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Word Cloud for Sacajawea
The Future Of Learning: Short Film Take Fascinating Look At Ed And Tech
Project Vesto
BLM MUM ABOUT GRAZING BEEF
LAKE MEAD AGREEMENT: A PROMISING PRECEDENT ON WATER RIGHTS
My Side: Train wreck coming on the Colorado River?
Cry Me A Tributary
Arizona canal project an uphill journey

National Women's History Museum's photo.

What words come to mind when you think of **Sacajawea?** In honor of Native American Month, we would like to create a word cloud on her!

Comment below with one or two words and we will add your contributions in creating a word cloud later this week.

Unfamiliar with what a word cloud is? Here's an example: http://www.journalofamericanhistory.org/projects/lincoln/media/pinsker/documents_artifacts/word_cloud.html

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The Future Of Learning: Short Film Take Fascinating Look At Ed And Tech

www.huffingtonpost.com
From school e-readers and flipped classroom models to computerized testing and online courses, educators are still grappling with ways to shift an educational paradigm of the 20th century into one of the 21st.

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Project Vesto

This is a Nevada based competition for NEVADA entrepreneurs -- I know there are many of you that have great ideas out there. Now is the time to start!!!

NIREC | Project Vesto | NIREC nirec.org
Nevada's innovation intermediary, focused on aiding entrepreneurs with innovation and commercialization of technologies, and acceleration of their startups

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BLM MUM ABOUT GRAZING BEEF

Bureau of Land Management law enforcement agents are investigating issues stemming from last spring's planned roundup of Gold Butte rancher Cliven Bundy's cattle that have been roaming public land northeast of Las Vegas for more than a decade in violation of federal court orders.
http://erj.reviewjournal.com/ct/uz3688753Biz15219697

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LAKE MEAD AGREEMENT: A PROMISING PRECEDENT ON WATER RIGHTS:
The total amount of water involved in the five-year "trial run" agreement signed last Tuesday between Mexico and various southwestern states and water agencies - amending a 68-year-old treaty on rights to water in the Colorado River - is not inconsequential. But the real breakthrough may lie in the precedent it sets.
http://erj.reviewjournal.com/ct/uz3688753Biz15219702
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My Side: Train wreck coming on the Colorado River?

Hannah Holm, Post Independent

A heavy train is moving at five miles per hour toward… a cliff? A collision? And how far away might this unknown calamity be?
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Cry Me A Tributary

The Colorado river is being drained beyond sustainability. Gerard Helferich reviews Wade Davis's "River Notes."

Wall Street Journal

On paper, the Colorado may seem a slacker among the rivers of the American West. The Rio Grande, snaking between the United States and Mexico, is longer. The Columbia, churning from Canada into Washington and Oregon, conveys far more water to the sea. But the Colorado, Wade Davis reminds us in "River Notes," is the quintessential waterway of the Southwest, "the muse of poets and songwriters, river guides, shamans, medicine women, eco-warriors, engineers, dam builders and every farmer from the Grand Valley of Colorado to the Imperial Valley of California."
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Arizona canal project an uphill journey

By Shaun McKinnon The Republic | azcentral.com Sun Nov 25, 2012 11:52 PM

Sometime before 2:30 a.m. on Sept. 30, in the desert in far western Arizona, a concrete slab buckled and gave way. The slab lined the edge of the Central Arizona Project Canal, and as it broke, millions of gallons of water began to gush, unchecked, into the silent darkness.
Almost 200 miles away, at the CAP control center in Phoenix, computers showed the water level dropping outside the community of Bouse.

PDF: CAP canal by the numbers

An inspection crew left at daylight Sunday and at 7 a.m. found the breach. Water had flooded nearby Arizona 72, carving jagged channels as it spread. Crews would later estimate water losses at about 130 million gallons.

With the canal wall washed away, the crews had little choice but to shut the system down. The canal would have to run dry for repairs to begin.

At the Colorado River, gates and siphons were closed. And with that, the lifeblood of much of Phoenix and Tucson was cinched shut. If it remained closed long enough, the cities would run out of CAP water. The clock was ticking.

More than half a century ago, when planners envisioned a canal that would carry water from the river 336 miles to Tucson, there were plenty of reasons to consider the idea impossible. Building a canal through this forbidding stretch of desert, where the washout now drained away in rivulets of sand, was just one.

