



FRIENDS of *Great Salt Lake*

P.O. Box 2655, Salt Lake City, UT 84110-2655

www.fogsl.org

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Surfing the Solar Sun Tunnels 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, and advocacy.

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EXECUTIVE DIRECTOR'S MESSAGE

RESOLUTION OF APPRECIATION OF GREAT SALT LAKE IS WELL DESERVED FOR A LAKE THAT CONTINUES TO CONTRIBUTE TO OUR CULTURE, OUR COMMUNITY, AND OUR CONSCIOUSNESS

"I want to learn more about it and share what is there with my children and grandchildren that I'm sure don't know. And probably write down some of the stories of [my husband's] family that have lived out there."

-Focus group participant in Carla Koons Trentleman's Ph.D dissertation Place Attachment
Among Neighbors of Great Salt Lake and Its Environs, May, 2009

One gratifying outcome of the 2014 General Session of the Utah Legislature is H.J.R. 20: Joint Resolution Recognizing the Significance of The Great Salt Lake. It was shepherded through the legislative gauntlet by Chief Sponsor Representative Larry B. Wiley (House District 31, Salt Lake) and Senate Sponsor Jerry W. Stevenson (Senate District 21, Davis). Please remember to thank them. A copy of the resolution "BE IT FURTHER RESOLVED" (and suitably engrossed, I hope) will be sent to the Utah Department of Natural Resources and the Great Salt Lake Advisory Council.

Kudos to everyone involved in crafting this formal expression replete with "WHEREAS"es that speaks to the broad and significant range of economic, hemispheric, and cultural attributes that our Lake provides for all of us. Special big briny hugs for everyone who took time from their busy lives to trek to the Hill to speak on the Lake's behalf. The Lake was heard.

It's a small but significant gesture for a Lake that keeps on giving to the people of Utah, the hemisphere, and the world. To wit: the economic significance of Great Salt Lake to Utah's annual GDP is \$1.3B. It employs over 7,000 Utahns and annually generates over \$375M of labor income. It is home to significant hemispheric and global populations of birds that rest, stage, and nest there. The wetlands of Great Salt Lake account for 75 percent of all wetlands in the State of Utah, whose total land area consists of only 1.5 percent wetlands. In 1991, Great Salt Lake was designated as one of only five Western Hemisphere Shorebird Reserve Network Sites in the lower 48 States. All five bays of the Lake have been identified as Important Bird Areas by the National Audubon Society because of significant bird use. The Lake's natural beauty has drawn thousands to make artistic interpretations of its elements, including two landmark earthworks: the Spiral Jetty and the Sun Tunnels. Even Brigham Young swam in the Lake three days after the pioneers arrived in the Salt Lake Valley. (Borrowed directly from the GSL Resolution of Appreciation).

Now that's what I call the true spirit of giving.

But what makes this gesture an extraordinary one is that most Utahns dismiss Great Salt Lake as something that's just "out there". It's stinky, buggy, and salty. It's a cheap and convenient place for industrial discharges. You wouldn't be surprised to know that many people think that any water that ends up in the Lake is considered wasted. Clearly it's a misunderstood resource that's not often regarded as the treasure it is. Preserving and protecting Great Salt Lake for the future is a far-fetched

idea to a large portion of the population throughout the state. Just like good jazz, it's an acquired taste. But definitely one we have to cultivate in our growing population.

"...maybe we have to learn, maybe you have to learn to appreciate and grow up with those experiences because I don't think there's very many people that hadn't lived out here and could express those same feelings. You get visitors out there, they'd don't like anything about it. It's a dead lake to them, it stinks, there's bugs. So maybe you have to learn, you know, by living there and experiencing some of those things, to appreciate it."-Weber focus group participant - Trentleman study

Bingo! It is all about learning. Learning about why this dry and scratchy lakescape matters. And why this stunning remnant of ancient Lake Bonneville is a sacred place to the people who came before us. At the same time, funding for research to gather more empirical data about what makes this ecosystem tick needs to continue so we can make sound management decisions for the system today and tomorrow. We owe the Lake our commitment of stewardship for its future so we can continue to honor this place as a refuge for the visionaries who settled the valley and the architects who designed Great Salt Lake City on its shores.

"That's our name to fame. If someone says, 'where do you live?' and I say, 'Have you heard of the Great Salt Lake,' I don't care if I'm in Nebraska, or where I'm at, 'Have you ever heard of the Great Salt Lake?' 'Yes.' 'I live about three miles from the Great Salt Lake.' They know where you're at." -Weber focus group participant - Trentleman Study

As the renowned writer and painter, Alfred Lambourne, said, "Under certain conditions a place becomes a part of us; we own it." That is indeed the case with the Lake.

