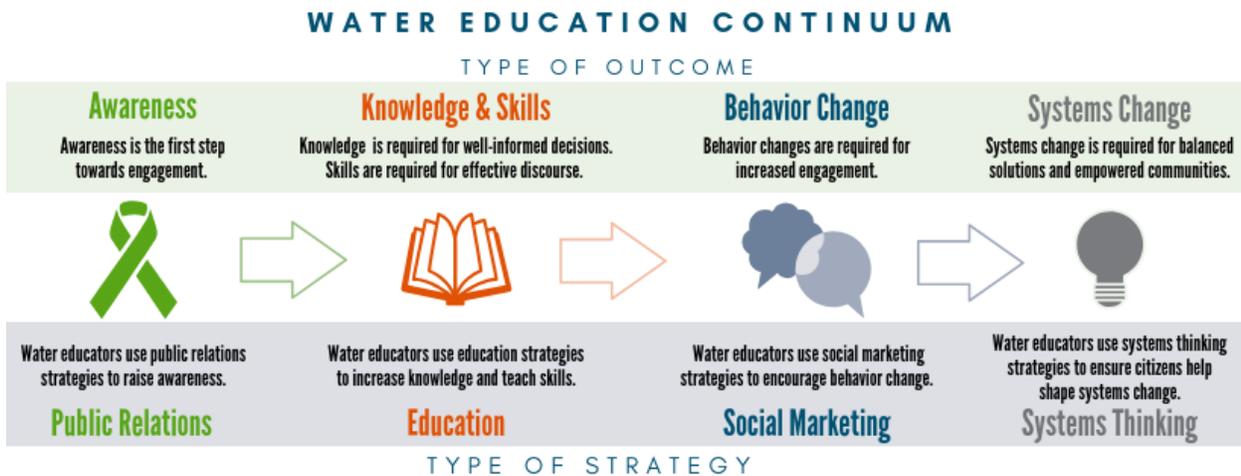


# WATER EDUCATION IN COLORADO

## What is Water Education?

Water education has multiple connotations. It traditionally refers to formal and non-formal education programs that build awareness and knowledge of a wide variety of water topics. Yet it can also refer to activities that foster public engagement, behavior change and even systems change. Each of these activities is associated with distinct disciplines that rely on specific principles and practices to achieve outcomes.

The continuum below demonstrates both the strategies associated with each discipline, based on the intended outcome, and the “tiered” relationships that exist between disciplines. For example, an increase in awareness lays the foundation for subsequent increases in knowledge that are necessary for an individual to effect meaningful behavioral and even systems changes. Not all individuals will have the opportunity or choose to act on their water knowledge. Achieving the Impact envisioned in SWEAP requires that individuals move from basic awareness to knowledge to behavior change, including participation in discourse and informed decision making. This, in turn, requires both individual initiative and the enabling and/or empowering conditions that water education can help provide through social marketing and systems thinking strategies.



## 2020 Water Education Situation

Water education in Colorado is highly localized and decentralized. With diverse interests, audiences and resources, it tends toward a fragmented, poorly coordinated approach when it comes to realizing statewide impact.

In 2008, the Colorado Water Education Task Force assessed the status of water education in Colorado. The resulting report included nine recommendations that are all important precursors

to SWEAP. The Task Force's final recommendation called for the creation of a detailed action plan. SWEAP is the framework of this plan. In addition, the Task Force recommended fostering collaborative opportunities among water educators, which led to the establishment of the Water Educator Network, coordinated by Water Education Colorado. The Water Educator Network has included more than 100 educators from different institutions across Colorado since 2014. The Network has fostered good communication and strong partnerships among water educators, yet certain limitations to understanding and sharing of best practices remain.

Research by the One World One Water Center and others finds that funding, staffing, skills, and access to resources is either lacking or highly variable around the state. Some educators are also constrained by a lack of clarity about how to connect specific strategies to vision and outcomes for their work. Without clear outcomes, it is difficult to define and track the metrics that are critical to documenting success and return on investment.

In addition, feedback from both formal and non-formal educators consistently stresses the importance of educating youth and engaging licensed professional educators, with their students, in actively promoting water education and action. To this end, SWEAP recognizes the necessity of strong support from the Colorado Department of Education and the importance of incorporating water literacy as part of implementation of Colorado Academic Standards. The invitation from, and participation of, local schools and school districts is also critical to successful implementation of SWEAP.

Greater clarity on the desired impact and outcomes will enable water educators to more easily and confidently convey the value of their work in connection to the greater whole. This will help them attract the necessary financial and policy support to ensure they have sufficient resources, tools, and expertise to achieve important water education outcomes.

