FACT SHEET – GREAT SALT LAKE:

Over the last several years, news headlines announce,

- Record-breaking fire season singes Utah's budget

- Burning through money: The cost of Utah wildfires

- Utah 2018 wildfires destroy the most structures in the past 15 years

Leading headlines today are dire warnings about the Great Salt Lake. These include,

- Is it too late to save the diminishing Great Salt Lake?

- Great Salt Lake Water Level Drops to Record Low

- Great Salt Lake will disappear in 5 years without massive "emergency rescue"

These alarming environmental issues come with the loss of life, homes, and businesses, compromised air quality, and staggering price tags.

Fighting Utah's wildfires costs tens of million each year. Certain proposed solutions for the Great Salt Lake are in the billions of dollars.

So, how did Utah get into this dire situation, and is there a causal relationship between wildfires, forest mismanagement, and the Great Salt Lake water levels?

Wildfires. How did we get here - A glance back in history to current

A quick look at old photos, paintings, or drawings of the Salt Lake area at the time of the early pioneers and settlers shows a very different landscape than what we see today. One of the most obvious differences is the vast increase in the number of trees.

This is consistent with many areas across Utah. In fact, the US Forest Service estimates there are approximately 7.6 billion “live trees” in Utah, and our forests continue to grow year after year.

Planting Millions of Trees (Mostly in our Canyons) – Early 1900s

According to Tom Wharton from the Salt Lake Tribune, “From 1905 until about 1921, the Big Cottonwood Canyon spot where the Spruces campground is located served as a tree nursery, where millions of saplings sprouted in an effort to reforest the Wasatch.” Salt Lake City and state leaders joined with a new federal agency called the U.S. Forest Service in the early 1900s to restore the watersheds and reforest the canyons "which had been completely denuded of trees in the 19th century to build early Salt Lake City".

"Your city can have a superb water supply from the Big Cottonwood, but the watershed must be covered with trees…” stated legendary conservationist Gifford Pinchot, the first chief of the U.S. Forest Service. The tree nursery opened in 1905. It helped produce millions of seedlings, including Utah red pine, Engelmann spruce, Douglas fir, Western yellow pine, ponderosa pine, lodgepole pine and larch, the only conifer that loses its needles. These were planted throughout the Wasatch canyons.

https://archive.sltrib.com/article.php?id=56598789&itype=CMSID Tom Wharton

http://www.slcdocs.com/utilities/NewsEvents/news2000/news1202000.htm

https://livingnewdeal.org/projects/spruces-campground-big-cottonwood-canyon-ut/

Non-native trees planted (Mostly in our Valleys) – Starting in the 1940s

Russian Olive "During the New Deal days, the federal government introduced the Russian Olive trees to the west, seeing them as a great windbreak, a source of shade, and a way to control soil erosion...The trees were prized because they would survive almost anything."

https://www.hjnews.com/preston/russian-olive-trees-a-good-idea-gone-rogue/article_2c0caef0-3671-5ad6-99ce-aef209b35c78.html

Tamarisk, also known as salt cedar, was introduced into the United States from Asia in the 1820s for its ornamental characteristics and was later used for windbreaks and stream bank stabilization. Tamarisk has since taken the place of native trees and shrubs, like cottonwood, aspen, gamble oak, willow, and mesquite, and now infests rivers, streams, wetlands, reservoirs, and springs across the West.

Chinese Elm is an ornamental tree in urban areas planted for tough durability, interesting bark, and yellowish to reddish-purple fall foliage as well as being resistant to Dutch elm disease and air pollution.

Fire suppression and Forest management

Just one hundred years after these millions of trees were planted, Science Direct states, "The density of our forests in the western US has increased by 80 percent in the 100 years between 1911 and 2011..."

https://www.sciencedirect.com/science/article/abs/pii/S0378112721010975?dgcid=author#f0005

According to an August 2022 Deseret News article, "A pair of Salt Lake County Council members (Theadore and Snelgrove) are raising the alarm over what they contend is an extreme wildfire risk...The two cited Utah's Hazard Mitigation Plan that puts Salt Lake County in the top spot in the state for being at risk for wildfires and an analysis done last year by Redfin, which shows that Utah, with its fast growing population and encroachment of homes in mountainous areas, is No. 1 in the West for the percentage of homes at risk for wildfires."

Prior to their comments, "Utah had 1,327 wildfires on state and private land" in 2018, leading Utah State Forester Brian Cottam to claim "It was record-breaking in all sorts of bad ways."

