

FRIENDS of *Great Salt Lake*

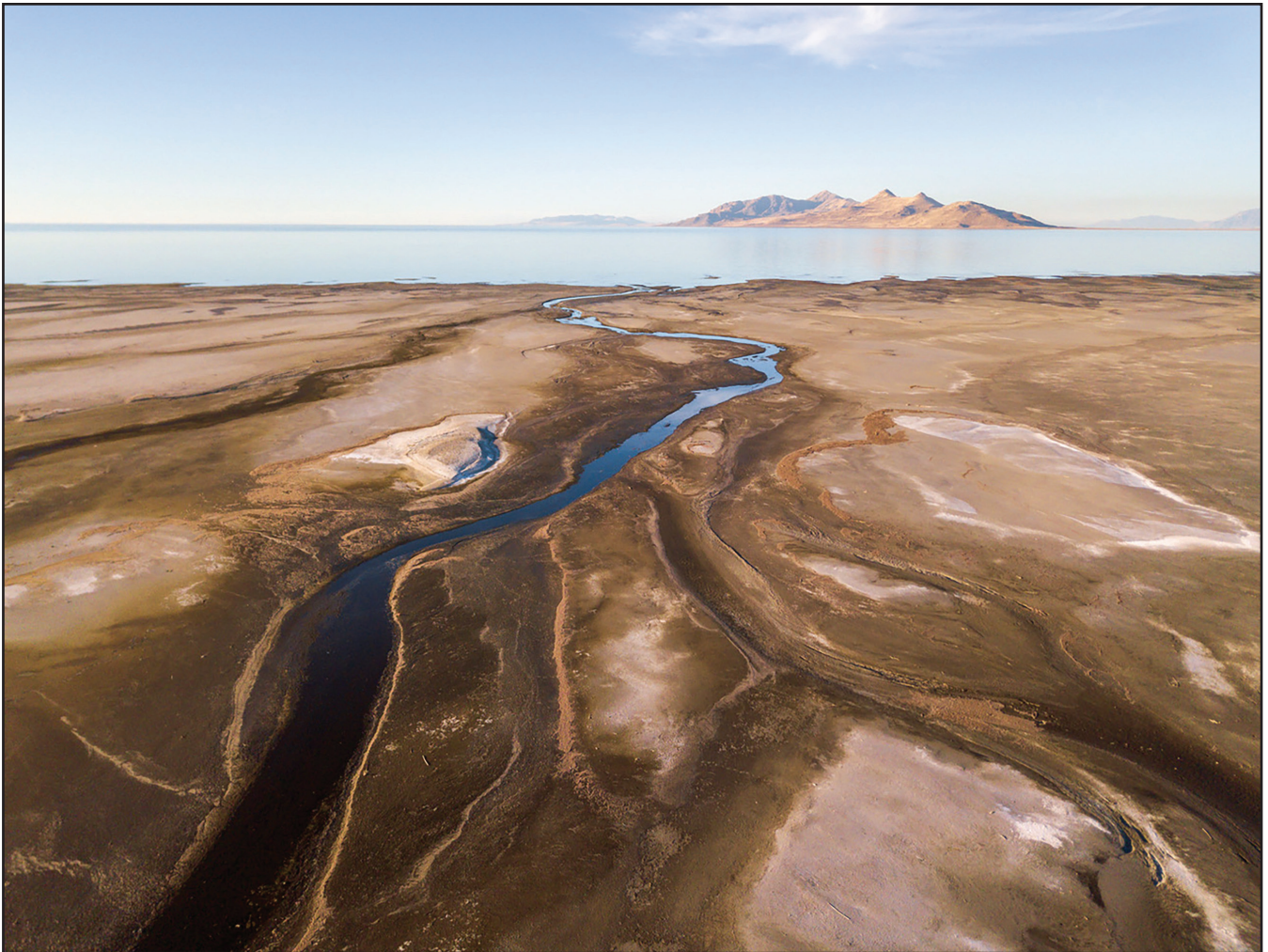
150 South 600 East, Ste. 5D, Salt Lake City, UT 84102

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Compassion, photograph
by Charles Uibel

The mission of FRIENDS of Great Salt Lake is to preserve and protect the Great Salt Lake ecosystem and to increase public awareness and appreciation of the lake through education, research, advocacy, and the arts.

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EXECUTIVE DIRECTOR'S MESSAGE

THINK AND DO—WHAT DO WE DO ABOUT A RECORD LOW GREAT SALT LAKE?

In late July 2021, the Great Salt Lake in Utah reached its lowest water level on record, and it has continued dropping since then. On July 23, the U.S. Geological Survey (USGS) gauge at the Saltair boat harbor at the southern end of the Lake recorded the average daily level at 4,191.3 feet (1277.5 meters) above sea level, the lowest mark since measurements began in 1875. The previous low was set in 1963.

NASA Earth Observatory · August 18, 2021 Story by Michael Carlowicz

Behold! Great Salt Lake microbialites! Fondly referred to as the “coral of Great Salt Lake.” These calcium carbonate structures created from groundwater springs inundate the lakebed and play a critical role in the food web of the ecosystem. Microbialites are covered in rich and productive mats comprised of zillions of microbes that provide browse for brine shrimp and brine flies; both of which are critical food sources for more than 10 million migratory birds that come to the Lake to rest, stage, and nest during their migration. They are a bellwether of the health of the Lake. And for obvious reasons, *they should indeed be underwater* to function in this capacity.

According to Michael Vanden Berg, Energy and Minerals Program Manager—Senior Geologist, Utah Geological Survey in the Utah Dept. of Natural Resources (DNR), it takes years for these productive mats to form. To sustain and promote this critical activity and prevent them from drying up, microbialites need to be submerged in the Lake's briny broth at an elevation between 4,185' and 4,195' asl. With this margin already diminished by the record low elevation of 4,191.3' and falling, and with predictions of a drier fall water season, this doesn't bode well for these vital ecosystem contributors. Microbialites are the subject of extensive research because they continue to unlock ecological secrets about Great Salt Lake that can help inform responsible management decisions in our work to sustain this unique ecosystem. But water is key to achieving that goal.

On so many levels we are sharing a collective experience like no other in our lifetime. Among these experiences are the cumulative impacts on Great Salt Lake from water diversions that have occurred since statehood, and that are exacerbated by exceptional drought and climate change. We're reading more and more about how the Lake is exhibiting obvious signs of stress. Almost every day without fail someone brings up the dire state of the Lake. Even



This should be underwater, photograph by Amy Eskind

complete strangers ask me about it. On one hand it's heartening to know that so many people are interested in it. On the other hand, it's disheartening to know that this is because its future is in jeopardy.

What are we going to do? This is like what happened to the Aral Sea, isn't it? What about all of the birds that depend upon the Lake? Is there dust coming from the exposed lakebed? How can we get water to the Lake so it doesn't dry up?

I find myself troubled by the irony of all of this. Being fully aware of the plight of other saline systems around the world, and being in the presence of scientists, systems managers, academics, industry, government entities, conservationists, and other stakeholders working on systems like the Aral Sea, Lake Urmia and even Owens Lake, I had hoped that this would never happen to Great Salt Lake because we know better. We know how those devastating impacts translated into troubling results. And I had hoped that our commitment to continuing research and sound science would strengthen management practices, justify why the Lake should be included in Utah's water picture, and would certainly keep us from finding ourselves in the same tragic predicament. Ouch!