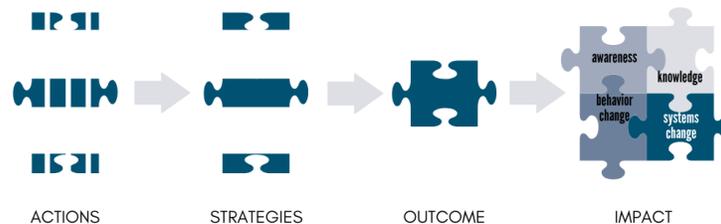
## STRATEGIC FRAMEWORK DESIGN

The strategic framework is the backbone of SWEAP. With a shared vision, guiding principles, and a core set of shared outcomes, individualized actions will achieve the greatest possible impact statewide. Success will be measured in terms of achieving the impact initially laid out by the Colorado Water Plan (CWP) Ch. 9.5.

By focusing on shared outcomes, this framework allows water educators to adapt strategies and actions to their unique audiences and focused on-the-ground actions, while contributing to statewide impact.

The design of the SWEAP framework is a simple logic model: actions carry out strategies to achieve outcomes toward impact. Metrics measure progress toward outcomes. The vision (for water education), critical water concepts, and guiding principles define the Plan’s overall context.

Strategic Framework Definitions	
<b>Vision</b>	The future state once the problem is solved or outcomes are achieved
<b>Impact</b>	The difference (water educators) make, what outcomes add up to
<b>Guiding Principles</b>	The rules or values that underlie or guide all work
<b>Outcome</b>	The goal, or end result, to be achieved, in specific, time-framed, detectable terms (3-5 yrs.)
<b>Strategy</b>	The few best methods, approaches, best practices, or innovative ideas to achieve outcomes
<b>Action</b>	The tasks to carry out strategies (1 yr.)
<b>Metric</b>	The measurable indicator used to track progress towards an outcome



*Locally Adapted Action, Based on Proven & Innovative Strategies, Achieving Outcomes & Statewide Collective Impact*

# SUSTAINABLE WATER 2050

## COLORADO'S WATER PLAN COMPREHENSIVE SOLUTIONS

### WATER EDUCATION, OUTREACH, AND PUBLIC ENGAGEMENT

## STRATEGIC FRAMEWORK

### VISION

Coordinated, well-funded, and impactful education, outreach, and public engagement achieving measurable outcomes by 2025

### 2025 IMPACT

**Coloradans are engaged in well-informed community discourse and decision-making regarding balanced water solutions, and are empowered to take thoughtful action regarding critical water challenges facing the state and their communities**

2020 Situation

Critical Water Concepts

Guiding Principles

**AWARENESS  
OUTCOMES**

Metrics

Strategies

**KNOWLEDGE  
OUTCOMES**

Metrics

Strategies

**BEHAVIOR CHANGE  
OUTCOMES**

Metrics

Strategies

**SYSTEMS CHANGE  
OUTCOMES**

Metrics

Strategies



**BASIN & LOCAL ACTIONS**

(to be developed in response to local needs and audiences)

# STRATEGIC FRAMEWORK

## Vision

Coordinated, well-funded, and impactful education, outreach, and public engagement achieving measurable objectives in water education by 2025 that contribute to sustainable water by 2050.

## 2025 Impact

Coloradans are engaged in well-informed community discourse and decision-making regarding balanced water solutions, and are empowered to take thoughtful action regarding critical water challenges facing the state and their communities.

## Critical Water Concepts

*(See Appendix A for more information)*

- The physical and chemical properties of water are unique and constant.
- Water is essential for life, our economy, and a key component of healthy ecosystems.
- Water is a scarce resource, limited and variable.
- Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.
- The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.
- Water is a public resource governed by water law.

## Guiding Principles

The following principles are implicit throughout this Plan and should guide the work of Colorado water educators participating in SWEAP implementation. These principles are essential to meeting SWEAP water education outcomes effectively and equitably.

### ***Balanced and reflective of tradeoffs***

Balanced decisions require an assessment of trade-offs and opportunity costs, and consideration of a range of perspectives stemming from geographic, economic, professional, and value- or interest-based differences. Therefore, water educators participating in SWEAP will strive to incorporate information into educational experiences that examines diverse perspectives as well as trade-offs for any given decision/action to the environment, public health, government, economies, and more.