Cottam then stated, "When you add in other agency firefighting costs, including the federal government, the costs of the Utah wildfire season in 2018 topped $150 million."

Rep. Casey Snider, R-Paradise, a volunteer firefighter who holds a master's degree in environmental science and policy, responded by saying, "That is an unsustainable amount. We know how we got here and it is a lack of management."

So, you wonder: What do Utah's 7.6 billion trees, extreme wildfire danger, "lack of management", and hundreds of millions of dollars spent fighting wildfires, have to do with water levels in the Great Salt Lake?

The simple answer is: Water

The Great Salt Lake needs trillions of gallons of water to achieve and sustain healthy levels, while trees in our overgrown and frequently unhealthy forests and valleys need those same trillions of gallons of water to exist and reproduce.

How big is the Great Salt Lake Watershed? The Great Salt Lake Watershed is approximately 19,000 square miles (nearly 1/4 of Utah's land mass of 84,904 sq. miles) and encompasses much of Box Elder, Tooele, Salt Lake, Utah, Juab, Wasatch, Summit, Morgan, Weber, and Davis Counties.

https://www.netstate.com/states/tables/st_size.htm

https://www.utahcleanwater.org/great-salt-lake-watershed.html#:~:text=The%20Great%20Salt%20Lake%20Watershed,inches%20of%20rain%20per%20year

How much water does one tree drink per day? "The basic rule for a drinking pine is 10 gallons of water for every single inch of tree diameter per day. That means a 12-inch plant will absorb nearly 120 gallons of water."

https://www.insidetheyard.com/how-much-water-does-a-pine-tree-drink-a-day/

According to Purdue University Landscape Report, trees can absorb between 10 and 150 gallons of water daily.

The US Forest Service states, "A healthy 100-foot-tall tree…can take 11,000 gallons of water from the soil…in a single growing season", and

Utah.gov estimates that each mature Russian olive tree is transpiring 100-200 gallons of water per day depending on its size.

https://wri.utah.gov/wri/project/justification.html?id=4155

Where is all the water coming from to water Utah's billions of trees? Contrary to popular news stories and sound bites, the majority of Utah's water is NOT consumed by growing alfalfa. In fact, according to Utah State University, approximately 87% of Utah's surface runoff evaporates or is used by trees and plants before it reaches rivers or groundwater.

https://extension.usu.edu/waterquality/files-ou/Publications/Exploring_Utahs_Water_Final.pdf

So, are you saying trees in the watershed are the problem?

We are identifying dramatic human-caused changes in the landscape and ecosystem that have occurred over the past 100 years or so. According to the data, the number of trees and types of trees in the Great Salt Lake Watershed seem to greatly impact the amount of water that can or should reach the Great Salt Lake.

Tree density A November 2022 study concludes that to save our forests, and increase our water yields, we may need to drastically reduce the density of our overgrown and frequently unhealthy forests in the west.

https://www.sciencedirect.com/science/article/abs/pii/S0378112721010975?dgcid=author#f0005

Type of tree "Less snow tends to accumulate on the ground in a forest than in an open location. This is because a more or less important part of the snow falling in a forest first settles on the branches. Some of this snow does end up falling to the ground, especially when the branches move in the wind, but another portion, being more exposed to the sun given its elevated position, melts and reaches the ground in the form of water or even evaporates and never reaches the ground at all."

"So, there is less snow accumulation in a forest and thus the snow often disappears more quickly in the spring … This phenomenon is particularly evident in a coniferous forest, whose dense needles often retains more snow than the bare branches of deciduous trees. There, even less snow reaches the ground. Under such circumstances, there is often less than a third of the accumulation compared to open areas nearby. But even in dense deciduous forests, snow accumulation is less than elsewhere."

https://laidbackgardener.blog/2020/04/24/do-trees-melt-snow/

According to Salt Lake City's 1999 Watershed Plan, Big Cottonwood Canyon historically provided 51,238 acre-feet of water. However, today, Salt Lake City Public Utilities Director Laura Briefer claims Big Cottonwood Canyon produces less than 20,000 acre-feet of water.

What can explain the huge reduction of water captured by Salt Lake City from Big Cottonwood Canyon?