As we all know, the Division of Forestry, Fire & State Lands in DNR has the jurisdictional responsibility to manage Great Salt Lake *in perpetuity* as a Public Trust resource for the people of Utah. One of the tools that the Division utilizes to inform its management practices is the *Great Salt Lake Comprehensive Management Plan*. The plan is updated every 10 years to reflect trends and conditions of the Lake's ecosystem. The *March 2013 Great Salt Lake Comprehensive Management Plan and Record of Decision* focuses on management strategies for declining Lake level conditions.

The Great Salt Lake Level Matrix on p. 333 is one of the insightful tools that came out of the plan. I call it the Great Salt Lake Rosetta Stone because it provides a comprehensive picture of how the dynamics of Lake elevations affect salinity, lakescapes, landscapes,



habitats, wildlife, recreation, navigation, industry, and the extensive range of ecosystem services Great Salt Lake provides. Elevations in the Matrix focus on the South Arm/Gilbert Bay of the Lake because this is where the Jordan, Weber/Ogden and Bear Rivers enter the Lake. In the Matrix is a range of elevations that could be characterized as the “sweet spot” where the Lake levels are the most beneficial for the resource and at which most of the ecosystem services can be sustained. This sweet spot is between 4,198’ and 4,205’ asl.

USGS records show that between 1847 and 1930, the average water level in the Lake was 4,202.9’ asl. That level is right in the middle of that sweet spot. That same water level average carried forward from 1930 to 2015, but only because of the extraordinary amounts of snowmelt and rain we experienced in the mid-80’s. Realistically, water levels over the last 20 years have been below the sweet spot, often well below, meaning that most of the Lake’s resources have been and are being impaired.

The Lake’s fluctuations are influenced by a range of variables including temperature (this past summer was the hottest on record), precipitation, snowpack and runoff (shorter and warmer winters are becoming more common), upstream diversions, inflows and timing of same (only 6” compared to an average of 2’ of water got to the Lake this spring), consumptive water use by a growing population in the second driest state in the nation (average daily water consumption per person of 232 gal.), evaporation, and climate change. However, even with the influence of climate change on Utah’s water resource, striving to keep the Lake within that sweet spot should be a goal. The difficulty is to stay on top of the predictive ebb and flow of the Lake’s elevation (some of us call this breathing of the system) with water management measures to effectively keep water levels in this relatively shallow system within that range. Proposals like the Bear River Development and prospects of water reuse simply compound and confound the situation. The challenge is that keeping water levels in that range is virtually impossible without the guarantee that water in Great Salt Lake is recognized as a beneficial use under Utah’s Prior Appropriation Water Law. This recognition would allow the system to hold water rights or lease water from existing water right holders. Therein lies the rub!

“We must find ways to balance Utah’s growth with maintaining a healthy Lake. Ecological, environmental and economical balance can be found by working together as elected leaders, agencies, industry, stakeholders and citizens working together,” Brian Steed, Executive Director of the Utah Department of Natural Resources.

So here we are with a reality check that is testing our commitment to being good stewards and testing our effectiveness at taking prompt and meaningful actions to address this issue. Which brings me to the December 2020 *Recommendations to Ensure Adequate*

Water Flows to Great Salt Lake and Its Wetlands. This report is an outcome from the Great Salt Lake Resolution (HCR-10) Steering Group representing a diverse group of stakeholders of which FRIENDS was a part. It’s divided into 16 Strategic Opportunities that are organized into 6 focus areas along with 60 specific recommendations to address those opportunities. The expectation from all of this effort is to encourage ongoing discourse among a wide range of interests, fund studies, and generate thoughtful and timely decision-making that will essentially save Great Salt Lake. Access to the full report is located at: <https://ffsl.utah.gov/state-lands/great-salt-lake/>

The report was in response to the 2019 Legislative *HCR-10 Concurrent Resolution to Address Declining Water Levels of the Great Salt Lake*. Unanimously supported by the Legislature and signed by Governor Herbert, the Resolution states: “by taking steps now, Utah will be best-positioned to avoid the kind of degradation and economic harm experienced by other states [and] communities.” **Now** of course is the key operative of this declaration. And one that we are all impatient to actually see happen.

There is encouraging news however. During the 2021 legislative session, funding was approved for a study of Great Salt Lake groundwater that evaluates the connection between groundwater and the Lake. And funding for a second project will bring local land use authorities and corresponding water suppliers together to identify ways in which coordination between these entities can be improved, as well as provide resources to other land use authorities. Both are good news and important steps in the right direction. Still, we need more projects funded and more actions taken expeditiously to experience the important momentum we believe needs to occur.

So let’s cut to the chase. This is what happened to the Aral Sea, Lake Urmia, and Owens Lake. And now it’s in our own backyard.

I’ll take Director Steed at his word about “maintaining a healthy Lake.” And you can take FRIENDS at our word that we are committed to working effectively through our programs and our engagement with the water community to preserve and protect the Great Salt Lake ecosystem. But it’s going to take all of us as stewards for this hemispherically important ecosystem to play a role as well. Contact your legislators/elected officials, and Governor Cox expressing your concern about our declining Lake. Participate in local planning decisions that are shaping your communities and water impacts. Share your concerns through community media sources, and join us on the Hill during the 2022 Utah Legislative Session to speak in support of various legislative bills that are being proposed. We all can make a difference. We have to. Because the Lake doesn’t have the luxury of time. And neither do we.

In saline,
Lynn



FRIENDS' ORGANIZATIONAL STATEMENT

Founded in 1994, FRIENDS of Great Salt Lake is a membership-based nonprofit 501c3 with the mission to preserve and protect Great Salt Lake ecosystems and increase public awareness and appreciation of the Lake through education, research, advocacy, and the arts. The long-term vision of FRIENDS is to achieve comprehensive watershed-based restoration and protection for the Great Salt Lake ecosystem.

FRIENDS of Great Salt Lake sponsors programs related to our mission statement: Lakeside Learning, the Doyle W. Stephens Scholarship, the Great Salt Lake Issues Forum, and the Alfred Lambourne Prize.

Lakeside Learning Field facilitates 2.5 hour inquiry-based educational field trips for 4th grade students. The trips combine informal environmental education strategies while incorporating science, technology, engineering, art and math (STEAM) to reinforce the Utah Common Core State Science Standards. Lakeside Learning emphasizes learning through participation.

Within the research component of our mission, we sponsor the Doyle W. Stephens Scholarship for undergraduate or graduate research on Great Salt Lake ecosystems. Established in 2002, the scholarship supports students in new or on-going research focused within the Great Salt Lake watershed. Recent project winners span the effects of changing salinity on microbialites to the impacts low water levels in Great Salt Lake have on Utah's air quality.

FRIENDS is actively involved in advocating for Great Salt Lake. Every two years, FRIENDS hosts the Great Salt Lake Issues Forum to provide focused discussions about the Lake for a variety of stakeholders including policy makers, researchers, and industry leaders.

Each Forum engages the community in constructive dialogue regarding the future of Great Salt Lake.

In 2014, FRIENDS established the annual Alfred Lambourne Prize for creative expressions of our Inland Sea in the categories of visual art, literary art, sound, and movement. FRIENDS celebrates the relationship between local artists and one of Utah's most precious natural resources, Great Salt Lake. Through artistic expressions, we enhance our capacity to build awareness about the Lake and our need to preserve and protect it for the future.