In tandem with the GSL Resolution of Appreciation, another valuable outcome from the legislative session was the approval of \$400,000 to fully fund the development of the Great Salt Lake Integrated Water Resource Management Model (IWRMM). This is fantastic news!

Conceived and recommended by Governor Herbert's Great Salt Lake Advisory Council, and championed by many of us who recognize the importance of having a good water model that focuses its analysis on Great Salt Lake, the IWRMM would serve as an indispensable tool that will enhance decisions that address issues related to future water supply, salinity and Lake



level. These factors have a direct affect on the economics, public health, and ecological viability of the system.

The model will take two years to develop. Stakeholders will be invited to help shape its parameters. However, the key to the success and usefulness of the model will depend upon its resilience and flexibility in incorporating ways of using information that might not be easily quantified, simplified, or reduced in the way most models require. It's imperative that this model is able to "talk" with other models that have been developed in different disciplines to avoid blind spots in comprehensive planning scenarios. Like a working document, the model should have an iterative capability so that it can consider whatever is dished out that is relevant to the water picture for Great Salt Lake.

What you don't want to do is what was done for the West Davis Freeway proposal. A proposal that is being marketed as the answer to transportation needs of the future in West Davis County, a vast swath of agricultural landscape that lies between I-15 to the east and Great Salt Lake to the west. The genesis of this proposal came from the 1950's mentality of large-scale automobile investments that promote more roads and encourage sprawl. Using 2040 growth projections along the Wasatch Front and the presumption that vehicle miles traveled would only be increasing, the transportation demand model was designed to answer only one ill conceived question - How can automobile congestion and delays be reduced in this sector over the next 20 years?

Relying on a paralysis of perspective, the model consists of a complex algorithm that digests information about lane miles and population, and spits out minutes of automobile delay. This model supports the argument that the only solution is to increase road capacity. Running on its own parallel track, the model ignores planning efforts like the Wasatch Choice for 2040 growth vision which "considers how growth, mobility, housing and jobs can be shaped for the next few decades to have outstanding positive impacts on the life of residents in the Greater Wasatch Area".

We can't afford to take such chances with Great Salt Lake and its water needs.

As a terminal lake that's currently without its own water right or water appropriation (we're working on it) it's obvious that we need to have a much better handle on the status quo of water use and proposed water development as the population continues to grow and climate change affects precipitation, snowpack and run-off. The Integrated Water Resource Management Model has the potential to be a significant step forward in effective and sustainable management of the Lake. Hopefully, it will rise to the occasion

"I would say that the one thing that I learned tonight is that I really take the Great Salt Lake for granted. I never realized that it's one of the special things in my life that probably I've overlooked, and didn't realize it, how it has affected our community as well as my personal life...You live around it. You were a part of it, it was a part of your life and all of a sudden you're saying, "wow,

yeah, it really was," and it's still there and what's gonna become of it? Because there's gonna be some changes with the Great Salt Lake. We know there's dams being formed, or being ready, and it's going to recede...we're gonna lose a lot of what goes into the Great Salt Lake."

[Response from another participant] "We have to fight for that so that doesn't happen."

--all from Weber focus group participants - Trentleman Study

FRIENDS will be there for the Lake. I hope you'll be there with us.

In saline,

Lynn

Review H.J.R. 20: Joint Resolution Recognizing the Significance of the Great Salt Lake at www.fogsl.org



Wilson's Phalaropes and Franklin Gulls in Ogden Bay, Great Salt Lake, 2013 by Rosalie Winard



FRIENDS ORGANIZATIONAL STATEMENT

FRIENDS of Great Salt Lake is a membership-based non-profit 501c3 organization founded in 1994. The mission of FRIENDS is to preserve and protect the Great Salt Lake Ecosystem and to increase public awareness and appreciation of the lake through education, research, and advocacy. The long-term vision of FRIENDS is to achieve comprehensive watershed-based restoration and protection for the Great Salt Lake Ecosystem.

FRIENDS has a very active Board of Directors and an Advisory Board consisting of professionals in the scientific, political, literary, education, and broadcast communities. The organization sponsors an array of programs, activities, and materials in pursuit of its mission.

Every two years, FRIENDS hosts the Great Salt Lake Issues Forum to provide a focused discussion about the Lake for policy makers, researchers, planners, industry and other stakeholders. The goal of each Forum is to encourage constructive dialogue about the future of the lake's ecosystem and its resources, and to illuminate the complexities involved in research, management and planning for the lake.

The Friend of the Lake award, given at each forum, acknowledges a citizen, business or organization working to promote Great Salt Lake awareness in the community.

In 1997, Bruce Thompson was hired as Education Director to initiate a regional education project designed to enhance both the knowledge about and care for the future of Great Salt Lake. Bruce wrote and produced a live-narrative slideshow program "The Lake Affect: Living Together Along the

Shores of Something Great." The program is now available on DVD.