Not only does this appear to be a net loss of tens of thousands of acre-feet of water flowing to the Great Salt Lake, but it also seems to be endangering the public safety of residents of Big Cottonwood Canyon and its many guests. According to Director Briefer, this lack of surplus water and city ordinance prevents some existing homes and cabins in Big Cottonwood Canyon from having year-round culinary water and water in its fire hydrants. Much of Big Cottonwood Canyon is listed as "high" to "extreme" risk of wildfires.

Climate Change

Some stewards of our water resources and forest management quickly allege "climate change" to explain and excuse our mismanaged forests and the reduced amount of available water. It is generally accepted that our planet "lives and breathes."

The Great Salt Lake fluctuates greatly in size in response to nature's whims. For example, the previous record low of the Lake was set in 1963, well before "climate change". The Lakes surface area in 1963 was 950 square miles. The Lakes recorded high was in 1986, with a surface area of 3,300 square miles. Now the Lake has returned to the historic low of 1963.

https://water.utah.gov/great-salt-lake/

It would seem that a changing climate, drought, and less available water are reasons for more aggressive and effective forest and water management.

Water Conservation

Can we conserve our way out of this problem?

It appears the answer is NO.

While it is prudent to be good stewards of our natural resources, we must take a hard look at the data to determine what impact conservation efforts by City, County, and State residents can have on restoring water levels in the Great Salt Lake.

Relevant data points include:

- Current volume of water in the Great Salt Lake? Approximately 7 million acre-feet, compared with 15 million acre-feet historically

https://en.wikipedia.org/wiki/Great_Salt_Lake https://www.theguardian.com/environment/2023/jan/10/utah-great-salt-lake-collapse-imminent

- Evaporation per year? Historically, an average of 2.9 million acre-feet of water evaporate every year off the Great Salt Lake, which is 8,300 acre-feet per day, or 2.7 billion gallons.

https://nhmu.utah.edu/sites/default/files/attachments/Great%20Salt%20Lake%20FAQ.pdf

- Additional volume of water needed to restore the Lake levels? Roughly 7 million acre-feet

https://www.usgs.gov/centers/utah-water-science-center/science/great-salt-lake-elevations

https://www.utahbusiness.com/what-to-do-about-the-great-salt-lake-drying-up/

According to Salt Lake City, their annual water conservation is 2.9 billion gallons of water (8,900 acre-feet). Based on historical rates, this amount of water quickly evaporates off the Great Salt Lake in approximately 24 hours.

https://www.ksl.com/article/50479856/salt-lake-city-meets-water-conservation-goal-saving-29b-gallons-of-water

Furthermore, all of the cities and towns in Utah use a combined annual total of approximately 850,000-acre-feet of water, half of which returns to the drainage system. If we removed every resident from the Great Salt Lake Watershed and their water savings went directly into the Great Salt Lake, it would do very little to raise the Lake's water level.

Will purchasing water shares for the Great Salt Lake solve the problem?

Probably not. Let's assume some well-intended lawmakers put together a $40 million trust and certain environmental groups are tasked with finding and buying water shares to dedicate to the Great Salt Lake. How many water shares will they be able to purchase and what impact will those shares have on the Great Salt Lake?

Trust amount - $40 million

Price per acre foot - $2,500 per acre-foot of Jordan River or Utah Lake water

Acre feet purchased - 16,000

Days of evaporation off of the Great Salt Lake (16,000 acre-feet) - 2 days

Farming and alfalfa

Likewise, as some have recommended, terminating all farming in Utah; including alfalfa, vegetables, orchards, etc., and dumping 100% of farming's 2,000,000 acre-feet (post-evaporation) back into the water system is not the answer. Many residents live and much of the farming occurs outside of the Great Salt Lake Watershed and Basin. Therefore, it is impossible to redirect all of Utah's water into the Great Salt Lake or its Basin.

Summary

Although well intended, it seems many of the past "solutions" to perceived problems have gone unchecked and unmanaged, thereby compounding today's issues regarding wildfire danger, water availability, low water levels at the Great Salt Lake, compromised lake effect snow, dangerous toxins in our air, and more.

Decades ago, the US Forest Service, joined by City, County, and State officials planted millions of trees. Unfortunately, there have not been adequate management practices put in place to thin and adequately maintain the forests and land. This has resulted in unacceptably high and dangerous overgrowth and wildfires.

Additionally, non-native, water-guzzling trees and plants have spread like a scourge along our creeks, streams, rivers, and more. Unchecked growth has led to the loss of trillions of gallons of water each year that would otherwise flow to the Great Salt Lake.

