The Synapse: Intercollegiate science magazine

Volume 25 | Issue 1 Article 9

2020

Running Out of Life Itself: A Story of Water in the American West

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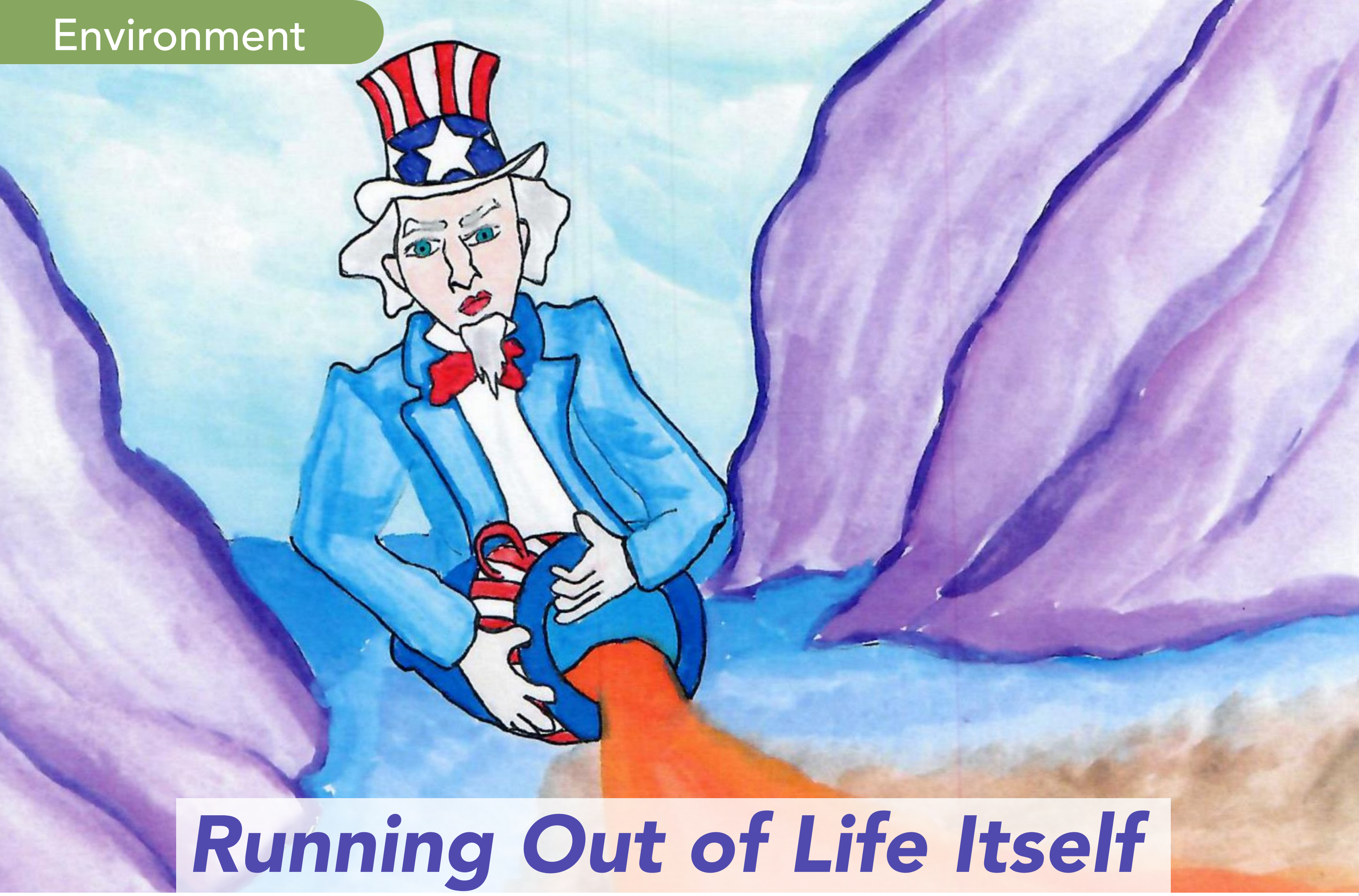