In 1998, the Utah Chapter of the Wildlife Society awarded FRIENDS the Conservation Achievement Award..

In 2000, Project SLICE, a 4th grade curriculum using Great Salt Lake as a system of study, was initiated. The Lakeside Learning field trip program, a component of SLICE, continues to grow.

In 2002, the Doyle W. Stephens Scholarship Award was established. The scholarship provides support to undergraduate and graduate students engaged in new or on-going research that focuses on Great Salt Lake.

In 2002, Lynn de Freitas was awarded the outstanding volunteer educator award by the Utah Society for environmental Education.

In 2006, FRIENDS was the recipient of the Calvin K. Sudweeks Award from the Utah Water Quality Board for outstanding contributions in the water quality field.

Andrea Nelson, hired in 2012 as Education & Outreach Director, is working to expand education outreach into the Great Salt Lake community.

Kristin Liszkowski, hired in 2013 as Membership & Development Director, is working to raise funds and write grants to expand the reach of FRIENDS.

On the Cover

Surfing the Solar Sun Tunnels by Charles Uibel

Solar energy funnels through the tunnels on Summer Solstice evening. Staring down the sun through a set of tubular concrete galaxy bells, these beaming faces have engraved in them the last blast of solar delight from the longest day of the year.

Contact Charles at <http://www.greatsaltlake.photography/>



2014 Great Salt Lake Issues Forum

Great Salt Lake Elements:

The | Air | Land | Water | Wildlife | History | Art | of our Inland Sea



Be a part of this Great Salt Lake celebration.

SCHEDULE

Wednesday, May 7th (free to the public)

Reckoning with a Simply Complex Ecosystem

Thursday & Friday, May 8th & 9th:

Fabled History, Singular Beauty, Symbolizes Community

Living Together Along the Shores of Something Hemispheric

Register now: fogsl.org

University of Utah, Salt Lake City

Fort Douglas Officer's Club

May 7-9, 2014

KEYNOTE SPEAKERS

Barbara Bodenstein

USGS National Wildlife Health Center

Leslie McFarlane

Utah Division of Wildlife Resources

Jared Farmer

Author and Professor of History at State Univ of NY/Stony Brook)

Rob P. Clay

Western Hemispheric Shorebird Reserve Network



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RESEARCH AND GREAT SALT LAKE

THE GREAT SALT LAKE'S TWO DEEP BRINE LAYERS

Two major causeways that divide the Great Salt Lake have radically changed salt balances in different sections of the lake, and have caused deep brine layers to form. For you scrabble buffs, limnologists call these layers “monimolimnions”. In 1959 the Southern Pacific Railway built a 13-mile rock-fill causeway across the main lake, dividing it in half. This division causes the south arm (Gilbert Bay) to have a higher elevation and lower salinities than the north arm (Gunnison Bay). The high-density brine from Gunnison then flows back through the causeway fill material, through a breach, and until recently, through two culverts constructed to allow equilibration and salt transfer (Fig. 1)¹. This brine settles into the deepest sections of Gilbert Bay, and because it is denser than the overlying layer, mixing between the two layers is limited. Approximately 45% of Gilbert Bay’s bottom is covered by the deep brine layer (Fig. 2). A similar phenomenon occurs in Farmington Bay when Gilbert Bay water passes through the automobile causeway bridge and fill material and underflows the fresher waters in Farmington^{2,3}. However, in this case, the overlying mixed layer is only about 3-5 feet thick, whereas in Gilbert, the mixed layer is about 20-24 feet thick.

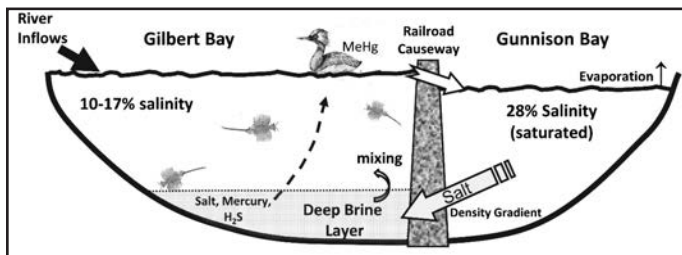


Fig. 1. Bi-directional low paths through the culverts and causeway fill that cause a deep brine layer in Gilbert Bay (South arm).

Algae and detritus produced in the upper mixed layer fall into the deep brine layer and decompose (Fig. 3). This decomposition strips oxygen from the water, releases nutrients, and promotes other microbial processes that produce high levels of hydrogen sulfide (Fig. 4). This ‘rotten-egg’ gas is very toxic, and levels in the deep brine layers of both bays exceed EPA’s chronic criteria for protecting invertebrates by more than 2000-fold^{3,5}. Consequently, the lack of oxygen and toxicity of the deep brine layers result in dead zones where brine shrimp, brine fly larvae and other invertebrates can’t survive.