FRIENDS maintains a Board of Directors and Advisory Board composed of professionals within the scientific, academic, planning, legal, arts, and education communities. Staff members include, Lynn de Freitas, Executive Director; Rob Dubuc, General Counsel; Holly Simonsen, Membership & Programs Director; and Katie Newburn, Education & Outreach Director.



Great Horned Owl
Photograph by Gary Crandall

On The Cover

"Water is always connected to more water. When supply seems short, clear a channel, and let water find a way. Does water hold itself back from Great Salt Lake? No! Water waits ready to wash its way in, to reinvigorate, reanimate, and restore. Look around, see if there is something you can give away, to help remove the blockage. Must the policies of freedom require an equal measure of death? Some think that if water reaches the Lake, it is wasted. To maximize one's water allotment, the Lake should receive as little water as possible. The Lake dies.

Hardened ideas and old agreements are making Great Salt Lake water poor. Once brilliant solutions are now frozen-in-time water policies applied to a Lake which refuses to freeze. Let some of these old methods and ideas go. Let them soften a little. Have a little compassion for your neighbor by being a good neighbor. Don't be so sure that one end of a river is more important than the other.

We are building a new Great Salt Lake, and a new climate, and a new rationale."

—Charles Uibel

<http://greatsaltlake.photography>

<http://really.photography>





Moody Mother Nature, photograph
by Mike Christoff

AGRICULTURAL WATER & GREAT SALT LAKE

Great Salt Lake is in grave peril. Lake levels have been measured since the pioneers arrived in the Salt Lake Valley in 1847. Never before have we seen levels this low. Those who care about the Lake wonder: what can be done? The answers to that question remain partially formed, untested, technically challenging, and prohibitively expensive. One thing is clear; however, any effective strategy to reverse the Lake's decline must involve all water users, including agriculture. In 2021, agricultural uses statewide account for roughly 80% of the water diverted out of natural systems for human use. While that percentage is lower in the Great Salt Lake basin, water for agriculture still represents a majority of diversions. Given that, any reasonable solution for Great Salt Lake must involve "agricultural water optimization." What does that term mean, particularly in the context of Great Salt Lake? This article begins to answer that question.

Federal efforts to promote soil and water conservation date from the 1930s, when, in response to the Dust Bowl, Congress created the Soil Conservation Service (SCS). In 1994, the agency's name was changed to the Natural Resource Conservation Service (NRCS) to recognize a role broader than just soil conservation. While SCS/NRCS programs have encouraged the adoption of many laudatory practices, some federally funded "conservation" programs may in fact harm natural resources like Great Salt Lake.

For example, for decades the NRCS has used financial incentives to encourage farmers to switch from flood irrigation to sprinkler systems (pivots and wheel lines) in the name of "efficiency" and "conservation." Sprinklers do tend to distribute water more uniformly across a field than traditional flood irrigation, particularly where ground cannot be fully leveled. Sprinkler systems may also reduce labor costs and increase yields. In rare cases, they can provide localized environmental benefits by diverting less water from a natural source than traditional flood irrigation.

Those benefits, however, tell only part of the story. Such systems impose real costs—costs that go well beyond the price of the infrastructure itself—and that side of the ledger has been ignored for too long. In many cases these systems are mounted with large sprinkler heads that send out enormous jets of water, leaving a cloud of spray behind. Every droplet represents an increased evaporative surface. Furthermore, these small droplets more easily cling to plant surfaces by and are not absorbed into the roots of the plant.

Through a combination of these factors, substantially more water evaporates into the atmosphere as compared to traditional flood irrigation. The increased crop production from sprinkler systems also means more evapotranspiration, as plant growth requires water to fuel it. Lastly, water from sprinkler systems does not percolate down through the soil to recharge aquifers or become return flow in the way that water from flood irrigation does. Given that, the water "conservation" and "efficiency" narrative used to promote sprinkler systems for decades simply does not hold water when considered at the watershed scale. Sprinkler irrigation dramatically increases water consumption. That means less water for farmers who live at the bottom of a river system (for example, Delta); it can also mean less water for natural resources at the bottom of a river system, like Great Salt Lake.



Wheel line irrigation, photograph courtesy of L. de Freitas

As one user's efficiency or conservation can operate to the detriment of other users in this way—essentially robbing Peter to pay Paul—some in the Utah water community decided to adopt the term "optimization" instead. In doing so, they hoped to promote using water in thoughtful ways so as to maximize, or "optimize," the beneficial uses that can be satisfied by a given volume of water. While water "efficiency" and "conservation" are often viewed through the lens of a single user, the term "optimization" suggests that this precious resource should be viewed through the lens of multiple users and evaluated at a watershed scale. Rather than ask "what does this practice mean for this user," we must ask "what does this practice mean for the watershed?"

Several years ago, in my role as a legislator, I worked with others to convene a group of stakeholders to investigate how we, as a state, could optimize water use in agriculture. We created programs to fund both applied research and adoption of the most innovative



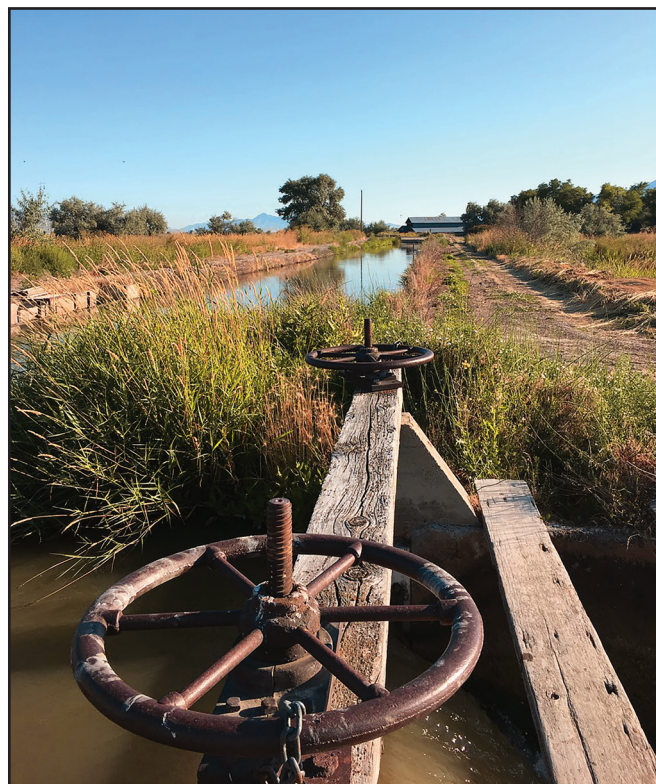
ideas. Those programs continue today, and we are making great strides in finding innovative solutions to critical water challenges.

One of those solutions is water banking—a strategy that the stakeholder group, drawing on Utah’s Recommended Water Strategy Report, identified early on. Water banking harnesses the power of free markets to connect water supply with water demands of all kinds, both human and environmental. Simply put, it makes it easier for water right holders to share water in voluntary and non-disruptive ways. After a lot of work by a lot of stakeholders, Utah passed water banking legislation in 2020.

How does this affect Great Salt Lake? Consider this scenario: what if funding could be secured for on-farm water optimization that would benefit farmers and Great Salt Lake at the same time? What if an agricultural producer saw benefit in switching to drip irrigation and was willing to make the change, but could not afford the needed equipment? Could that producer, in exchange for the money necessary to fund the drip system, lease a portion of his or her water rights into a water bank? While legal and practical challenges remain, a water bank could empower a win/win solution where the producer gets what they need and, in exchange, the resulting water savings could then be used to benefit a natural system like Great Salt Lake. While a program like this would make little difference at an individual producer level, it could make a significant difference if multiplied across a watershed.