As we look to identify the real issues fueling Utah's extreme wildfire danger and depleting water flow to the Great Salt Lake, it seems appropriate to ask, "Do those individuals and groups who are in positions of power and influence regarding wildfires and water share the same mindset that helped lead us to this natural catastrophe?"

What are some reasonable steps and possible solutions?

- **New water sources.** We must create and capture new sources of water. This requires that we open, not close, the Great Salt Lake Basin for new water appropriations.

https://naturalresources.utah.gov/dnr-newsfeed/gov-cox-closes-gsl-basin-to-new-water-right-appropriations

- **Tree thinning.** "By thinning out trees … ease(s) water shortages during droughts. And by reducing the water used by plants, more rainfall flows into rivers and accumulates in groundwater."

"Forest thinning...restoring forests through mechanical thinning...can also save...billions of gallons of water each year."

"The need for forest restoration is being driven largely by the need to lower the risk of high-intensity wildfires and restore forest health … Downstream users...benefit from the increased water yield..."

"Forested areas needing restoration are large, but potential changes in water availability are significant...forest thinning could increase water flow from...watersheds by as much as 10 percent."

https://www.nsf.gov/news/news_summ.jsp?org=NSF&cntn_id=245128

- **Incentivize private landowners.** Possibly create new water rights by tree thinning. Possible carbon credits for watershed restoration, reforestation, and wildfire prevention.

Fortunately, the necessary technology and systems seem to already be in place, just waiting to be scaled up and funded. These include:

- **Watershed Restoration Initiative.** Scale up the State of Utah's Watershed Restoration Initiative, a wildly successful partnership-based program focusing on improving watershed health, biological diversity, water quality and yield, habitat for wildlife, and vegetation resilience due to drought and wildfires, https://www.youtube.com/watch?v=KEZuG8eKHsc&t=37s https://www.youtube.com/watch?v=slEKsTUxqY4&t=355s

- Enhanced public/private efforts such as the:

106 Reforestation, or similar technology, that is dedicated to high mountain habitat restoration, specializing in aspen forest regeneration, and active wildfire mitigation,

https://106reforest.com/

Demonstration forests. Partnering with private landowners in the Great Salt Lake Watershed for their lands to be used as "demonstration forests"

https://www.suu.edu/news/2010/09/suu-signs-demonstration-forest-agreement-with-division-of-forestry,-fire-and-state-lands.html

Placing a "bounty" on select non-native, water-guzzling trees. According to the Salt Lake County District Attorney's office, a tree in the Wasatch Canyons is valued at approximately $750.00, and

https://archive.sltrib.com/article.php?id=3808581&itype=CMSID

Outreach, education, and training for the public.

https://wri.utah.gov/wri/files/5260/Images/During/How%20to%20Effectively%20Kill%20Tamarisk%20and%20Russian%20Olive.pdf

In addition,

- Each County and City within the Great Salt Lake watershed must produce accurate information regarding its forested and prioritized areas,

- Each County and City must review its tree ordinances to clear the way for water-saving and reforestation efforts. For example, Salt Lake County's ordinance that blankets the coveted, high-elevation watersheds of Big and Little Cottonwood Canyons states,

"A significant tree that is removed shall be replaced by two trees" or, "...saplings may be used in lieu of the larger trees...at the rate of ten saplings per required replacement tree..." This requirement for even more trees might actually compound the negative impacts and results of overgrown forests and diminished water production,

https://library.municode.com/ut/salt_lake_county/codes/code_of_ordinances?nodeId=TIT19ZO_CH19.72FOCAOVZOFC_19.72.110TRVEPR

- If an urban City wishes to plant native trees, it should be required to remove a certain number of non-native, invasive, water-guzzling trees,

https://www.deseret.com/utah/2021/11/15/22783351/erin-mendenhall-caps-off-her-1000-trees-initiative-for-2021-environment-air-quality

https://www.ksl.com/article/50442848/can-expanding-salt-lake-citys-urban-forest-improve-air-quality-ease-historic-inequality

- Be honest and transparent with the public regarding accurate data, proposed funding, and anticipated results. And last but not least,

- Answer the simple questions: **If we trim back our vast tree overgrowth by 1% or less, would that 1) refill and save the Great Salt Lake, 2) replenish dry watersheds, 3) restore our forests to a more healthy vegetation standard, and 4) proactively use state and federal funds for wildfire prevention, thereby reducing the severity and the numbers of wildfires in Utah?**