There were political challenges. California officials never wanted Arizona to build the canal. There were technical barriers. Tucson sits a little over 2,000 feet *higher* in elevation than the river. Pumping that much water uphill would require enormous amounts of power — and today, that power supply is tenuous.

Even at hundreds of miles long, the canal would leave much of Arizona outside its reach. Critics wondered whether it would work, whether Arizona needed it.

And the canal's two biggest challenges both came from hundreds of miles away.
The first came from a deal, struck in the back hallways of Congress, five years before the canal was ever dug.

The other returns every winter, more than 1,000 miles upstream, where the Rocky Mountains touch the sky.

Hard-fought victory
As much of Washington tried to flee the hot swamp of the capital's summer in July and August of 1968, Arizona Rep. John Rhodes feared that his state's long-delayed Central Arizona Project was about to sink into a political bog.

For going on two decades, the project had been kicked, batted around, cut up, reassembled and kicked again as other states, chiefly California, fought to stop Arizona from diverting water from the Colorado River to the interior cities of Phoenix and Tucson.

California and Arizona were longtime adversaries when it came to the river, each claiming the other was overreaching in efforts to secure water rights.

California had long been drawing huge quantities of water for farms and southern cities — too much, many Arizonans believed. In 1935, tensions had risen so high that Arizona Gov. Benjamin Moeur sent the National Guard to the border in an unsuccessful attempt to stop construction of Parker Dam, which would help divert water into California's own canal.

As the conflicts grew more heated, Arizona took its case to the courts and prevailed in several critical cases. Finally, after years of negotiations with California Gov. Edmund "Pat" Brown and, later, Gov. Ronald Reagan, Arizona agreed to guarantee delivery of California's share of the river in a shortage, even if it meant taking water from the CAP Canal.

In exchange, California's representatives would give their votes to CAP.

At last, Rhodes was at the doorstep of securing one of the largest water projects in Western history. But as summer dragged on, a single vote stood in the way.

A congressman from Colorado, Democrat Wayne Aspinall, had blocked yet another attempt to win approval.

Rhodes had hatched a scheme with the help of Floyd Dominy, the feisty commissioner of the Bureau of Reclamation, the federal water agency, and leaders in the Senate, which passed a CAP bill. He still needed help from House Speaker John McCormack, D-Mass., who could use his power to help Arizona do an end run around Aspinall.

Rhodes would later recall his meeting with McCormack during an interview recorded as part of a CAP oral-history project. The speaker listened to Rhodes' plan: Arizona's Sen. Carl Hayden would attach the CAP authorization to an appropriations bill that had already passed the House. When the bill returned to the House for final approval, the Rules Committee, at the speaker's behest, would allow it to come to a vote, and Aspinall would be nearly powerless to stop the House's final OK.

"What will Aspinall say?" McCormack asked.
"Frankly, Mr. Speaker," Rhodes replied, "he will climb the wall."
"Good," McCormack said.

Aspinall, it turned out, had crossed the speaker one too many times in the past. It was payback time.

Aspinall still managed to attach water projects for his state to the final CAP compromise, and the measure passed, after a journey as epic as the river itself, with a simple voice vote on Sept. 12, 1968.

Flush with victory, Arizona then had to find the money and a way to move the water uphill.

A risky deal
The deal that Arizona struck to win California's votes for CAP came with a risk, but at the time, the risk seemed remote.

The agreement works like this:
When the river is full, Arizona, Nevada and California all get their full shares of water. For Arizona, the allocation is 2.8million acre-feet per year, with about 1.5 million of those acre-feet flowing into the CAPCanal. (An acre-foot is 325,851 gallons, enough water to serve two households for one year.)

But when river levels drop below a certain level, Arizona takes the hit. If there's not enough water for all three states, Arizona has to give up some — or even all — of the water designated for the canal. California, on the other hand, gets to keep its water.

Forty years ago, the deal seemed good. The reservoirs were full.

“I think at the time, we thought were just giving the sleeves from our vest,” said Sid Wilson, a former CAP general manager and a former deputy manager at Salt River Project.

But the river’s flow is a force greater than politics. The Colorado River drains a vast stretch of the Rocky Mountains, where many winters bring heavy snowfall — and some do not. While the river’s two giant reservoirs, Lake Mead and Lake Powell, can store enough water to meet three years’ worth of demand, the system depends on the yearly return of ample snowfall.

The drought of the last 13 years put that decades-old deal in a new light.

As one dry year followed another in the first part of the new century, water levels at Mead and Powell plummeted. In November 2011, Lake Mead shrank to within 8 feet of a level that would require the first-ever rationing on the river.