### ***Supportive of the Colorado Water Plan vision***

The Colorado Water Plan (CWP) was the culmination of a decade of work by hundreds of thousands of stakeholders working to envision and map the road to a sustainable water future. Water educators pursuing the outcomes in SWEAP will equip and empower the people of Colorado so that they can contribute to informed decision making and forward progress on solutions that ultimately result in success for CWP objectives.

### ***Objective and fact-based***

Trusted, reliable information is critical to equipping Coloradans to participate in effective discourse and decision making. Water educators participating in SWEAP will advance informed decisions and sustainable solutions by striving to present fair, objective, and instructionally sound information.

### ***Achieved with strong partnerships and collaboration***

The outcomes and strategies envisioned in SWEAP cannot be achieved by a single organization. Water educators participating in SWEAP will take a collaborative approach and seek to establish and maintain partnerships when pursuing a strategy to achieve shared outcomes.

### ***Using a watershed approach***

River basins and watersheds within Colorado serve as geographically defined organizing units for education, collaboration and study, where the natural connections and mutual impacts of decisions made or actions taken in one part of the watershed resonate throughout. Water educators participating in SWEAP recognize that using a watershed approach is foundational to teaching the Critical Water Concepts discussed in this Plan.

### ***Accessible, engaging, and striving for equity***

Because all Coloradans are directly affected by water-related decisions, water educators participating in SWEAP will take an inclusive and equitable approach and will regularly evaluate strategies for their degree of success within marginalized communities. Training and events will be accessible and follow best practices for community engagement. In addition, water education materials and professional development opportunities will emphasize culturally responsive education practices. Participants engaged by water education activities build stronger connections within their communities and an enhanced appreciation for water, as well as new knowledge and skills to apply toward taking thoughtful action regarding critical water challenges.

### ***Implemented across Colorado***

Water educators participating in SWEAP help ensure that water education is accessible across the geographic diversity of Colorado. Water educators will strive to make content accessible and relevant in the various communities in which they work and identify opportunities to expand the reach of water education in underrepresented geographies.

### ***Adaptive and iterative in response to changing conditions***

Because conditions are consistently changing, water educators participating in SWEAP will approach implementation in an adaptive fashion. Implementation of strategies across Colorado and the effectiveness of those strategies in meeting statewide outcomes will be measured and reported by participating entities at regular intervals. As results are evaluated, highly effective strategies and new, innovative strategies will likely emerge. Subsequent updates to this plan will

address gaps and new opportunities identified in the evaluation cycle and will incorporate the best available information at the time.

## **Outcomes (to be achieved by 2025)**

The outcomes below will be measured statewide. "Proportion" refers to the proportion of Coloradans within each river basin.

- The proportion of Coloradans who can identify how water supports their quality of life, as well as the threats to and potential solutions for a sustainable water supply, increases.
- The proportion of Coloradans who can articulate at least three Critical Water Concepts increases.
- The proportion of Coloradans who report confidence in having the knowledge necessary to take an active role in water stewardship in their community increases.
- The proportion of Coloradans who report confidence in having the skills necessary to take an active role in water stewardship in their community increases.
- Participation in community discourse and decision processes about water at the state, regional and local levels increases.
- Voters have access to factual information that addresses potential impacts to sustainable water resources in relevant issue areas.
- The proportion of Coloradans that are demonstrating sustainable water behaviors increases.
- Where relevant, local and state policies and practices are supportive of advancing statewide water literacy.
- Where relevant, local and state policies, regulations, and practices demonstrate a consideration of impacts on sustainable water resources.
- Water decision-making bodies are increasingly representative of the demographic make-up of the area they serve.

## Strategies by Outcome

	Outcomes	Strategies
AWARENESS	1. The proportion of Coloradans who can identify how water supports their quality of life, as well as the threats to and potential solutions for a sustainable water supply, increases.	1a. Implement a multi-channeled public relations and media campaign that can be applied at various scales throughout the state.
KNOWLEDGE & SKILLS	2. The proportion of Coloradans who can articulate at least three Critical Water Concepts increases.	2a. Produce and distribute information to support and clarify Critical Water Concepts. 2b. Facilitate incorporation of Critical Water Concepts in educational programming.
	3. The proportion of Coloradans who report confidence in having the knowledge necessary to take an active role in water stewardship in their community increases.	3a. Curate and promote a readily accessible source for current, factual information on a broad array of important water topics. 3b. Support hands-on and project-based learning and service opportunities for water-related issues. 3c. Incentivize and reduce barriers to participation in training for underrepresented groups and geographic areas.
	4. The proportion of Coloradans who report confidence in having the skills necessary to take an active role in water stewardship in their community increases.	4a. Train the trainer to build participants' skills in discourse and decision-making. 4b. Expand leadership development opportunities for adults and youth that foster skills for informed discourse and decision-making.
BEHAVIOR CHANGE	5. Participation in community discourse and decision processes about water at the state, regional and local levels increases.	5a. Curate a compendium of best practices for inclusive civic engagement. 5b. Ensure water discussions or decision-making processes are accessible, convenient, inclusive, and well-publicized.
	6. Voters have access to factual information that addresses potential impacts to sustainable water resources in relevant issue areas.	6a. Provide factual information that can be used to analyze issues, policies or initiatives from a water perspective. 6b. Encourage the incorporation of water-related impacts in voter information and forums.