Very high levels of mercury also accumulate in Gilbert Bay’s deep brine layer^{6,7}, and much of it is in the highly toxic methyl-mercury form (Fig. 4). Concentrations of methyl

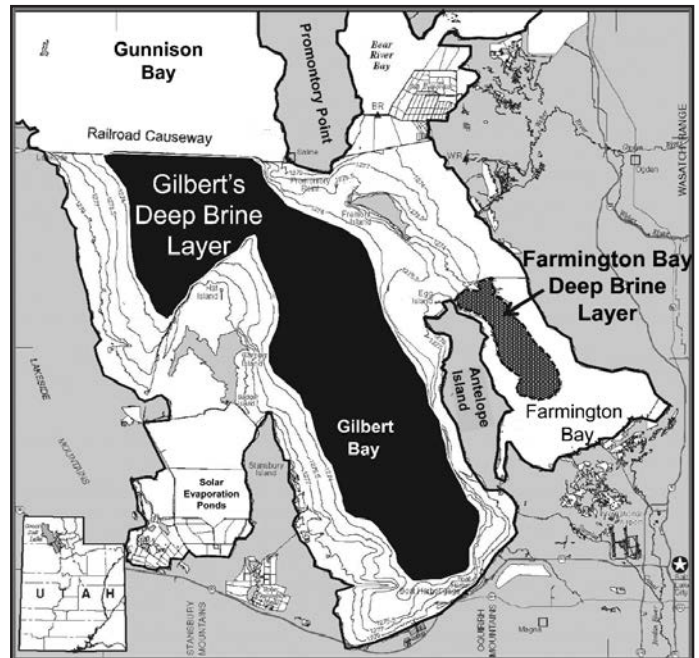


Fig. 2. Extent of the deep brine layers in Gilbert and Farmington Bays. The deep brine layer in Gilbert is shown at a depth of 23’ and at a lake level of 4200’ based on the USGS map of R. Baskin. The extent of the layer in Farmington Bay is shown at a depth of 3.5’ and is only approximate because the bay’s morphometry has not been carefully mapped.

mercury measured there are some of the highest ever reported in the United States. Some of this mercury may come from the sediments where heavy metals have accumulated due to smelting activities in the Salt Lake Valley. Levels may also be high because much of the sedimenting algae and detritus don’t fall to the bottom because the high-density brines keep them in suspension, and they consequently release small amounts of mercury into the deep brine layer⁷.

The high sulfide and mercury levels in the deep brine layers also affect the upper mixed layers because there is constant movement of the brine and contaminants upward. This occurs due to the continuous flow of heavy brines from the northern sources into Gilbert and Farmington Bays. Turbulence caused by winds ‘shaves’ off the tops of the deep brine layers and mixes the salts, hydrogen sulfide, nutrients and mercury into the upper water column where they can then effect brine shrimp, brine flies and other organisms. One estimate indicates that 25% of Gilbert Bay’s deep brine layer and mercury is mixed into the upper layer each year⁷. The amount of mixing in Farmington Bay is much greater, because the deep brine layer is only protected by a 3-foot thick overlying layer. When high winds mix hydrogen sul-





Fig. 3. Twenty liter Cubitainers® of water collected Aug. 3, 2010 from the surface layer of Gilbert Bay (left and right), and from 23' in the darkly-stained deep brine layer (center).

fide from Farmington's deep brine layer it reacts with oxygen in the upper layer, and the entire water column loses its oxygen³. This process occurs in California's Salton Sea, and kills all of the organisms in the sea. The release of hydrogen sulfide from Farmington Bay is also a major source of "lake stink"³.

Gilbert Bay's deep brine layer is in the spotlight now because the SP Railway has recently closed the culverts that allowed much of the brine to move from Gunnison to Gilbert Bay. The loss of these brines will cause Gilbert to become fresher, potentially to the detriment of the brine shrimp and to the mineral extraction industries in the south. However, the decreased flow of brine should diminish the magnitude of the deep brine layer.

A bridge is planned to replace the culverts and allow bi-directional flow of salts and water between the two bays. The size and configuration of this bridge will effect both the overall salinity of Gilbert Bay, and also the size of the detrimental deep brine layer. Consequently, managers and the railway are building salt and hydrological flow models that are helping them construct a bridge that will minimize the negative effects of the causeway on the lake's many uses.

