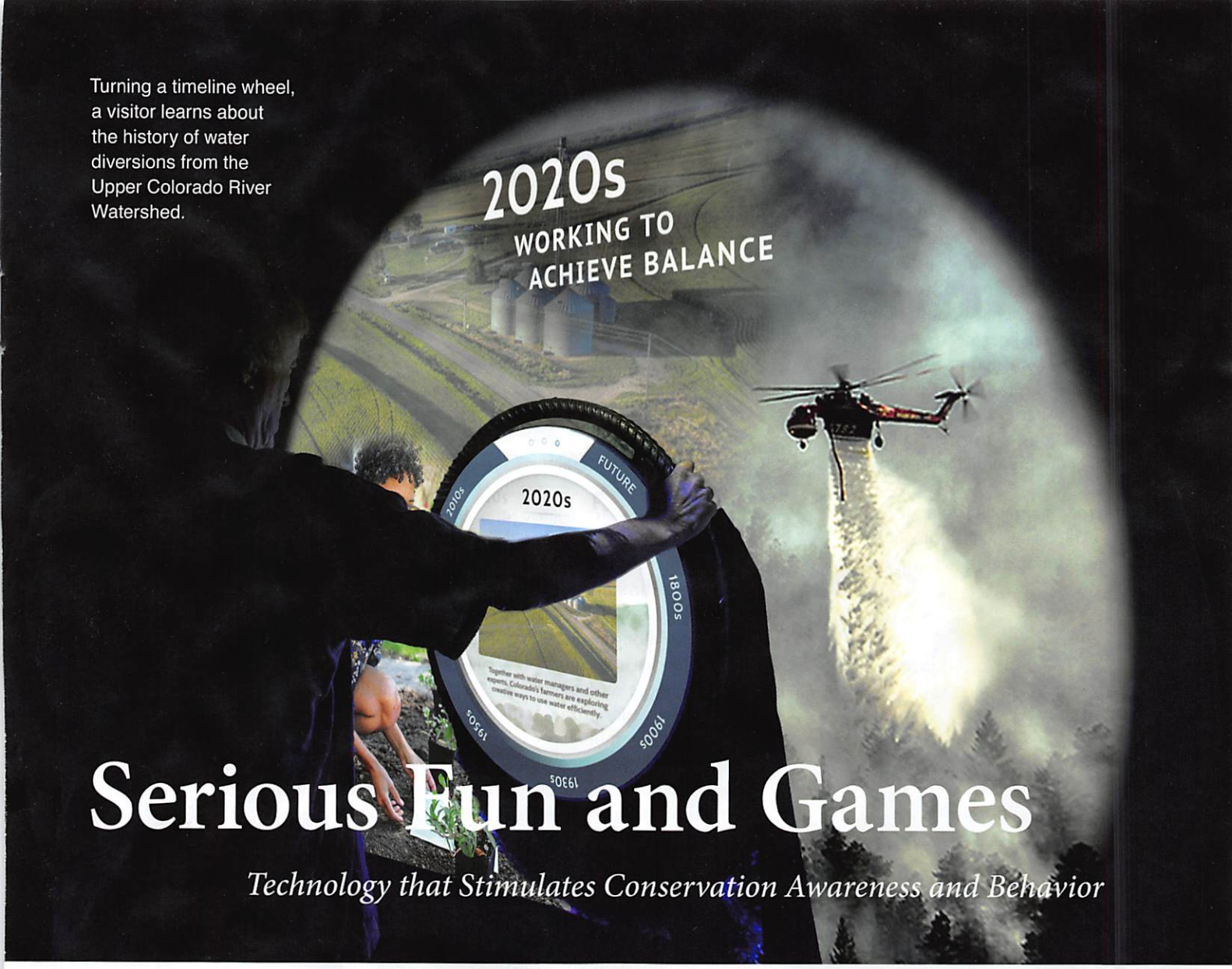

Turning a timeline wheel, a visitor learns about the history of water diversions from the Upper Colorado River Watershed.

Serious Fun and Games

Technology that Stimulates Conservation Awareness and Behavior

Turn on a tap in any city along Colorado's densely populated "Front Range"—Fort Collins, Denver, Colorado Springs—and what comes out? River water.

That's a key message at Headwaters River Journey (HRJ), a cutting-edge new museum within the nonprofit Headwaters Center, built on land donated by the town of Winter Park. The site is nestled high in the Upper Colorado River Basin. Tucked between the closest major ski area to Denver and one of the main entrances to Rocky Mountain National Park, HRJ attracts a large number of Front Range visitors throughout the year.

"A primary goal of the Headwaters Center is to provide a place for various water interests to come together to constructively discuss and address issues to minimize the future impacts on rivers in Colorado and throughout the West," said the project's main visionary Bob Fanch, who launched the ambitious endeavor with his wife, Suzanne, via the Sprout Foundation.

The primary interpretive challenge for the project: present the complexities of water diversions and delivery through the Continental Divide, from free-flowing mountain rivers on one side to cities on the other side. The main target audience is residents living in Metro Denver who use the water—yet have very little awareness about the water's source, and the risk this poses for rivers already impacted by a changing climate.

The interpretive exhibits utilize a variety of approaches and technologies—all aimed at stimulating conservation awareness and action. The entire Headwaters Center, including all the electronic exhibits, operates completely off the power grid, serving the purpose of not only informing, but also modeling and inspiring.

Within the museum, curving walls, custom riverine floor treatments, wavy interpretive

CHIP ISENHART

KIRSTEN HOLMES

KRISTIN ASHWORTH FANCH

graphics, and flowing gallery furniture were all carefully combined to support the storylines and create a rich immersive experience.