Contrast that kind of win/win solution with what happened in early efforts to restore Walker Lake, a much smaller terminal lake in the Nevada desert about a hundred miles east of Lake Tahoe. Senator Harry Reid decided to do something to save Walker, which had been in slow decline for decades as the lake’s water supply was diverted for other purposes. As Majority Leader, Senator Reid convinced Congress to appropriate \$100 million dollars to restore Walker, and that money was put to use in a “buy and dry” strategy, in which senior agricultural water rights were purchased for top dollar and then retired from irrigation so the water could instead flow to the lake. While this helped reverse lake declines, it had several unintended consequences. It harmed the local economy as farms went out of business. This led to resentment, community decline, and opposition to the program. It also created secondary environmental problems, as those farms, now shorn of their water rights, became weed patches and dust bowls.

Fortunately, the story doesn’t end there. The program, now managed by the National Fish & Wildlife Foundation, began exploring ways to restore flows and keep agricultural lands in production at the same time. For example, the program purchased senior groundwater



Headgate on Bear River Irrigation Canal, photograph courtesy of L. de Freitas

rights, but rather than try to transport the groundwater directly to the Lake, exchanged those water rights for lower quality surface rights. The trade delivered water to the Lake while enabling local producers to use higher quality groundwater to grow higher value crops. As a result of this win/win, local support for restoring Walker Lake increased.

Walker Lake 2.0 suggests that we can craft creative solutions that benefit agricultural producers and natural resources like Great Salt Lake at the same time. That’s why that syllable-laden phrase “agricultural water optimization” will play an important role in the context of Great Salt Lake. We must find creative ways to get beyond the zero-sum game that forces us to choose between a healthy Great Salt Lake, on the one hand, OR a healthy agricultural sector and rural communities on the other. If we get creative—and pursue water optimization in thoughtful and collaborative ways—we can have both. The pioneers who settled these desert valleys succeeded, and made our communities possible, by taking the long view and working together. We must harness that same pioneer spirit to save Great Salt Lake even as we empower and strengthen our rural communities.

Tim Hawkes represents House District 18 (central Davis County) in the Utah Legislature. He is General Counsel for the Great Salt Lake Brine Shrimp Cooperative, Inc., served as co-chair of Governor Herbert’s State Water Strategy Advisory Team.



GREAT SALT LAKE & WATER REUSE

I had this conversation with my germ conscious grandchild. Mind you, this child knows a lot about sewer and wastewater treatment having done a science fair project about bacteria:

“So, what do you think about sewer water reuse?”

“What do you mean by reuse?”

“You know, people using the water that has been flushed down the sewer a second time after it has been treated.”

“YECK! Who would want to drink pee water?... Hum...I guess it depends on how thirsty you are!”

Every few years, Utah gets thirsty enough to think about the reuse of wastewater without the YECK factor getting in the way. Reuse in this case means taking treated wastewater and putting it on lawns, gardens, using it for agriculture, or use by industry. A statement from EPA states “EPA supports water reuse as part of an integrated water resources management approach developed at the state and local level to meet the water needs of multiple sectors including agriculture, industry, drinking water, and ecosystem protection.”

If water reuse happens, what need is being met first? Along the Wasatch Front, is there a need for green lawns or a vibrant Great Salt Lake Ecosystem? Who gets to make that decision? Reuse without conservation drains the Lake. Can we really allow that to happen?

The preliminary results of a recent study on reuse in the Great Salt Lake Basin helps us answer these questions. First, water in GSL Basin is governed by water rights laws. Reuse is allowed under Utah Code Title 73C-3C. Reuse is permissible if the State Engineer approves, and it is consistent with the underlying water right. This is not much of a leap since most municipal and industrial water rights are 100% consumptive. There are also treatment requirements that must be met, but these are usually a simple add-on to existing wastewa-

ter treatment facilities.

Secondly, the volume of water reuse that is possible is variable. In the GSL Basin it could be as much as 274,000 acre-ft of water every year. That is more than the Bear River project. That is also about 10% of the average inflow of water to Great Salt Lake. And if even half that amount is lost to Great Salt Lake, that 50% is more consumptive loss than projected for the Bear River Project. If this occurs, Great Salt Lake could go down another foot or two feet. Make no mistake this is not good for the Lake. Loss of a reliable water supply hurts, and it is not good for Utah's economy or likely our air quality, either.

In some cases, water reuse is here. Central Valley Water Reclamation Facility produces reuse water that waters the neighboring Golf the Round golf course. Today this is only a small percent of Central Valley's wastewater flow. The remainder of their discharge flows into the Jordan River and then into Great Salt Lake. Of eleven major wastewater treatment plants along the Wasatch Front, eight are in some stage of consideration for water reuse. The key as to where this water goes rests in the hands of the cities and water districts who hold the underlying water rights. That decision is also influenced by us, the water users. When they believe water reuse is necessary, major water reuse will occur. Droughts are the type of thing that make these decisions probable. Reuse had been delayed due to that YECK factor and the availability of cheaper water. When little other water is available, the cost will not be such a major impediment. The solution is water conservation. If water reuse is not needed, it will not happen.

Cost for reuse improvements could be as inexpensive as \$0.25 million per million gallons per day (MGD) of capacity converted to reuse. Or the construction required for reuse could be as high as \$1.3 million per MGD converted to reuse. After construction is complete, the additional treatment costs are minimal. The other major expense is getting the reuse water to end users. Where



secondary water systems exist, the distribution of reuse water will be easier and cheaper than in areas where outside watering is done with drinking water.

Not all things about reuse are bad. If, after conservation, reuse occurs and replaces depletion of natural stream flows and these natural flows remain in streams and go to the Lake, that could be good. In addition, water reuse could aid in water security and drought proofing. However, when reuse simply supports excessive water use habits, that is not so good.

Reuse water decisions are coming. If the Lake is lucky, laws could designate the Lake in need of these flows for “ecosystem protection.” Thus, they could be a reliable “water right” for the Lake. To prevent more water being diverted from Great

Salt Lake, significant conservation is needed. As much as 70% of the turf grass we have today needs to be replaced with water-wise landscaping so growth can occur, and we don’t deplete the Lake further. Water suppliers will make the decisions for reuse based on the collective actions of us, the end water users. If all of us conserve enough, reuse will, by default, not take place and the water will remain for ecosystem protection. If we don’t conserve, reuse will become another piece of the puzzle further damaging Great Salt Lake. It really is our choice.

Leland Myers is the former District Manager of Central Davis Sewer District before he retired. He is currently a member of the Great Salt Lake Advisory Council and works part-time for the Wasatch Front Water Quality Council.