BEHAVIOR CHANGE	7. The proportion of Coloradans that are demonstrating sustainable water behaviors increases.	<p>7a. Identify sustainable water behaviors that are a priority for each basin.</p> <p>7b. Develop and implement social marketing strategies for behaviors that are identified as priorities, statewide and at the basin level.</p> <p>7c. Research and implement best practices for tracking the use of sustainable water behaviors in each region.</p>
SYSTEMS CHANGE	8. Where relevant, local and state policies and practices are supportive of advancing statewide water literacy.	8a. Collaborate with Colorado Department of Education and other partners to incorporate water literacy as part of implementation of Colorado Academic Standards.
	9. Where relevant, local and state policies, regulations, and practices demonstrate a consideration of impacts on sustainable water resources.	<p>9a. Support policy makers in developing the knowledge to evaluate trade-offs in water issues.</p> <p>9b. Curate and provide guidance on tools and best practices for incorporating consideration of water impacts and trade-offs into policy-making.</p>
	10. Water decision-making bodies are increasingly representative of the demographic make-up of the area they serve.	<p>10a. Provide trainings, leadership development, and mentorships tailored to underrepresented groups and geographies.</p> <p>10b. Provide equity and inclusivity training for coordinators, chairs, and appointing agencies of decision-making bodies.</p> <p>10c. Track metrics to ensure that Coloradans from all demographics and geographic areas demonstrate progress in outcomes 1-7 and identify program changes needed to close any gaps.</p>

*Behaviors, issues, concepts, etc. referenced in outcomes will be further defined and developed as part of SWEAP implementation.*

## ACTIONS

### Actions Customized at Regional, Watershed, and Local Levels

Strategies are carried out at many levels, by diverse organizations, agencies and institutions for a wide variety of audiences. It is not likely, nor anticipated, that any individual water educator or any one organization will have the depth and scope to address every outcome or embrace every strategy included in this plan.

SWEAP provides the strategic framework for collective impact as a starting place, recognizing that individual water educators and educational organizations will continue to customize actions to reach specific audiences and meet the unique needs and interests of their communities. The Sample Local Actions below (page 21) provide examples for linking actions to strategies to outcomes that can be used across the state to plan activities that align with the SWEAP strategic framework. For implementation of SWEAP to be successful, actions under each strategy will need to be targeted to specific audiences. In this way, water educators retain control and flexibility for their on-the-ground work, while also supporting collective outcomes and a more coordinated, statewide approach.

While educators’ programs and activities will certainly vary, they can begin to tell a similar story of working with tested and innovative strategies to achieve shared outcomes that are deliberately designed to contribute to the success of the Colorado Water Plan and a sustainable water future.

### Example Actions

Some SWEAP strategies will require state-level action to complete, such as partnering with the Colorado Department of Education. The following chart outlines example local actions by individual water educators or organizations that would support the strategies identified in SWEAP.

SWEAP Strategies	Local Actions: <b>EXAMPLES ONLY*</b> Local= basin/watershed and community-scale
<b>Outcome 1: The proportion of Coloradans who can identify how water supports their quality of life, as well as the threats to and potential solutions for a sustainable water supply, increases.</b>	
1a. Implement a multi-channeled public relations and media campaign that can be applied at various scales throughout the state.	1a1. Work with Basin Roundtables/PEPO liaisons to adapt statewide messaging and campaign elements tailored to individual basins and audiences. 1a2. Work with local media outlets, community groups, nonprofit organizations and business to disseminate message and support campaign.