If that happened, the deal that had helped create the CAP Canal would have started to empty it. Lake Mead has since risen, but climate experts say the seven states that share the Colorado River need to address the real possibility that the river may never flow the way planners originally envisioned.

“We didn’t understand the long-term hydrological changes that were taking place on the river,” Wilson said. “We had a vision, but no vision is complete.”

The dam plan

In the summer of 1967, as Arizona was still trying to find the votes in Congress to authorize the Central Arizona Project, planners were already drawing a system that would recast the most iconic landscape in the West.That plan nearly killed the canal.

Like almost every Western water project, the plan involved dams. Dams store water, divert it, and use it to make power. The early CAP plans included two dams — one at each end of theGrand Canyon, one for either of two possible delivery methods.

The Marble Canyon Dam, upstream, would store water on the Colorado River and divert it south toward Phoenix. The Bridge Canyon Dam, downstream, would be used to generate hydroelectric power to lift water from Lake Havasu through a canal across the west desert.

The image of dams in the Canyon was just the ammunition opponents needed.

Environmental groups painted pictures for the rest of the country of a flooded, ruined Grand Canyon, and the pictures were worth thousands of protest letters and calls.

California, which had not yet signed off on CAP when the dams hit the front pages, was only too happy to watch Arizona twist. The longer the canal project was delayed, the longer California could divert the water Arizona aimed to take.

Stewart Udall, a former Arizona congressman, was Interior secretary in the summer of 1967. He was also an emerging voice in the growing environmental movement.

Whatever he thought of the dams, he knew the project wouldn't win House approval in the middle of a national controversy. So, with Arizona's acquiescence, his Interior Department gave up the fight.

Under the revised plan, the canal would snake across the desert from Lake Havasu, at less than 500 feet above sea level, to Tucson, close to 2,400 feet.

The power to do the lifting would have to come from somewhere else.

The new plan was a coal-fired plant in Page. Coal was plentiful nearby. CAP could buypower at reduced rates, and its owners, a group of utilities from Arizona and California, could sell what the canal didn't use.
With the route established and the power source in place, the most difficult decisions seemed to have been made.

But this was a water project, and not everyone had given up on the idea of a new dam.

Against gravity
Arizona's earlier system of canals, those operated by Salt River Project with water from the Salt and Verde rivers, deliver water using gravity. The water starts in the mountains, then flows downhill from the reservoirs, into the canals and on to treatment plants, farms or backyards. CAP works the opposite way.

The water starts at the bottom of the hill, drawn out of the river as it nears sea level. It requires pumps to lift the water. Water rises through the pumps, spills down the next stretch of aqueduct, then rises again. The stair-stepping pumps lift water a total of 3,000 feet.

With construction of the Navajo Generating Station, the CAP Canal tapped an inexpensive power source, one meant to last beyond 2040.

Instead, state officials fear the plant could shut down far sooner and, even if it survives, could lose its ability to produce cheap electricity.

In August 2009, the Environmental Protection Agency proposed a rule that would require the power plant's owner to install new air-scrubbing equipment as part of a long-term plan to reduce haze over the Grand Canyon and other parks in the region.

The EPA's proposal reopened a controversy Arizona thought had been settled decades ago: how to produce enough power to run the canal.

Arizona officials say if the EPA moves ahead with its proposal (a decision could come before year's end), the cost of producing power at Navajo would skyrocket, forcing CAP to raise water

rates. Or the plant's owners, a consortium of utilities and the federal government, could decide the upgrades are too expensive and simply close up shop. That would leave CAP to buy electricity on the open market — at a far higher price.

"The bottom line is, everything else that is out there is much more expensive than Navajo," said Tom McCann, CAP's assistant general manager for planning and operation. "And it's all about rates when you come down to it."

CAP is looking at a range of options for a replacement source if one is needed.

At the same time, CAP officials have worked on other research that suggests the new scrubbers won't produce an added benefit, while environmental groups seized on the chance to close a plant they say has contaminated the Navajo Reservation.

Both sides acknowledge the awkward situation: The Page plant was proposed and built in a compromise with the environmental groups that rejected the Bridge Canyon Dam project in the Grand Canyon.

"We've always had to look at what happens when we don't have a power source," said David Modeer, the current CAP general manager. "We're looking sooner now."