Central Davis Sewer District adjacent to Farmington Bay, photograph courtesy of Central Davis Sewer District

THE WATER NEEDS SURROUNDING GREAT SALT LAKE

A MULTI-USE WATER AGENCY PERSPECTIVE

Those of us who work in regional water supply often note that we are pulled a lot of directions at once. Very few entities with water interests have the opportunity to focus on so many needs and requirements at the same time. For example, our District rarely goes a week without our staff concentrating on real-time culinary water deliveries, population and industrial growth, drinking water regulations, agricultural deliveries, fish and wildlife mitigation, public recreation, conservation, and preservation of natural systems. For the Weber Basin Water Conservancy District, the

acknowledge the complexity of managing the many interests surrounding Great Salt Lake. Not the least of those interests is a water supply for the urban and suburban communities along its eastern shores. Though agriculture (the largest) and even the mineral industries trump municipal use on the list of activities impacting GSL water levels¹, it is clear that Great Basin communities in Utah intercept tributary rivers, streams, and aquifers. The question quickly turns to how do we responsibly optimize the supplies already available for municipal and industrial (M&I)



Pineview Reservoir on the Ogden River, photograph courtesy of Weber Basin Water Conservancy District

last one listed includes attention to two northern Utah river basins and Great Salt Lake (GSL). The requirement to look at these many interests gives us a unique perspective and appreciation for the complexity of the issues and how they relate. We rarely see a simple solution to water supply and environmental concerns. I have found that simple solution concepts are reserved for those with the most myopic of interests.

The good news is that I have also observed readers of this publication generally recognize and

uses in our communities so that further pressure to GSL is minimized? Again, it's complicated.

For starters, we must recognize that Wasatch Front M&I supplies do not all look the same. Though there are pockets of secondary irrigation systems along the entire Wasatch Front, the counties north of Salt Lake County com-

1 Impacts of Water Development on Great Salt Lake and the Wasatch Front Wayne Wurtsbaugh, Craig Miller, Sarah Null, Peter Wilcock, Maura Hahnenberger, Frank Howe, Utah State University



prise the largest nearly contiguous urban pressurized secondary water system in the United States. Contrastingly, most communities south of Davis County use culinary water to irrigate their landscapes. How we distribute and measure these sources differ and how we will become more efficient with their use also varies.

The majority of northern Utah's year-around municipal water supply is used for six months of outdoor irrigation. Consequently, the four large water conservancy districts in Utah have been proactive in creating conservation programs that primarily focus on outdoor water use. These districts recognize the criticality in sustainable and efficient utilization of our water resources and have invested heavily in these programs. They include rebates for smart irrigation controllers, toilet replacements, incentives for developer and resident installed water wise landscapes, and public education programs including demonstration gardens, landscape classes, and irrigation system audits. These programs have and will continue to have a substantial impact on the sustainability of our water use. Another program available to facilitate water wise landscapes is Localscapes. The Localscapes approach is a series of landscaping patterns and practices that takes into account Utah's unique climate. It's good landscape design simplified, so that residents installing or retrofitting their yard may have proper guidance in creating a long-term water efficient setting.

Let's not forget that included in the complexities to water conservation is that some efficiency projects may actually be detrimental to downstream interests if, as compared to what was done before, the efficiencies cause a net reduction in the amount of water that is returned to a stream, lake, or aquifer. Even though Utah water law may allow for 100% consumption for a M&I water right, that is not always the case. Another complication may be that simply converting agricultural water to M&I supplies will harden demands on the same supply. Farmers have historically been good stewards of their water and considerably reduce their consumption in drought years. Comparably, an urban water consumer matrix tends to be less flexible and therefore may create a higher drought year demand. Therefore, we need to proceed with conservation initiatives, good engineering analyses, and careful implementation.

Back to those Wasatch Front counties north of Salt

Lake County: the most important water efficiency program is installing meters on individual secondary water connections. The technology is now available in retail meters to measure an untreated source water without fowling the inner workings. It is expensive and not necessarily popular as each meter is averaging \$1,500 per installation and customers are having to adjust to the concept of having their usage observed and controlled. However, the usage behavior seems to be immediate and long lasting as we educate the user on their water consumption.

The challenge of how land is developed and ultimately landscaped is directly tied to future water efficiency in our communities. Land use authority largely resides with our municipalities and counties. Water districts are subject to providing water to the types of communities designed by those municipal bodies. There is an exciting multi-agency effort in development that addresses the land use authority/water demand nexus. The four large Utah water conservancy districts and the League of Cities and Towns have initiated the H2O Collective. This effort will provide dialog, guidance, and comparatives for the districts to share efficiency information and municipalities to implement a new standard of landscape expectation. There is agreement that the urban, suburban, and commercial landscapes will be where the most water savings will occur.

As we proceed with ever-increasing populations and added interests in the water realm, it is important that we occasionally take a breath and note what and how many varied interests are vying for the same natural resource. From an agency that seems to have most of those interests in mind, we hope that there are those out there willing to broaden their view and work together to formulate real solutions. I am confident that Utahns will find that path.

Tage Flint is General Manager/CEO of the Weber Basin Water Conservancy District. He participated in the development of the July 2017 Recommended State Water Strategy as co-chair of Governor Herbert's State Water Strategy Advisory Team, and the development of the *December 2020 Report Recommendations to Ensure Adequate Water Flows to Great Salt Lake and Its Wetlands* by the Great Salt Lake Resolution (HCR-10) Steering Group.



UTAH CITIZENS' COUNSEL: COMMON INTERESTS

WITH FRIENDS OF GREAT SALT LAKE

At the kind suggestion of Lynn de Freitas, the Utah Citizens' Counsel is delighted to introduce FRIENDS of Great Salt Lake to our mission and goals. UCC is a nonpartisan group of about 20 seniors with policy experience who advocate for improving public policy in Utah. We frame our policy positions in light of a Declaration of Utah Human Rights that we wrote 7 years ago. Those rights include rights to:

1. Equal dignity and respect under the law, regardless of status
2. Right to a healthy environment, including air, land, and water
3. Public education to ensure responsible citizenship
4. Comprehensive, quality health care at reasonable cost
5. Personal security within the family and community at large
6. Fundamental social support systems to assure an adequate standard of living for Utahns
7. Transparent, ethical governance and effective citizen participation in the democratic process

Together these rights declare our view of the kind of community we seek for all Utahns to live in. The rights interact in various ways at government policy levels and cannot be easily separated. For instance, (and as the COVID-19 pandemic has dramatized) clean air and water affect public health and health care needs. Moreover, we know that air pollution which affects some locations more than others has adverse effects not only on health but also on public education opportunities and access to social support services.

We have issued annual or biennial reports since 2014. Our latest was in November 2020 and is available, along with our earlier reports, on our website at www.utahcitizenscounsel.org. We like to think that our positions reflect not only the values articulated in our Declaration but also current, accurate empirical data supporting those positions. (They even include endnotes for those inspired to see our source material.)

What may be of particular interest to FRIENDS are our 2014-2020 committee reports dealing with environmental health. We have focused quite a bit on stronger mitigation of the Wasatch Front's air pollution, e.g., urging incentives for electric and hybrid vehicles, residential building codes that meet international standards, improved public transit, and a revenue neutral carbon fee-and-dividend system to reduce CO₂ in our air. Simultaneously, we have addressed the broader issue of climate change and Utah's increasing drought and wildfires. (Aggressive reduction in global greenhouse gas emissions to keep regional warming below 2 degrees centigrade would cut the risk of mega-drought nearly in half.)