<b>Outcome 2: The proportion of Coloradans who can articulate at least three “critical water concepts” increases.</b>	
2a. Produce and distribute information to support and clarify Critical Water Concepts.	2a1. Work with local water educators to understand and incorporate Critical Water Concepts in their information and programs.
2b. Facilitate incorporation of Critical Water Concepts in educational programming.	2b1. Outreach and work with district/local schools to build appreciation and incorporation of Critical Water Concepts in curricula. 2b2. Create local field programs to demonstrate Critical Water Concepts and provide to schools.
<b>Outcome 3: The proportion of Coloradans who report confidence in having the knowledge necessary to take an active role in water stewardship in their community increases.</b>	
3a. Curate and promote a readily accessible source for current, factual information on a broad array of important water topics.	3a1. Share water information throughout the community in multiple venues.
3b. Support hands-on and project-based learning and service opportunities for water-related issues.	3b1. Facilitate student-led action projects as part of project-based learning.
3c. Incentivize and reduce barriers to participation in training for underrepresented groups and geographic areas.	3c1. Identify, reach out, and share information resources with underrepresented groups in the community. 3c2. Facilitate dialogue between traditional water professionals and decision-makers with underrepresented groups to remove barriers.
<b>Outcome 4: The proportion of Coloradans who report confidence in having the skills necessary to take an active role in water stewardship in their community increases.</b>	
4a. Train the trainers to build participants’ skills in discourse and decision-making.	4a1. Host environmental issues forum moderator trainings.
4b. Expand leadership development opportunities for adults and youth that foster skills for informed discourse and decision-making.	4b1. Tailor programs that use role play to build decision-making skills based on Colorado water scenarios.
<b>Outcome 5: Participation in community discourse and decision processes about water at the state, regional and local levels increases.</b>	
5a. Curate a compendium of best practices for inclusive civic engagement.	5a1. Integrate best practices in all outreach activities.
5b. Ensure water discussions or decision-making processes are accessible, convenient, inclusive, and well-publicized.	5b1. Work with program organizers and meeting coordinators to utilize best practices. 5b2. Facilitate community-based, neighborhood-focused “fireside chats” to solicit input from broader local audience.

<b>Outcome 6: Voters have access to factual information that addresses potential impacts to sustainable water resources in relevant issue areas.</b>	
6a. Provide factual information that can be used to analyze issues, policies or initiatives from a water perspective.	6a1. Ensure local voter information sources have and understand the water analyses.
6b. Encourage the incorporation of water-related impacts in voter information and forums.	6b1. Work with local citizen groups, nonprofit and education organizations to disseminate the information and include it in their materials.
<b>Outcome 7: The proportion of Coloradans that are demonstrating sustainable water behaviors increases.</b>	
7a. Identify sustainable water behaviors that are a priority for each basin.	7a1. Convene local water educators to define behaviors important to the basin. 7a2. Define audience-specific opportunities and obstacles to desired behaviors.
7b. Develop and implement social marketing strategies for behaviors that are identified as priorities, statewide and at the basin level.	7b1. Review (and then update) projects and activities to move from awareness to behavior change (increase incentives, remove barriers).
7c. Research and implement best practices for tracking the use of sustainable water behaviors in each region.	7c1. Track local behavior change.
<b>Outcome 8: Where relevant, local and state policies and practices are supportive of advancing statewide water literacy.</b>	
8a. Collaborate with Colorado Department of Education and other partners to incorporate water literacy as part of implementation of Colorado Academic Standards.	8a1. Encourage local educators to express need and interest for this from the Department.
<b>Outcome 9: Where relevant, local and state policies, regulations, and practices demonstrate a consideration of impacts on sustainable water resources.</b>	
9a. Support policy makers in developing the knowledge to evaluate trade-offs in water issues.	9a1. Provide information and field experiences/ training to help policy makers evaluate trade-offs.
9b. Curate and provide guidance on tools and best practices for incorporating consideration of water impacts and trade-offs into policy-making.	
<b>Outcome 10: Water decision-making bodies are increasingly representative of the demographic make-up of the area they serve.</b>	
10a. Provide trainings, leadership development, and mentorships tailored to underrepresented groups and geographies.	10a1. Target local outreach and programs to underrepresented groups in the community.
10b. Provide equity and inclusivity training for coordinators, chairs, and appointing agencies of decision-making bodies.	10b1. Adapt training to local needs and facilitate training opportunities.
10c. Track metrics to ensure all demographics and geographies demonstrate progress in outcomes 1-7, and identify program changes to close gaps.	10c1. Participate in regional and statewide surveys. 10c2. Solicit ongoing community input about what is working and not, adapt accordingly.

# INDICATORS OF SUCCESS

## The Dashboard

The cumulative impact of SWEAP can be defined by a few key indicators of success, which will be built on specific metrics for each outcome during the implementation phase.