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Wayne Wurtsbaugh is a Professor of Watershed Sciences at Utah State University

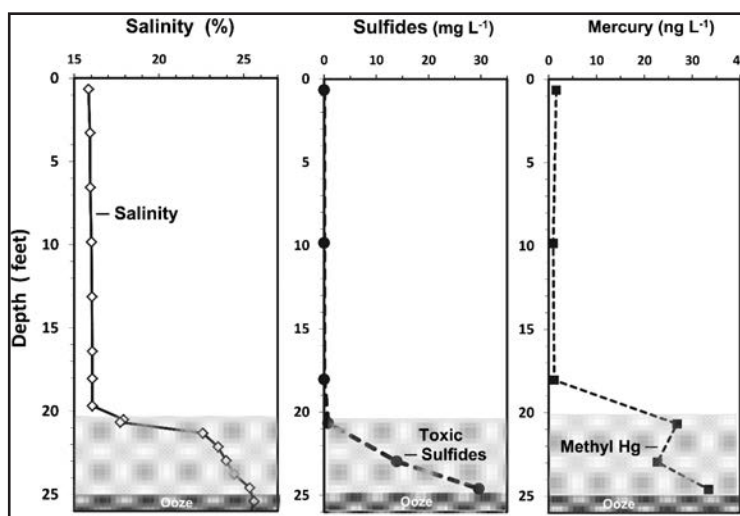


Fig. 4. Salinity and toxic hydrogen sulfide and methyl mercury in the water column of Gilbert Bay. The gray area shows the deep brine layer starting at a depth of 21 feet (Aug. 3, 2010)⁷.



PROTECTING AMERICA'S WATERS

WHAT DOES WATER QUALITY IN PARLEY'S CREEK HAVE TO DO WITH SIERRA LEONE?

Born and raised in a third world country, I spent most of my childhood years with my brothers trying to find valuable water to drink, walking miles to acquire clean water to use. When Margie Nash came to our A.P. Environmental Science class and offered us an opportunity to study water quality I took the occasion to learn how water quality affects our everyday lives. Curious to know the quality of the water at Parley's Creek, my peers and I conducted a series of water testing from February through May, 2013. We expected the water at Parley's Creek to be clean with little pollution and thickly covered in algae, a decent ecosystem.

We conducted our first water quality test on February 13 and our observation was that it had a clear, normal flow with no odor and a moderate substrate layer of algae. Just by observing the water we could tell that it is in a good state, but we still had to collect samples of the water for further testing. The air temperature was 1.6 C and the water was warmer at 5.6 C. The water had a PH level of 7.5. Since oxygen is instrumental for life we measured the dissolved oxygen level which was 6 mg/l on a scale from 1 to 12mg/l.

Our first test showed my peers and me a picture of what quality water should be. In Sierra Leone I never knew the process of identifying clean water other than the clarity of the water. If only I knew what I know now. We did not have a water faucet in Sierra Leone, we had to walk miles to the closest well to acquire about five to six gallons of water that would last a family of five a week, and the water would only be used for cooking and drinking. Pollution in rivers and lakes was a normal occurrence. People would wash their clothes and take baths in lakes and rivers and all the soap would run downstream causing chemical concentrations that affected the organisms in the ecosystem. People would also drink the water in the river thinking, "if the water is clear then it is safe to drink." Growing up there were lots of unexplained deaths in my home town. If I could go back and investigate the causes of death, I think I would find that the majority of the deaths was caused by the water the people were drinking.



Tennyson George photo courtesy Margie Nash

As we moved into March and the weather got warmer, my peers and I started to see changes in Parley's Creek. The water was covered with thicker layers of algae, the air temperature was 20 C and the water was 12 C, the pH level was still 7.5 and the dissolved oxygen level was 10 mg/l. As the weather changed my peers and I saw changes both positive and negative. One negative change we saw is at the beginning of our water testing there was no trash in the water, then as the weather got warmer the water was filled



with trash such as plastic bags, plastic bottles, wrappers, paper, and much more. The water had become a landfill for people, not knowing how their trash affects the macroinvertebrates or how their pollution causes biomagnifications and affects birds that are the secondary consumers in the creek's food web.

As my peers and I continued testing the water in May, we saw even more trash in the water and we started to see major changes in our data. The turbidity of the water substantially decreased. The past two months of testing, the average turbidity of the water were greater than 57.5 cm, during our testing in May the average turbidity was less than 48 cm. The turbidity was not the only decrease we saw in our data: there was a decrease in the water PH level from an average of 7.4 to 6.5.

Our observations of the water reminded me of the rivers in Sierra Leone. The rivers in Sierra Leone had become a landfill, everybody would dump their trash in the rivers and the trash would wash down into lakes and the ocean. The trash would fill up the lakes so that you could never tell it was a lake at first. Could you imagine a lake fill up with trash? The people in my town did not know how to clean up the lake.