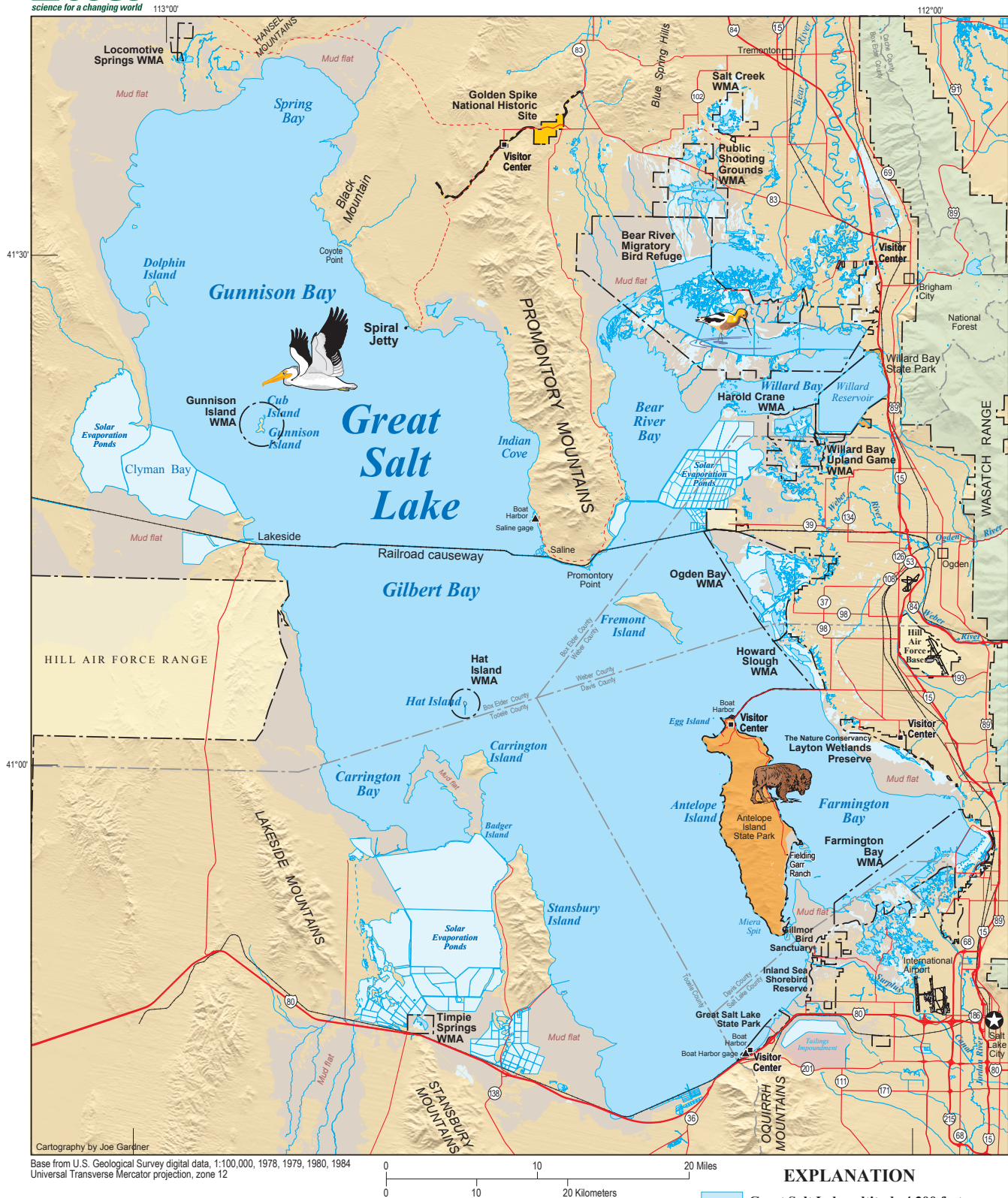
In the past three years, we have expressed serious concerns about decline in water levels of Great Salt Lake and the negative impact of the Bear River Development Project on water conservation needs. For similar conservation reasons and complex regional Colorado River water allocations issues, we oppose the Lake Powell Pipeline. The Inland Port Project also raises significant UCC concerns affecting environmental health—pollution, erosion of wetlands, damage to ecosystems, inequitable consequences for residents of SLC's west side, and other troubling outcomes. We know that FRIENDS has far greater depth of understanding of these issues than does UCC, so we applaud your advocacy and consider ourselves your allies.



Dixie Huefner,
Steering Committee Coordinator,
Utah Citizens' Counsel



GREAT SALT LAKE MAP



USGS has measured lake altitude at or near Boat Harbor gage since 1875, and at Saline gage since 1966
Great Salt Lake historic maximum altitude 4,211.60 feet, June 3, 1986, and April 1 and 15, 1987
Great Salt Lake historic minimum altitude 4,191.35 feet, October 15 and November 1, 1963



NEW INSIGHTS ON PHENOMENAL BIRD NUMBERS

AT GREAT SALT LAKE

Analysis reveals continued importance of the Lake and need to understand factors affecting bird populations

Large numbers of shorebirds, waterfowl, and other waterbirds being reported at Great Salt Lake continue to impress. During the fall of 2018, biologists with the Great Salt Lake Ecosystem Program (GSLEP) estimated more than 3.2 million Eared Grebes (more than 85 percent of the North American population) were present at the Lake. In July of 2020, GSLEP biologists counted 122,850 Wilson's Phalaropes (more than eight percent of the North American breeding population).

bird numbers have changed in the surveyed areas over time. Audubon entered into a collaborative agreement with GSLEP to analyze changes in counts (trends) for 30 species and 7 species groups and to relate counts to water conditions. This article describes trends observed from 1997–2017.

Almost without exception, the total number of birds counted across areas surveyed by GSLEP remained unchanged or increased during spring and fall for

the 37 species and groups analyzed. It is important to note that these trends do not apply to Great Salt Lake as a whole—just those areas surveyed by GSLEP. Some habitats, such as shorebird playa habitat, may be under-represented within the surveyed areas. Additional work is required to understand why counts were stable or increased, as these trends do not necessarily indicate that habitat conditions were stable or improving in the surveyed areas. In light of conditions over the last several years including this year's severe drought, there is also a need to repeat the analysis including post-2017 years to see if the recent data show bird declines.



Eared Grebe (EAGR), photograph: Max Malmquist

Established with the purpose to manage and conserve the bird and aquatic communities of Great Salt Lake, GSLEP has conducted monitoring of migratory shorebirds, waterfowl, and other waterbirds at specific locations within the Lake since 1997. The specific locations surveyed by GSLEP represent areas with particularly large counts of birds, and they occur predominantly in Bear River, Farmington, and Ogden bays. The resulting dataset—collected by GSLEP biologists and volunteers—is likely among the longest annual count datasets for wetland sites in the western United States.

This unique dataset offers the opportunity to go beyond impressively large counts to understand how

Regionally across western North America, the Intermountain West Joint Venture and collaborators documented surface water declines of 27% and 47% for closed-basin lakes and wetlands, respectively, from 1984–2018. With declining regional conditions, birds may be pushed to the surveyed areas at Great Salt Lake because they are running out of places to go. Coordinated monitoring of birds and habitats across the region will be required to evaluate the effect of regional conditions on bird use of the surveyed areas. For this reason, Audubon strongly supports recently introduced federal legislation (S.1466) that would establish a US Geological Survey program to assess, monitor, and benefit the hydrology of saline lakes and the migratory birds and other wildlife that depend on



them. The bird numbers, along with the stable and positive trends at Great Salt Lake, suggest that the surveyed areas continue to provide important migratory habitat that must be conserved to support key species. However, explicit objective setting and management planning for shorebirds, waterfowl, and other waterbirds will be key to securing their habitat and food sources for the future.