Running Out of Life Itself

A Story of Water in the American West

Written by Ethan Pochna
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Water is one of the few uncompromising necessities. Without it, we would die. The reliable supplies found along the Nile, the Euphrates, and the Ganges, were critical to the development of civilization. Yet, humanity famously forsook this precious resource during the industrial age, when decades of wanton pollution and development destroyed wetlands and rivers. The United States was no different, but it received a wake-up call when a brand new movement started talking about the environment, yelling about a 1969 fire on the Cuyahoga River. In 1972, 366 House Representatives and 75 Senators declared that they would no longer ignore the necessity of safe water supplies, and the Clean Water Act passed with a bipartisan supermajority. In response to critics who questioned the government's ability to afford the plan, the bill's sponsor, Edmund Muskie, asked, "Can we afford life itself?"

The start of the 21st century has returned the issue of "life itself" to the table. Have you ever found it odd that an extremely dry state like Kansas is America's breadbasket? How about the fact that America's fifth-largest city, Phoenix, AZ, is sustained by a mere eight annual inches of rain? Yet both are only possible because of two sources of water — the Ogallala Aquifer and the Colorado River — and the 20th-century innovations that allowed entire regions to drink from their bountiful supplies. The consequence of this reliance is a story you have probably heard before. It is a story of overuse and of dwindling resources, but this time, we are not talking about something that keeps your car running. It keeps you alive.

In an ancient era, when most of the West was covered by ocean, tectonic plates began to shift. The Rocky Mountains began to rise. As they did, they displaced massive amounts of loose sediments and water onto the area that now makes up the great plains. Loose clay, silt, and sand continued to accumulate, and tons of water continued to flow for millions of years, leaving the ground porous and wet. Water was trapped in the spaces between sediments. This process formed a huge network of water reservoirs in the ground below the Great Plains. This large water network persisted, in some places reaching down a thousand feet, even as climates shifted and the land above dried out.

The largest of these reservoirs is called the Ogallala Aquifer, and it is the reason why America's breadbasket can exist in such a dry climate. During the centuries before the aquifer was tapped, the Ogallala region was without significant settlement, and the area faced constant drought. However, in the mid-20th century, new pumping technology replaced archaic windmills with diesel engines. The small-scale, low-production, struggling farms in the region were able to build deeper, more powerful wells. They soon discovered that the water supply could support large-scale, unrestrained irrigation, and a "green rush" ensued as people flocked to the region. According to Roger Funk, a Western Kansas farmer who experienced the 1950s boom, it seemed like "you could pump all the water you wanted to pump." The brown region turned green, and by 1980, the aquifer irrigated nearly 20% of US crops.

Farmers soon learned that they could not, in fact, pump all the water they wanted to pump. Aquifers are isolated from the short-term water cycle and only "recharge" when water from the surface (or an adjacent groundwater source) slowly percolates downward, through unsaturated soil, until reaching the "saturated zone," or the section of sediments where all possible space is occupied by water. The lower limit of this zone is generally a hard layer of rock that water cannot pass through, and the upper limit of this zone is called the water table. Groundwater moves slowly, so particularly intense extraction in one area may result in a "depression," or a steep dive in the local water table; if net extraction exceeds recharge, an entire aquifer's reservoir can be depleted.

Unfortunately, the Ogallala Aquifer recharges slowly for the same reason that it is so necessary: in the semi-arid Midwest, evaporation exceeds rainfall. Water does not get very far on its journey into the ground. Furthermore, the Ogallala is considered "fossilized water": the runoff from the Rockies that initially filled it millions of years ago no longer exists. Thus, no matter how massive the Ogallala Aquifer may be, it is a finite resource. Wells began to go dry in the 1970s, and scientists found that in many areas, the water table was dropping by 6 feet a year, and natural recharge could only muster half an inch. By the late 1980s, overuse had caused a cascade of drying events, and the region's peak of 13 million irrigated acres fell by 20%.