The best way they thought of cleaning the lake was to pour gasoline in the lake and burn the trash, which only made the problem worse. They never did clean the lake, instead the lake became a landfill for the people in my home town. When the landfill filled up, they would just burn the trash and add more trash. Maybe this could explain the deaths in my home town.

At the beginning of our testing I did not know much about the importance of water quality and how it has impacted my childhood life in Sierra Leone. Parley's Creek seemed to be in pretty good shape as we expected it to be, unlike the lake in my home town, but the large amount of trash my peers and I saw seemed to cause a problem that clearly affected the water. It may seem likely that the water would never end up identical to the lake in my home town, but it could end up similar to the lake in my town if the trash is not cleaned.

Tennyson George graduated from Highland High School in Salt Lake City and is currently majoring in biology at USU and minoring in environmental science

This project was funded by the U.S. EPA Environmental Education Program through the Utah Society for Environmental Education.



Smiling faces after Willard Spur airboat trip
photo courtesy Margie Nash

A STORY FROM THE DEPTHS

THE SEA SERPENT IN THE GREAT SALT LAKE

Decades of ichthyological and cryptozoological research have turned up compelling evidence that lake-dwelling cryptids, sometimes incorrectly referred to as “sea serpents” or derided as “lake monsters,” inhabit most of our elevated state’s lakes, notably Bear, Utah, and Fish. I tended to dismiss tales of a large aquatic creature in Great Salt Lake, largely because all the reporters seemed to have been “guzzling the intoxication of the varied scene” when the monster appeared on the Salt Lake’s glassy surface. “All the reports of the Salt Lake Monster come from scurrilous gentiles who were all drunk out of their heads when they actually spotted the Salt Lake Monster,” the Logan Herald-Journal none-too-accurately quoted me. “We have been unable to link the Salt Lake Monster with the family of lake monsters that I believe survive to this day in Utah.”

Even in Utah, history isn’t revelation, it’s investigation. Re-examining the evidence makes it hard to dismiss the Salt Lake Monster out of hand. The “Lake of Paradoxes” best historians didn’t make that mistake. “There has been an air of mystery and strange fascination about the Great Salt Lake from the time of its discovery and early exploration down to the present,” David Miller wrote in 1959. “Every lake of any character must have its monster, and Great Salt Lake qualifies in this respect.” Miller cited eyewitness testimony “to the existence of a monster in the northwest arm of the lake.” In May 1871, the Corinne Daily Reporter described “a theory, founded on what appears to be good proof,” that the leviathan known as the Bear Lake Monster had “passed under the Wasatch mountains by a subterranean passage and taken up his residence in Great Salt Lake.” A local bishop claimed “that about once in ten days a great animal comes into the mouth of Weber river to drink fresh water, and there indulges in the slaking element to such a degree that the main current rushes down towards the lake with roaring velocity,” and “the fish, or brute,” also visited Bear river.

“Appalling monsters have bellowed in its shallows and made forays upon its shores,” wrote Dale Morgan, the Great Salt Lake’s most eloquent bard. Morgan followed “some strange back alleys” in pursuit the beast. The great historian noted that without the testimony of J. H. McNeil, a citizen of the “flourishing metropolis” of Kelton, “science might have remained ignorant of its very existence, for it was only after Mr. McNeil supplied the clue that a rather wonderful collection of facts fell into a pattern.”

In early 1871, the Corinne Record printed a “highly sen-

sational, although seemingly well authenticated fish story” describing the “Monster Inhabitant of Salt Lake”—now “a fact established beyond dispute.” Extensive boiling tanks manufactured salt at Monument Point, where workers kept the fires going day and night. At about 10 P.M. on July 8, the men “saw a huge mass of hide and fin rapidly approaching”—as it came to shore, the beast “raised its enormous head and uttered a terrible bellow.” According to Mr. McNeil, the creature looked like a huge crocodile with the head of a horse and was about seventy feet long, while Mr. Houghton, another workman, “said all he saw was two great big eyes and a long tail.” The Record speculated that the creature “must be of the species or genus *Megalosaurus*—those huge lizards . . . thought to have been long since extinct.”

Since it has not been reprinted since 1871, J. H. McNeil’s affidavit describing his encounter with the “great animal” is worth quoting in toto:

On the night of July 8th I was working at the salt works at Monument Point, when about 10 o’clock I heard a great noise on the lake, and looking in that direction saw a great animal like a crocodile or alligator approaching the bank, but much larger than I had ever heard of one being. It must have been seventy-five feet long, but the head was not like an alligator’s—It was more like a horse’s. When within a few yards of shore it made a loud noise and my companion and I fled up the mountain, where we stayed all night. When we came down in the morning we saw tracks on the shore, but nothing else.

William Harris added, “the workmen refused to go back, preferring to lose their work”—and their livelihoods.