While total numbers were mostly stable or increasing, the analyses did reveal specific areas where counts for species or groups declined. For example, Franklin's Gulls and Willets showed declining numbers in some areas within Farmington and Ogden bays. Areas of decline could become the focus of conservation and management actions and help to ensure the surveyed areas continue to support birds and their habitats.

It is imperative to maintain the ability of Great Salt Lake and its associated wetlands to support birds and their habitats. Great Salt Lake is so significant to breeding and migrating shorebirds, waterfowl, and other waterbirds that each one of its five bays is individually recognized as a globally Important Bird Area, an area critical to the international conservation of bird populations. Utah Governor Cox has declared 2021 the "Year of the Shorebird" in recognition of the 30th anniversary of the Lake's designation as part of the Western Hemisphere Shorebird Reserve Network (WHSRN). WHSRN is a hemispheric network of sites that, through effective partner-based conservation, strives to secure healthy shorebird populations and habitats now and into the future. Audubon's Saline Lakes Program also recognizes Great Salt Lake as critical to a network of lakes and associated wetlands that provide habitats for shorebirds, waterfowl, and other waterbirds in the otherwise dry Great Basin landscape.

Like other saline lakes across the globe, upstream



Wilson's Phalarope (WIPH), photograph: Max Malmquist

water diversions, drought, and climate change have affected and will continue to affect water supplies needed to maintain Great Salt Lake and its associated wetlands for birds and for other services, such as brine shrimp harvesting and recreation. The importance of flows for Great Salt Lake was recognized through a Concurrent Resolution (H.C.R. 10) passed by the Utah legislature and signed by Governor Herbert in 2019. With the resolution in place, a steering group established through Utah's Departments of Natural Resources and Environmental Quality produced a set of recommendations, and in 2021, Utah's legislature appropriated funds to support some of the recommendations including an effort to assist local governments integrate water and land use planning. Audubon will continue working with collaborators, including GSLEP, to characterize the factors at Great Salt Lake and regionally that affect birds and their habitats. It is through these efforts that informed conservation and management actions can maintain Great Salt Lake's phenomenal bird numbers and its special status within the region, across the hemisphere, and within the global conservation community.

Brian Tavernia is Saline Lakes Ecologist with the National Audubon Society

*Note that this article was originally published on [Audubon.org/westernwater](https://www.audubon.org/westernwater)



THE UTAH WATERFOWL ASSOCIATION:

WORKING TO PREVENT LOST LAKES

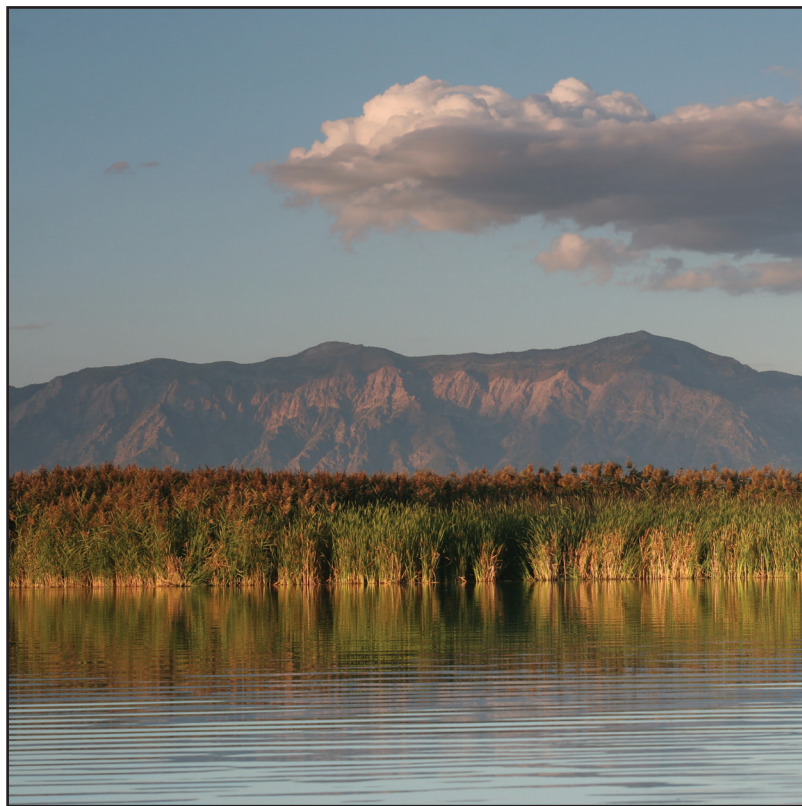
The Utah Waterfowl Association's mission during its 20-year existence has been to preserve Utah's waterfowl, its habitat, and Utah's waterfowling heritage. This mission is inspired by the successful preservation efforts of past generations of waterfowlers but is equally motivated by the failures of the past. The UWA, originally conceived and organized by Jeff Richards, has fought to ensure that there are far more successes than failures and that healthy habitat and clean water are available to Great Salt Lake's ecosystem. We also work to ensure that a long-standing Utah tradition of waterfowling carries on into the future and inspires new generations of advocates for the natural wonder of Great Salt Lake (GSL) and the migration it sustains.

Yet another drought year has heightened our appreciation for the fact that more than 120 years ago Utahns began preserving wetlands around Great Salt Lake when the first duck clubs took form, most of which continue to nurture and preserve habitat to this day. After a series of early 1900s Utah court decisions unanimously confirmed the clubs' right to control access to their land and waters, the State of Utah embarked on an impressive program of public marsh preservation around GSL. This led to a string of state waterfowl management areas along the Lake's shores. The federal government joined this effort with Bear River MBR. In more recent times, National Audubon Society and The Nature Conservancy have saved thousands of additional acres. The upshot of these combined efforts is that several hundred thousand acres of public and private wetlands around GSL are managed for migratory birds.

What most people don't realize is that while many wetlands along GSL's margin have been saved, much has been lost. This is best exemplified by the plight of several shallow but sizeable lakes that once dotted the north end of the Salt Lake Valley. These are the Lost Lakes. A few are described below.

Hot Springs Lake: The best known of the Lost Lakes is Hot Springs Lake. This lake and its marshes spread across several hundred acres

now occupied by Beck Street and heavy industry. Geothermal springs fed a lake that swarmed with thousands of shorebirds and waterfowl during the migration. "The spring lake abounds in wild ducks and geese" according to one local paper in the 1886. The lake's warm water allowed portions of it to remain open into late fall and winter, attracting late migrators. The lake also attracted crowds of duck hunters, a testament to the abun-



Ogden Bay, photograph by Scott Baxter

dance of waterfowl there. At one time, there were also boaters, bathers, and a resort. Unfortunately, it also became a repository for city sewage and a suspected breeding ground for mosquitoes. Its luck in surviving one proposed drainage scheme after another came to an end in 1915 when city officials emptied it forever. Today, just west of I-15, a small depression still tries to reassert itself as the last vestige of this once remarkable habitat. Sometimes in the spring, a few avocets can be seen wading there—serenaded by the freeway.

White Lake: In October 1895, the Salt Lake Her



ald declared that “White Lake yesterday was covered with ducks. There are pintail, mallard, canvasback, and teal.” Between 1200 and 1400 South and west of the Jordan, there was a large lake that drew crowds of duck hunters in the fall and ice skaters in the winter. As with Hot Springs Lake, its waters became fouled with sewage. Ice harvested from the lake was banned for domestic use, though some made its way onto the market, leading to loud complaints from irritated customers who only discerned the ice’s unwholesome quality when it melted and outhouse odors permeated the kitchen. No vestige of the lake remains.