In order to assist with evaluating the effectiveness of strategies and actions in accomplishing SWEAP outcomes, the state will implement a statewide public awareness survey in 2020. The envisioned survey effort will collect baseline data on water issues and follow up with periodic surveys to measure progress. In addition to a statewide survey effort, SWEAP will work with partners to develop and implement assessments to evaluate the effectiveness of local and regional education activities.

Key indicators will be summarized in the SWEAP “dashboard” to help reflect progress toward achieving the collective SWEAP Outcomes.

Increase in awareness of critical water concepts, plus threats and solutions to sustainability	Increase in knowledge and skills necessary to take an active role in water stewardship	Increase in diverse participation in community discourse and decision- making	Decision-making bodies are increasingly representative of the demographic make-up of Colorado
 <p>A gauge chart with a semi-circle divided into four colored segments: orange, green, red, and grey. A black needle points to the red segment.</p> <p>Awareness</p>	 <p>A gauge chart with a semi-circle divided into four colored segments: orange, green, red, and grey. A black needle points to the red segment.</p> <p>Knowledge &amp; Skills</p>	 <p>A gauge chart with a semi-circle divided into four colored segments: orange, green, red, and grey. A black needle points to the red segment.</p> <p>Behavior Change</p>	 <p>A gauge chart with a semi-circle divided into four colored segments: orange, green, red, and grey. A black needle points to the red segment.</p> <p>Systems Change</p>

## IMPLEMENTATION

### Capacity Building

SWEAP serves as a common agenda for a coordinated, well-funded, outcome-based water education effort that will support sustainable water by 2050, aligning with the outcomes of the Colorado Water Plan. It is a basis for increasing funding and creating resources to build capacity in water education toward effective and equitable implementation of this Plan.

Water Education Colorado (WEco), in cooperation with funders and other statewide partners, will play an important role in building capacity for Colorado water educators working at all levels. WEco and others can develop and curate collections of strategy-specific resources to be broadly used by water educators. This Plan also envisions adopting or creating toolkits that provide step-by-step guidance in the implementation of particularly effective and innovative strategies. Toolkits and similar guides or models not only build capacity as training tools, they help to institutionalize learning within organizations, independent of individuals' knowledge, and eliminate duplication of effort.

Resources and toolkits help to bring all implementation strategies to a common standard of practice, thus supporting standardized assessment across the state. Toolkits can be supported by technical assistance programs at different locations throughout the state that provide training, coaching, or mentoring for those skills that are most critical for implementation. The Water Educator Network, led by WEco, can fill a critical role as a peer-to-peer learning network, sharing information about successes, lessons learned, and other training or informational resources related to SWEAP.

Further, with this Plan, WEco and other statewide groups, can more effectively seek government, corporate, and private funding to support statewide capacity building and to fund local activities.

### Filling Water Education Gaps

This Plan meets a need as identified by water educators and the Water Educator Network to have clearer, more coordinated vision, purpose (impact), outcomes, and metrics. While the Plan encourages customized actions at the local level, it provides some standardization and consistency so that local actions contribute to a greater whole.

With shared outcomes and related metrics, progress at a statewide level can be evaluated and documented. In contrast, lack of progress in particular areas can also be analyzed. For example, in geographic areas where participation is not increasing (See Outcome 5), organizations providing technical assistance can support local groups in adapting strategies to achieve better results.

As particularly effective strategies are identified and new innovative strategies emerge, WEco can provide training programs to ensure water educators have the necessary skills to maximize impact. Similarly, if certain strategies are not being effectively implemented, informational resources and skill building programs can be developed and disseminated. During the implementation phase of this Plan, WEco and others can begin to decipher patterns and prioritize the development of tools, resources, and technical assistance, further adapting the educational components of the Colorado Water Plan and Basin Implementation Plans based on real data.

## **An Iterative Process**

SWEAP is a living document associated with coordinated, ongoing efforts. Mirroring the iterative process used in developing the Colorado Water Plan (CWP), SWEAP implementation will be coordinated at the state, regional, watershed and local levels. An adaptive management approach will be used to:

- Guide actions that achieve outcomes and measurable objectives
- Develop, track, and monitor specific metrics
- Evaluate and document progress based on outcomes
- Share learning and deliberately build capacity to support implementation of strategies
- Adapt priority strategies and actions based on outcome data and identified gaps

## **CONCLUSION**

Water education, outreach, and public engagement is critical to addressing Colorado's significant water challenges. To maximize impact, SWEAP-focused water educators must embrace a holistic approach to empowering Coloradans to participate in effectively addressing these challenges. Creating and executing SWEAP, based on the common strategic framework described in this Plan, is an essential step toward achieving a sustainable water future for Colorado.