It’s not been easy being Utah’s leading krakenologist. Remember the question that opens the fortieth chapter of Job: “Canst thou draw out leviathan with an hook?” (Job’s conclusion: “He esteemeth iron as straw, and brass as rotten wood,” so “None is so fierce that dare stir him up.”) I have spent lonely decades sorting through the compelling evidence that such creatures inhabit our elevated state’s fair lakes, researching similar beasts around the globe, and writing it all up, yet the compelling body of proof I have assembled about this intriguing phenomenon gets no respect in Utah. In a lecture to the Utah State Historical Society, my friend D. Robert Carter said he believed the monster was a species of giant bug—humbug. My quest for the truth about our desert state’s lake serpents doesn’t pay very well—



it doesn't pay at all. Along with everyone who has fallen under the spell of the Great Salt Lake and seeks to ensure its natural and spiritual survival, defending Great Salt Lake and even its Monster is a labor of love.

Will Bagley is a historian specializing in the history of the Western United States and the American Old West



Pictures of the Salt Lake Monster are rarer than dragon's teeth, but the Salt Lake Tribune published this one on August 2, 1902.

GREAT SALT LAKE EDUCATION

DISCOVERING UTAH'S WETLANDS THROUGH THE ARTS

Every year 4th grade students at Oakwood Elementary visit the Kennecott Nature Center located alongside the Jordan River to make field observations about the wetlands. Students are asked to think like scientists as they take in the sights and sounds of this unique and important ecosystem.

Hiking the wetlands trail with their classroom teachers and visual art teacher, Erica Wangsgard - when it's time - they break out their sketch paper and pens as Erica instructs and coaches the young scientists to confidently draw what they observe. Meanwhile, their classroom science teacher talks about the wetlands science they see before them, as well as human impacts on the system.

Oakwood Elementary is one of several Utah schools that successfully applied for the state's Beverly Taylor Sorenson Arts Learning Program in elementary education. Erica Wangsgard is Oakwood's BTS ALP Visual Art Specialist certified and endorsed by the Utah State Office of Education to teach Art to K-6 grades. Fortunately, Utah and the

Granite School District recognize the importance of integrating the arts with the Utah Core Curriculum.

After experiencing their outdoor "classroom", students finish up their wetlands artwork in their regular scheduled art studio time. This year, the artists carefully drew birds that visit or live in Utah's wetlands. Next, they completed the printmaking process with colorful ink prints of their bird art. Then they write about their art and wetlands experience.

Oakwood's 4th grade student artists/scientists have been invited to display their work at the 2014 Great Salt Lake Issues Forum, May 7 - 9th at the University of Utah. The students are very excited. And no doubt, the forum participants will be impressed with Oakwood's great Great Salt Lake art!

Erica Wangsgard is Oakwood Elementary's Beverly Taylor Sorenson Arts Learning Visual Art Specialist



Student Artists: Scientists Busy at Work by Erica Wangsgard



GREAT SALT LAKE AT A GLANCE

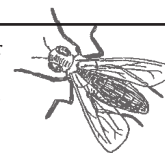


Courtesy USGS





E•phy'•dra, a noun; a genus of two species of brine flies that live on the bottom of the Great Salt Lake as larvae and pupae, and along the shores of the Lake as adults.



BRINE FLIES: TRANSPORTERS OF METHYLMERCURY AT THE GREAT SALT LAKE

Anyone that keeps up on the science of the Great Salt Lake (GSL) is aware that there's a mercury problem in this ecosystem that has resulted in the Utah Division of Wildlife Resources issuing consumption advisories for several species of water fowl at the GSL due to their having exceptionally high concentrations of mercury that could pose a risk to human health. And those that have ever visited the Great Salt Lake in the summer are familiar with the tremendous swarms of brine flies that inhabit its shores during the warmer months of the year. What has not been obvious, until recently, is that the mercury is not confined only to the lake itself, and brine flies play an important part in transporting mercury from the lake to the surrounding terrestrial ecosystems. The result is that mercury is bioaccumulated to high levels by some terrestrial organisms, including spiders and song birds, that are typically not exposed to elevated mercury levels.

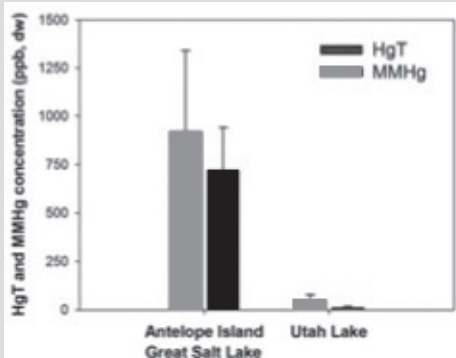


Figure 1. Average concentrations of total mercury (HgT) and methylmercury (MMHg) measured in spiders in the Fall of 2011 from Antelope Island in the Great Salt Lake and Pelican Point at Utah Lake.