Church Farm Lake:

This half mile wide lake was a popular spot for duck hunting along the Jordan River at about 1400 south and 300 West. It drew thousands of ducks and masses of duck hunters. In the early 1900s, hunters quickly bagged a limit of 40 ducks. At other times, as anywhere, the ducks were present but uncooperative. In the early 1900s, the property was sold to D&RG Rail Road for use as a freight yard.

Hunter/Silver/Hull/Yvonne Lakes:

At 2400 South and 4000 West, a series of lakes covered hundreds of acres. Caravans of hunters made their way to the lakes to

pursue flocks of birds that covered the lakes’ entire surfaces. Silver Lake was noted to be “one of the favorite feeding grounds” of ducks. The lakes later became duck clubs known first as the New Moon Club and, later, the Copper Club after it was sold to Kennecott. Kennecott later disposed of the land and it is now Stone Bridge Golf Course. Today, the closest approximation to a lake are some water hazards and a central pond. A driving range was placed across the parched, barren bed of one of the lakes.

Williams Lake and Smith Lake: These lakes sat due west of the City along the Saltair rail line (about North Temple) and around the south end of today’s airport. In late August 1905, a Salt Lake paper reported “Persons travelling to Saltair beach are surprised at the vast hordes of game birds that sport in the waters of Williams Lake. Thousands upon thousands of the birds can be seen every day in that vicinity.” On opening day of duck season hunters paid small access fees and crowded the large lake, apparently with great success. The Salt Lake & Los Angeles rail line wanted to lower the lake level. Later, an auto speedway was built across Williams Lake. At some point, it was completely dewatered. No trace of these lakes remains.

Decker Lake: In February 1901, the Tribune declared “Decker Lake is covered with birds.” In November 1910, another awe-struck local reporter described “The heaviest flight of ducks through the swamp lands west of Salt Lake City ever seen at this time of year was [at Decker Lake]. . . The sky was literally black with ducks for more than an hour.” It is now a diminished and hollow remnant of its former self. This is the only remaining lake south of North Temple save for a smudge of MacIntyre Lake farther west. Parking lots, roads, and buildings now surround what’s left of Decker Lake.

Today, GSL itself is in grave danger. Less water, hotter weather, and more development all take a toll. UWA has been fighting to ensure that the successful efforts of past generations are not lost in a rush for development or an inclination to apathy. Alongside other organizations, we have fought successfully for laws to protect privately managed wetlands, for buffers to existing wetlands, for new waterfowl management areas, for prudent wildlife management policies, and for continuation of a waterfowling culture that is deeply connected to the Lake. With others, we are locked in the battle for the Lake’s very survival through advocating for better water policy, water laws, and water use. We are committed to ensuring that GSL is never added to the list of our Lost Lakes.

Jack Ray,
President of the Utah Waterfowl Association,
Chair of the Great Salt Lake Alliance



HOW TO REACH US

FRIENDS of Great Salt Lake
150 South 600 East Suite 5D
Salt Lake City, UT 84102
801-583-5593
website: www.fogsl.org

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Submit articles and
images for consideration
to Lynn de Freitas at
ldefreitas@xmission.com
or call 801-583-5593

LAKE FACT:

Q: How much is an acre-foot
of water?

A: 325,851 gallons, or enough water
to flood a football field 1-foot deep.

THANKS FOR MAKING A DIFFERENCE

Memberships and Donations received between
April 16, 2021-August 31, 2021

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MAKING A DIFFERENCE

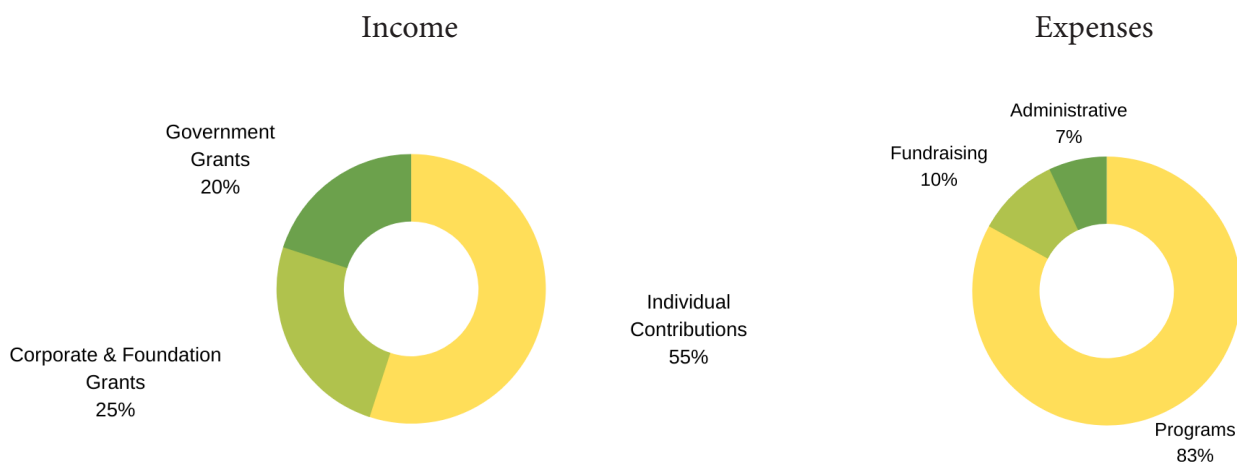
How We Do Our Work—THANKS TO YOU

Our Funding

As a 501(c)(3) nonprofit, FRIENDS of Great Salt Lake relies upon the generosity of our members, individual donations, foundations, and grants. Individual memberships and donations provide the bulk of our funding at approximately 55% of our annual revenue. Foundation donations and corporate grants generate 25%, and government grants generate 20%.

With an annual operating budget of under \$300,000, FRIENDS of Great Salt Lake spends a majority of funds on Programming (83%), including our Education Programs, The Doyle Stephens Research Program, Advocacy Programs, and the Alfred Lambourne Arts Program. Fundraising costs average 10%, and administrative expenses 7%.

FRIENDS of Great Salt Lake is a member of Utah Nonprofits Association (UNA). We operate with a Donor Bill of Rights, a Conflict of Interest Policy, a Gift Acceptance Policy, and adhere to UNA's Standards of Ethics. Access our IRS form 990 and our Annual Reports on our website.



GREAT SALT LAKE:
The Gift that Keeps on Giving,
Just Add Water



The Great Salt Lake Issues Forum
May 11, 12, 13 of 2022
Fort Douglas Officers Club, University of Utah

Please Save the Date for the 2022 Great Salt Lake Issues Forum. The Forum will be May 11, 12, and 13 of 2022 at the Fort Douglas Officers Club on the campus of the University of Utah. FRIENDS of Great Salt Lake's biennial Issues Forum brings together stakeholders from the academic, political, industrial, and scientific communities to discuss the most relevant issues related to understanding Great Salt Lake. The Forum is open to the public. For more information, including registration links, visit fogsl.org/2022forum





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Eternal South
by Mark Hofeling &
Matias Alvarez

2018, western red cedar,
21' x 22' x 38'

Photograph looking
west from Farmington
Bay Eccles Wildlife
Education Center,
courtesy of
L. de Freitas