The first galleries elevate appreciation of the natural, recreational, and agricultural values that depend on and sustain healthy rivers. Then, in a not-so-gradual transition, a hard-edged human-engineered perspective takes over the design—many visitors start to connect the dots between their own water use and trans-mountain diversions. Ultimately, guests of all ages are presented with numerous and varied opportunities for introspection, and to take action—on site—along with being able to stay engaged and connected off site.

Two control rooms provide live and remotely accessible exhibit views for troubleshooting, along with power backup relays (off the grid).

The museum's first exhibit, informally known as the Cirque, engages visitors in an immersive 4D experience of mountain winter storms leading to spring melt and raging rivers. Three projectors blend to fill the wrap-around screen, with another projecting snow and ice effects onto the floor. DMX-controlled fans blow cool air in sync with the cinematography and soundtrack.

A touchscreen interactive in the Cirque reinforces a "snow to flow" theme, via hourly time-lapse images gathered from a solar-powered camera in a weatherproof housing located in a high mountain cirque just a few miles from the exhibit. Visitors scroll their finger along a path of monthly snowfall to see accumulation and melt throughout the year.

The progression through the first gallery includes more immersive and wrap-around imagery, audio, and video. Visitors at a long, curved bank of monitors delight in the beauty of a riparian area and its associated wildlife as the stitched video changes through the seasons. The river flow matches visitors pacing in the space, with floor sensors triggering content on the monitors slightly in advance of a person's arrival at the screen. A final eddy along the flow contains a surprise grunting bull moose, hidden behind a scrim of willows—until an unsuspecting visitor wanders close!

The Headwaters Theater presents a provocative and unique film experience. A sculptural screen and multi-image projection help transition the storyline from the natural to unnatural coursing of rivers in the West. A Crestron control system and drop-down screen in the theater allow docents and others to present their own material on special occasions. Changeable slides before and after the main film help staff direct any desired messaging to reinforce the subject.

Parts of the HRJ exhibit immerse visitors in the underwater world of trout and aquatic insects—important indicators of river health. This area helps further underpin the question "Why should I care?" and allows visitors to stay engaged from the heart when they encounter the "problem" part of the storyline.

A giant brook trout and stonefly sculptures help anchor and animate the experience. Visitors play the Trout Survival game, utilizing a Leap Motion sensor to detect hand movements controlling a realistically animated trout avatar on a journey to lay eggs. Wave your hand back and forth to swim faster, dive for food, and avoid shallow warm water. Watch out for the osprey!

From this place in the visitor experience, the tension of the primary issue (trans-basin water diversions and their detrimental effects on headwaters rivers) manifests physically as visitors actually channel water from a headwaters stream into a full-sized artistic replica of the Moffat Water Tunnel that takes water to Denver. Grass lawns and the thirsty Front Range anchor the other end of the tunnel.

Visitors exit the tunnel on grass turf, with flanking interactive garden hoses where visitors listen to a variety of voice actors talk about water use for outdoor landscaping along Colorado's Front Range. More than half of the diverted river water gets used residentially for landscaping, and most of that for lawns. So the Solutions Gallery presents a number of cost-saving and attractive options to bluegrass.

At the center of the Solutions Gallery, a multi-player Balance Table game allows players to design a yard that's water-wise and family friendly. Users can replace bluegrass with native grasses or other xeric plants and see their water use go down. Planting a shade tree and/or adjusting sprinklers also have very specific effects, all calculated with the extensive and changeable backend math assumptions for each game choice. Ultimately visitors submit their design and see the impact of such choices expanded out throughout the Denver Metro

A primary "Ah-Ha" moment: A visitor turns a diversion headgate wheel, draining a stream (left monitor) into a huge water diversion tunnel (right monitor).

area. The millions of gallons of savings are then translated to river equivalents to make the point that water conservation helps take pressure off rivers.

The solutions area is loaded with updatable graphics and interactives to keep HRJ on point and flexible over time. Many of the exhibits also allow the visitor to email their results home and/or post to social media. Some also allow tracking of visitor answers, and to change questions via a client-friendly CMS, to document impact/awareness over time.

In back of the Solutions Gallery, a massive walk-in water tank (Think Tank) allows visitors to explore hundreds of visitor sticky note comments and ideas. The tank is sized to represent an average person's water use in just six months. In the middle of the tank, a lone laser lit drop of water periodically falls from the ceiling into a cistern lined with river rock. Each drop has a slightly different and enhanced audio effect triggered (and delayed just right) when the drop falls through a beam sensor in the ceiling. The cistern water is fully filtered, and can be pumped dry and recycled with a handcart and hose designed to water plants.

Touchscreen kiosks allow visitors to take action on behalf of rivers—joining partner efforts throughout the West and testing their knowledge of rivers and water use. Guests can email their results home, along with a certificate and exhibit content fact sheets.

At the end of the exhibition, the summative Fly the Divide interactive uses a Kinect sensor to detect arm movements, allowing a user to "fly" an animated osprey (yes, ospreys have been tracked flying over the Divide!). The bird's path follows a series of rivers and associated water diversions, eventually ending up in a Metro Denver neighborhood.

As people depart the experience, they exit onto adjacent river trails. The views—mountains and rivers—hopefully underscore a visitor's new appreciation of how water arrives at their tap. The dots—or drops—have been connected.

ABOUT THE AUTHORS

Chip Isenhart is a Principal and Creative Director at ECOS Communications, the design lead for HRJ. Kirsten Holmes is a Principal and Executive Producer at Trivium Interactive, HRJ's primary interactive media producer. Kristin Ashworth Fanch is the Director of the Headwaters Center.