Luckily, in the decades following those early alarms, many have learned to adapt. Low-water crops like wheat and grain sorghum have begun replacing water-intensive corn in the region, and GMO crops hold great potential for the future. Furthermore, Congress has increased funding for the Ogallala Aquifer Program every year since its inception in 2002, making great progress in coordinating regional farmers and governments to manage the Ogallala responsibly.

Nevertheless, progress seems increasingly futile. Today, the Aquifer is declining by around 3 feet a year, some parts of the saturated zone are so low it would take 1,000 years for the rain to reach them, and the water table below Kansas, the Texas panhandle, and Colorado has fallen to 60% of pre-industrial levels. Perhaps most damning, though, is that despite all efforts, Kansas's most extraction-heavy year was 2010, and what may easily take a century to deplete would take millennia to recover.

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Yet, while the Ogallala's slow-boiling tragedy remains unsolved, a more recent and increasingly dire water crisis has emerged on the other side of the continental divide, where the arid Southwest is losing its major artery: the Colorado River Basin. Winding for 1,400 windy, turbid miles from Wyoming to the Gulf of California, the Colorado River captures nearly all of the rain that falls between the Rockies and the Sierras, making it the key to life in the West. However, unlike the Ogallala Aquifer, the Colorado hits unpredictable extremes season to season and year to year, so Western settlers needed to tame it before getting to the business of development. Ever since the 1901 Reclamation Act sought to manage irrigation in the region, efforts to manage the West's essential water source have resulted in over 20 dams and dozens of laws and precedents (including a 1963 Supreme Court decision) to optimize apportionment.

Indeed, dams on the river create reservoirs from which all the West drinks, but ever since the Glen Canyon Dam was constructed in 1963, the Colorado River has only reached the Gulf of California a handful of times. This did not necessarily mean a water shortage, though, as long as the man-made lakes stayed full. 30 million people in seven states—Wyoming, Colorado, Utah, New Mexico, Arizona, California, and Nevada—and twenty Native American tribes rely on the water in those lakes, and a system of canals and aqueducts diverts their contents to cities and farms across the region, from Denver to Los Angeles. It is, in fact, the most overused river basin in the world, and it has been for a long time. While the river seldom buckled during the 20th century, though, the strains of the 21st have proved overwhelming.

In 2000, Lake Mead was full, held back by the Hoover Dam. Yet, over the past 20 years, agricultural demand and population have exploded across the West, especially in California. California's boom, in particular, has increased demand along lengthy diversion routes, and under the desert sun, massive amounts of water are lost to evaporation. The population growth has also intersected with a perpetual drought and the disruption of climate change, further diminishing an already measly supply while increasing demand. This tripartite pressure quickly collapses the fragile equilibrium—Lake Mead alone has dropped nearly 200 feet, halfway to the point where it can no longer flow past the Hoover Dam. In essence, the coming decades may see the Colorado River end in Northern Nevada.

The lakes are not just dwindling—evaporation takes water and leaves salt, so what little remains is rapidly salinating. Competition for access to the "best" water is fierce, and as the supply of surface water quickly dries up, many are turning to whatever groundwater they can find. Little is known about the groundwater in that region, but what we do know boils down to this: there is not much left. A study led by Stephanie Castle found that from 2004 to 2013, the basin had wholesale lost two entire Lake Meads worth of water (enough to satisfy US home water use for 11 years), and because Lake Mead itself is quite low, 77% of that water came from the ground. As Castle herself put it, "This is a lot of water to lose."

Efforts to deal with this crisis are far less mature than the system for managing the Ogallala, and given that the latter remains ineffective, it seems that water shortage will be the seminal issue that the US faces this century. While there are scores of organizations dedicated to the issue on both sides of the Rockies, the necessary level of federal intervention remains a long way off and scientific predictions grow more dire each year. While science, cooperation, and regulation will be necessary to avert disaster, this issue, as the intersection of environmental protection, human rights, and economics, could hardly be more complex. As things now stand, we are headed toward a nationwide experiment in the Tragedy of the Commons. • • •