KEYSTONE SCIENCE SCHOOL

2024 IMPACT REPORT

H2O OUTDOORS

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Program Overview

H2O Outdoors is a standards-based, educational program hosted at Keystone Science School and available to all Colorado high school students. Over the course of three days, students participate in a stream survey, expert panel, and town hall meeting to gain a broad understanding of the human and environmental complexities of water management in Colorado and, on a wider scale, the western United States.

During the program, students learned about Colorado's important role as the headwaters state for a large portion of the Colorado River Basin. They gained an understanding of water rights issues ranging from prior appropriation laws to the Colorado River Compact. The students conducted a stream survey, met experts from industries with stakeholder roles in the water management process, toured a water treatment facility and participated in a town hall debate to address a scenario designed around realistic water management questions.

Program Goals

1. Explain the concept of a watershed and identify major watersheds in the US, Colorado, and Summit County.
2. Understand water supply and demand issues in Colorado and the Colorado River Watershed.
3. Explain prior appropriation and the nature of a water right in Colorado.
4. Recognize the importance of limited freshwater resources.
5. Analyze and interpret the perspectives of real-life stakeholders in Colorado water management through the lens of sustainability.
6. Practice 'solutions-oriented' collaborative approaches to managing Colorado's water resources.
7. Collect field data relevant to water quantity and quality.

"I found it interesting that all these different people are coming from different ideals and different desires and it is just really fun coming up and working together to come up with a solution." - H2O Student

Day 1 - Expert Panel & Watersheds

Expert Panel

The expert panel is an opportunity for students to learn about water management, water quality, and quantity. The panel provides students with a baseline of water management knowledge while exposing them to careers within the world of water. This year's expert panelists included Mary Dawson, Aurora Water, Sr. Environmental Education & Outreach Specialist and Matt Bond, Denver Water, Manager of Youth Education.

Tour of Continental Divide & Watershed Exploration

To gain a sense of scale surrounding western water issues, students visited the Continental Divide to discuss human impact on watersheds, including pollution and trans-mountain diversions, and the distribution of water in Colorado relative to its population.

Day 2 - Stream Survey and Water Treatment Facility Tour

On day 2 students went into the field to conduct stream surveys and tested the health of local rivers. Following an analysis of the data, students made their own inferences of the general health of the watershed. They then toured a local water treatment facility.

What tests were completed?

Physical Water Test

1. Stream discharge (CFS calculations)
2. Stream Area
3. Resistance Constant
4. Surface Velocity

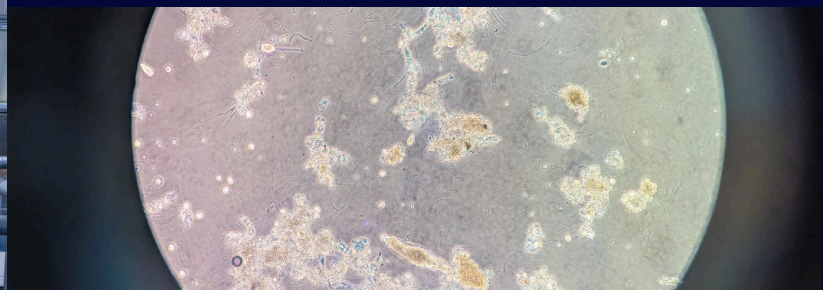
Chemical Water Quality Test

1. Temperature
2. pH
3. Dissolved Oxygen
4. Heavy Metals
5. Phosphates
6. Iron
7. Nitrates

Aquatic Biology Survey

Random sampling on stream bed for presence of pollution tolerant and intolerant benthic macroinvertebrates

"Going to the waste water management plant really changed my perspective on how large scale these things are carried out at. Generally making more conscience about how I use my water." - H2O Student



Day 3 - Town Hall

The town hall is the culminating activity with students focused on collaboration and consensus building. Through the lens of their assigned stakeholder roles, students worked to generate policy recommendations within the given prompt.

The prompt: The population of the Front Range is predicted to increase from 5.8 million in 2021 to 7.8 million by 2040. In preparation for this population boom, there has been a proposal to expand an existing reservoir in the mountains of the front range. The project will raise the height of the dam by about 100 feet and increase the capacity of the dam from 40,000 acre-feet to about 120,000 acre-feet. The water to fill this increase in capacity is coming from the Western Slope through an already established transbasin diversion tunnel.

Questions to think about as your stakeholder:

- Will your stakeholder benefit more from the water being moved to the Front Range or would it benefit you more to have it stay on the Western Slope?
- Do you agree with the proposal as it stands? What conditions would you add or modify to this proposal to see it passed?
- What alternative solution to raising the dam height do you propose?
- What compromises are you willing to work with if this proposal does happen?
- What do you want? What do you need? What are you going to bargain with or for?

Town Hall results and recommendations from the students:

- Only fill the reservoir to 60,000 acre feet
- The Front Range Water Providers will support the Colorado Farm Bureau in the installation of drip irrigation for free
- The water saved by installing drip irrigation will be lease to the Front Range Water Provider
- The Front Range Water Provider will sell their grey water to the Oil & Gas Industry for fracking
- Front Range Water Providers, Outdoor Rec & Tourism, and Oil & Gas will fund water infrastructure for Native communities that currently do not have access to their water rights
- Oil & Gas will backpay for the illegal fracking on Native land
- Oil & Gas will pay for the installation of a fish ladder in the dam
- Western Resource Advocates and the Colorado River District will help advertise the lawn conversion rebate program provided by the Front Range Water Provider

Town Hall Stakeholders

Colorado Farm Bureau
Colorado River District
Front Range Water
Trout Unlimited
Oil and Gas Exploration Company
Outdoor Recreation & Tourism
Western Resource Advocates (WRA)

Post-Program Evaluations

"Even though I want to go into a research career, I have kind of been losing sight of what I have been working for and coming here just restored my hope in what science careers have to offer. Especially going to the wastewater treatment plant and seeing how research is fundamental and doesn't always have the weird stigma that it does in high school." **– H2O Student**

"I would 100% recommend it. It gives you a taste of the real world and what jobs in science are like. I learned a lot and it was a lot more fun than I expected. It was science and you realized you were learning science, but it was really interesting to see how a career that you could have in the future actually are." **– H2O Student**

After the conclusion of the program:

- **100%** of our participants felt they were knowledgeable about water.
- **100%** of participants believed that collaboration can occur when opinions differ.
- **100%** of participants felt it was important to understand the issues surrounding water policy and management.
- **100%** of participants understood where their water comes from.
- **100%** of participants agreed that Collaboration is important in determining water policy and management.
- **100%** of our participants agreed that water is a limited resource.