This Plan addresses Colorado's water education needs in support of achieving the goal of sustainable water by 2050, as envisioned by the Colorado Water Plan; it supports a common agenda for water education, defines a set of shared outcomes, fosters effective practices, and hopefully inspires innovation at the state, regional, watershed, and local levels.

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## **Analysis**

The research and analysis for SWEAP was informed by:

- 61 individual and small group phone interviews
- A coalition of 30 experts from around the state with diverse experience and perspectives in water education; the Coalition came together to build the strategic framework
- One World One Water, Water Education Asset Mapping Project, 2018
- 2008 Water Education Task Force Report
- ThinkWater Systems Analysis and ThinkWater staff
- A review of related documents, data and surveys shared by the SWEAP Coalition

## APPENDIX A - CRITICAL WATER CONCEPTS

The following concepts represent foundational understandings for water education throughout Colorado. Although this list was reviewed by the SWEAP Coalition during development of this plan, it will remain a working list of concepts. To have a credible, comprehensive list of academic concepts that helps achieve the impacts envisioned in SWEAP, this list will be subject to ongoing refinement. This Plan envisions discussions with the Colorado Department of Education and others to ensure maximum alignment with Colorado Academic Standards and applicable national standards. At this time, water educators are encouraged to use this list, but to be mindful of potential future refinements.

### **The physical and chemical properties of water are unique and constant.**

Water is often taken for granted because it is so common, but water is a very unusual substance.

Its most spectacular property is that ice floats on water. Water is one of only a few substances whose solid form floats on its own liquid phase. This characteristic is responsible for the fact that oceans and lakes develop a layer of ice on top, rather than freezing solid from the bottom up.

Water is very unusual in other ways as well. For example, the heat capacity of water is higher than just about any other substance. The heat capacity of a substance is the amount of heat it will absorb to raise its temperature by a given amount. The heat capacity of water is more than twice the heat capacity of natural mineral and rock materials. This tends to mellow out temperature differences around the globe, from day to night and from summer to winter.

Water is also the best all-around natural solvent we know of. More substances dissolve in water than in any other liquid. This is due largely to water's unique "bipolar" structure, which allows water molecules to interact with many different substances - both polar and non-polar.

Water's molecular structure also generates strong inter-molecular attraction between the water molecules themselves. This gives rise to surface tension, which results in the spherical shape of raindrops and forms the "skin" that allows insects to walk on the surface of a lake or stream. Another effect of surface tension is the ability of water to rise, of its own accord, within a thin tube. This phenomenon is known as capillary action, and it is essential for the survival of trees and other plants that rely on this property of water to bring life-giving water and nutrients into their root system.

### **Water is essential for life, our economy, and a key component of healthy ecosystems.**

All living organisms need water to grow and survive. As humans, about 60 percent of our body is made up of water and we can only live three to five days without fluids. For other animals and plants, including those we rely on for food, a reliable supply of clean water is just as critical.

Economically, the direct use of water is concentrated in major sectors around the world, including agriculture, forestry, mining, energy resource extraction, manufacturing, electric power production, and public water supply. The output from these sectors supports activity elsewhere in the economy, creating a ripple effect as goods and services are produced and transferred through supply chains until they reach the final consumer.

In an ecosystem, water cycles through the atmosphere, soil, rivers, lakes, and oceans. Some water is stored deep in the earth. Surface water, on the other hand, is the source that sustains the majority of life on land. In many cases, water also structures the physical habitat of an ecosystem. Many small mammals, for example, rely on snow cover to forage and survive the winter out of view of predators. Rivers, lakes, and other bodies of water divide environments into different habitats, effectively creating unique systems where some organisms can live and others cannot. What's more, most of the life on Earth actually lives completely submerged in the waters of the oceans. Water is truly a powerful factor in all ecosystems.

## **Water is a scarce resource, limited and variable.**

Water covers 70 percent of our planet, and since many of us refer to water as a “renewable resource,” it is easy to think that it will always be plentiful. However, the freshwater that we drink, bathe in, and use for irrigation is limited and finite. Only 3 percent of the world’s water is freshwater, and two-thirds of that is tucked away in frozen glaciers or otherwise unavailable for our use.