Plan 6 approved

On May 6, 1973, a gathering of elected officials and water managers — they call themselves "water buffaloes," the veterans of the effort to tame the arid West — stood on the eastern shores of Lake Havasu and broke ground on the Central Arizona Project Canal.

CAP would deliver water through a canal that would flow night and day, like a river. But like most rivers in the dry country, the water would come at the wrong times, with lots of water in a wet winter and not enough in a dry summer. Delivery wouldn't be enough. The water would need to be stored, saved.

In those early visions of CAP, a dam in the Grand Canyon solved this problem. Water would flow through tunnels out of the Canyon, across the high plateaus and tumble down into the Verde River drainage, flowing on toward Phoenix. A vast new reservoir at the confluence of the Salt and Verde rivers, east of Mesa, would hold it all.

The final plan eliminated the Grand Canyon dam. But the reservoir east of Mesa still made for a good holding place. The 1968 legislation to build the canal authorized building Orme Dam to form the lake.

There was still one more catch.

The proposed reservoir would have flooded as much as two-thirds of the Fort McDowell Reservation. The Yavapais, fearful of losing their homeland, found allies in environmentalists who argued that the reservoir would wipe out critical nesting areas for the bald eagle.

Floods in 1978 and 1979 wiped out bridges and highways across the re-gion. Orme Dam supporters said it might have helped contain some of the run-off.

Meantime, President Jimmy Carter released his famous "hit list" of water-reclamation projects that his administration decided were unnecessary, and on it were Orme Dam and other CAP pieces. Carter even questioned the need for the canal itself.

Arizona Gov. Bruce Babbitt had decided Orme Dam was unneeded, but he knew it still had strong support among the water buffaloes. So he worked with federal officials to search for options.The work led them to five plans, and five plans were scrapped.

Finally, they emerged with Plan 6.It eliminated Orme Dam and called for expansion of the existing Waddell Dam, creating Lake Pleasant as a storage reservoir for CAP water. Plan 6 was accepted.

After the groundbreaking, crews worked on the canal's three main stretches concurrently, building berms, installing pumps and readying the historic project.

But questions remained, including an unexpected one: The canal was built to carry as much water as possible. It would carry far more than Maricopa, Pima and Pinal counties needed at the time. So what was central Arizona going to do with the rest?

Rural areas still struggle

Across the West, nearly all water systems have the same basic goal: Move water from where it *is* to where it's *needed*.

The CAP Canal delivers, by design, to Maricopa, Pima and Pinal counties.

And by design, the canal could carry even more. The system can handle 300,000 acre-feet more than it currently carries. And engineers have studied ways to raise the canal walls to further increase the capacity.

But the extra water wouldn't flow to where it's needed.

Rural Arizona is struggling to find sustainable water sources for future growth and, in some cases, survival now.

Prescott wants to build a pipeline to import groundwater from the Chino Valley area. Flagstaff bought a ranch near Winslow and plans to drill wells and import the water. Williams had to drill one of the deepest wells in the state to find new water.

"We've got plenty of water," said Wilson, the former CAP general manager. "It's just that so much of the time it's not where we want it."

The engineering is only part of the problem. CAP is funded by property taxes in the three counties it serves and overseen by a board elected by those counties. Any expansion would

require significant investment by outside communities, most of which are small and rural and barely scraping by financially.

“I think the CAP could be a facilitator to resolve some rural issues, we could be a part of a solution, but it’s still got to be paid for,” said Modeer, the current CAP general manager.

Water begins its journey

On May 22, 1985, after a journey of about three days from Lake Havasu, the first water from the Colorado River reached the outer edge of Maricopa County, a field of crops in the Harquahala Valley Irrigation District.

The moment was marked with a ceremony and a line of dignitaries watching as water poured from the canal into the ditches.

A more significant milestone passed quietly later in the year when the canal delivered its first water to municipal treatment plants operated by Phoenix and Glendale.

The canal arrived in Tucson in 1993, marking completion of the project.

Tucson, which had always relied on its aging network of wells and pumps, wanted to begin delivering CAP water right away.The water began flowing into the city’s water system, but the transition was far from invisible.

In fact, it was brown.

The water from the Colorado, like most surface water, was full of minerals picked up after flowing down through sandstone and across desert land. It required more treatment than the pure water pumped up from underground.

And when it began flowing out of taps in Tucson, it flowed brown. It ruined pipes and fouled faucets.

The city was forced to walk away from CAP and ordered water managers to find a better way of using it. The answer was right beneath their feet.

Tucson began putting the CAP water into so-called recharge basins, plots of ground where the geology would allow the water to percolate quickly into aquifers. The natural percolation process removed much of the organic carbon and other elements that were causing problems. Then the city drilled wells and pumped the water back out.

They didn’t know at the time that their ponds and pumps, not the canal, were the real picture of the system’s future.

In the bank

CAP was conceived as a way of delivering water to farmers, who would gradually give it over to cities as they grew into the croplands.

But by the time CAP was ready to sell water, two things had happened: Growth in Phoenix had accelerated, and the agriculture industry was on the decline. Farmers could no longer afford long-term contracts for CAP water, which was costlier than that offered by the older Salt River Project.

Still, at the time, cities didn't need all the CAP water that was available.

"I remember my parents talking about how we needed to get water from the Colorado River or we'd run out. And for many people in Arizona, that was seen as an article of faith," said Grady Gammage, a former CAP board member and a senior fellow at Arizona State University's Morrison Institute for Public Policy. "Yet most of my time on the board we were concerned about who would buy it."

And farmers still grew thousands of acres of crops. Many of those crops, like alfalfa and cotton, were water-intensive.

CAP offered a solution: Farmers could purchase water at a reduced rate but would not be guaranteed long-term contracts. The pool available for agriculture would shrink as water was allocated to cities and to Indian tribes, whose claims to water were written into the original CAP plan. For farmers, the water would last until 2030. After that, they would be on their own.

Even after supplying cities and cutting deals with farmers, Arizona was not using anywhere near its full allocation of CAP water. The water it didn't take remained in the river, flowing downstream — and California drew off the rest. Arizona officials hated the idea that California, their perennial nemesis on the Colorado, was still diverting more than its share.

Thus was born the Arizona Water Banking Authority. Arizona would divert its full allocation of CAP water each year and whatever wasn't sold to water users would be literally dumped on the ground. Vast storage ponds would let the water seep into the earth, where it would stay, banked like a savings account, a hedge against future shortages.

It was the same concept Tucson uses to strain minerals out of the water.

Tucson's plan, in the beginning, was just considered "the least-stupid way to use CAP water," said CAP's Modeer, who was head of Tucson's water department as the city converted to the blended recharge. "But there were a lot of benefits we never anticipated. Our water quality was better, our costs were lower. It ended up being the best idea we had."

It's also an example of how Arizona's water bank will work someday. The state has stored close to 4 million acre-feet of Colorado River water since the bank was founded in 1996 as a way to keep Arizona's allocation away from California. That is as much water as the canal delivers in 21/2 years.

But there's a key difference. Tucson saves some of its water underground and pumps most of it back out each year. The other water banks don't have any pumps. So the water is there, waiting, but there's no ready way to get it back.

Some water managers wonder who will pay to drill wells and build infrastructure to move water back to the canal.

CAP officials say they have developed plans that will handle even serious droughts, but they say it's not practical to drill wells before the water is needed. McCann, the planning deputy, said the agency will evaluate the various ways of recovering water to protect aquifers and act when necessary.

"If you built a wellfield today, it's going to sit there idle for maybe decades," he said. "It really doesn't make sense to build everything now. We know what the triggers are so that we can start working on recovery."

A supply that's certain

Repairs on the canal near Bouse would take about three weeks. Crews rebuilt the canal wall, poured new concrete and tested it for weaknesses.

Never in the time that the canal was offline or at reduced flow did CAP cut supplies to any of its customers. With so much water stored in Lake Pleasant, the system could have run that way through the end of this year.

Water levels at the lake would have dropped dramatically, crimping recreational activities at the reservoir. But homeowners turning on their faucets probably never would have noticed any difference. It was the old Plan 6, in action.

At 6 a.m. on Oct. 20, about three weeks after the collapse, water began to flow again.
No one held a ceremony. The system simply worked, as it has for decades.

The system works, as long as there's a way to store water and get it back.As long as the people who need it are close to the canal. As long as there's cheap power to make water flow uphill. And it works as long as there's snow.

A few days after the canal break, more than 800 miles away, snow was falling in Colorado's Rocky Mountains. Next year, it will melt, running down the slopes into the Colorado River and, some of it, eventually, into the CAP Canal.

http://www.azcentral.com/news/articles/20121121cap-water-tribes-farming-heritage.html?nclick_check=1

*www.azcentral.com/arizona**republic**/.../20121125arizona-ca...*