As a result, at least 1.1 billion people worldwide lack access to fresh water, and a total of 2.7 billion find water scarce for at least one month of the year. Inadequate sanitation is also a problem for 2.4 billion people—they are exposed to diseases, such as cholera and typhoid fever, and other water-borne illnesses. Two million people, mostly children, die each year from diarrheal diseases alone.

Colorado’s population is increasing rapidly. According to the Colorado Demography Office, the 2019 statewide population is 5.6 million people and is projected to grow to 8.1 million by the year 2050. Supplies of available fresh water are predicted to decrease due to the effects of climate change, which include more droughts and hotter temperatures.

By 2050, we’re predicted to have a shortage in Colorado of half a million acre-feet per year. That’s enough water for 2.5 million families, or the amount of water that can be stored in Granby Reservoir, the fourth-largest reservoir in Colorado.

Many of the natural water systems that maintain Colorado’s unique ecosystems have become stressed. Rivers, lakes and aquifers are threatened by pollution or subject to large depletions that

affect the water cycle, both upstream and down. Since Colorado became a state in the late 1800s, we have lost approximately 50 percent of our state's original wetlands through drainage, fill, and excavation. With each instance of degraded water quality and each acre of lost wetland, we also lose associated wildlife habitat, usable water supply, and water storage functions.

## **Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.**

As a headwaters state, the waters flowing through and leaving Colorado are part of extensive river basins and aquifers of nationwide significance: the Colorado, the Rio Grande, and the Mississippi Rivers and the Ogallala Aquifer. These waters eventually cross many state lines and join with more tributaries as they flow toward their historic outlets in the Gulf of California and the Gulf of Mexico.

Along this journey, waters within Colorado are intercepted and manipulated by a complex system of dams, diversions and conveyance structures that store and redirect native flows to serve agriculture, municipal, industrial, and ecological needs.

## **The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.**

Human actions have a measurable effect on the water cycle at every geographic scale, altering the amount, distribution, timing, and quality of both surface water and groundwater. Colorado's communities, industries, and ecosystems are consequently affected, because all our activities and functions depend, either directly or indirectly, on water.

With large scale changes such as climate change, the water cycle is projected to undergo significant change. According to many models, Colorado can expect less precipitation, especially in the warm months, and longer, more severe droughts as storm tracks shift northward leaving arid areas increasingly dry.

The form that our precipitation takes is also likely to change: projections for many regions of North America, including Colorado, suggest less snow overall, and more rain. In areas dependent on the gradual melting of snowpack to supply surface water through the warm months, this means lower flows and greater water stress in summer – a trend already in evidence in Colorado and other parts of the western U.S. While the effects of climate change on groundwater are not fully understood, rising water competition and stress at the surface are likely to drive greater use – and potentially overuse – of groundwater.

Impacts to water quality are another consequence of human actions. Water temperature, for example, generally rises in streams, lakes, and reservoirs in urban areas or deforested areas. This tends to lead to lower levels of dissolved oxygen in water, hence more stress on the aquatic animals that rely on dissolved oxygen to live. As a consequence of untreated runoff in many areas, pollutants such as nutrients, sediment, and pathogens can be washed into our waterways, resulting in degraded aquatic habitat, decreased reservoir storage, and higher treatment costs for potable water supplies.

Human actions are also responsible for many positive impacts on Colorado's water resources. Effective wastewater treatment, for example, is an essential feature of every residential development, and is largely responsible for protecting water quality throughout the state. Many farming practices, both ancient and modern, are also essential for minimizing negative water quality impacts due to irrigation. By consciously managing toward sustainable supplies and high-quality water, we can mitigate many of the potentially damaging effects of human actions.

## **Water is a public resource governed by water law.**

Colorado water law rests on a strong foundation of territorial and state law, which prove a basic proposition time and again: Water is a public resource and water law evolves with the customs and values of the people.

The Colorado Doctrine is a set of laws regarding water use and land ownership, adopted by the people of Colorado starting in the 1960s. It defines the essential principles of Colorado water law, which include that all surface and groundwater in the state is considered a public resource, and that water rights are the right to use a portion of that resource. It also states that water is subject to appropriation on a "first in time, first in right," basis, where those who were first to put water to a beneficial use have seniority during times of shortage, and junior water right holders are subject to being curtailed during those times.

Efficient water diversion and storage, beneficial use without waste, and recognition of all beneficial uses that Coloradans value—these have always been fundamental precepts of Colorado water law.

Over time, Colorado water law has adapted to recognize new beneficial uses in response to changing economic and community values, such as the protection of streamflows for the environment and for recreation.