Mercury is a toxic heavy metal and global pollutant originating from natural and, increasingly, anthropogenic sources. While all forms of mercury are toxic, methylmercury (MeHg) is the most dangerous form of mercury because it is the only form that is readily biomagnified up food chains, which results in much higher mercury levels in predators at the top of a food chain compared to organisms at the bottom of the food chain. This biomagnification has resulted in fish consumption advisories being issued in all 50 states in the US. Twenty bodies of water in Utah currently have consumption advisories for fish due to high mercury concentrations, with similar advisories for a handful of waterfowl around the Great Salt Lake.

The production of MeHg is primarily limited to sediments at the bottom of lakes and streams where oxygen levels are low, and the sediments of the Great Salt Lake are apparently some of the best anywhere at producing this toxic compound. As a result, the algae, water fowl, and other organisms that live or feed directly in the GSL have high levels of MeHg. Because MeHg is not produced to any real extent in land-based ecosystems, organisms that live there typically have extremely low concentrations of mercury. However, recent research has discovered that some land-based organisms at the GSL have extremely high concentrations of mercury despite their having no direct connection to the lake, making the GSL unique in yet another way compared to other inland lakes around the world.

For insect food webs, spiders represent one of the top predators, and may, therefore, accumulate high levels of mercury. To evaluate this possibility at the Great Salt Lake, researchers measured the mercury concentrations in spiders on Antelope Island, in the GSL, as well as spiders along Utah Lake, near Provo. As shown in Figure 1, they found that not only where the mercury concentrations in the spiders along the GSL nearly 60 times higher than those at Utah Lake,



Orb weaving spider on Antelope Island courtesy F.Black.



but a larger percentage of this mercury was MeHg, making it more likely that any organisms that consumed these spiders would retain and accumulate the mercury. The elevated mercury levels in the spiders at the GSL pose a potential risk to the spiders themselves, as well as to organisms that consume them. Organisms that prey on spiders include songbirds, and spiders represent an ideal food source for nestlings and fledgling birds. A number of species of songbirds have been observed preying on spiders and feeding spiders to their fledglings around the GSL (Figure 2).

The extremely high densities of spiders along the shores of the Great Salt Lake are made possible by the overabundance of brine flies that serve as a major food source for these arachnids, including the large orb-weaving spiders shown in Figure 1. Brine flies have their larval and pupal stages in the lake, where they're able to accumulate mercury, then as flying adults they're able to fly away and take this mercury with them to the surrounding terrestrial ecosystems. As a result, the tremendous clouds of brine flies are able to transport large quantities of mercury from the GSL to the

surrounding terrestrial ecosystem each year. Some of these brine flies die and are decomposed in the lake, so the methylmercury is returned to its original source, but other flies are consumed on land by spiders and birds. In addition to high concentrations of mercury in spiders at the GSL, high levels of mercury have also been documented in some song birds here, including Loggerhead shrikes (Figure 2), that consume the spiders. Additional data on the diet of these birds and spiders indicates that the mercury in both organisms ultimately comes from the brine flies, and thus in turn from the lake.

So while many people view the dense swarms of brine flies around the Great Salt Lake as something of a nuisance, the nature of their life cycle results in their playing a far more sinister role in transferring mercury from the Great Salt Lake to terrestrial organisms like spiders and song birds that would otherwise never be at risk of mercury toxicity.

Frank Black is a professor of Chemistry at Westminster College.



Figure 2. Loggerhead shrike with spider prey on Antelope Island (above). Loggerhead shrike feeding a spider to a fledgling on Antelope Island (below). Photos courtesy of R. Dudley

DISCOVERING OUR LAKE

GREAT SALT LAKE: THREE VIEWS

UMFA EXHIBITIONS EXPLORE THE LAKE AS SOURCE OF ARTISTIC INSPIRATION



Great Salt Lake by Alfred Lambourne, courtesy Snow, Christensen and Martineau

Utah's storied landscapes have long attracted photographers, filmmakers, painters, and writers—majestic red rock being the usual journey's end. The enigmatic beauty of Great Salt Lake, meanwhile, seems more of an acquired taste; the lake doesn't easily fit traditional definitions of a visitor landmark.

Great Salt Lake lures a special brand of seeker, one who is drawn toward its complexities and invigorated by the aesthetic and environmental questions it poses. Three new exhibitions on view this winter and spring at the Utah Museum of Fine Arts (UMFA) present distinctly different visual explorations of the lake as an object of artistic inspiration and intellectual inquiry. These shows may inspire visitors to see and think about the lake in new ways, especially its relationship to the human culture and industry deeply integrated around and within it.

The Savage Poem Around Me: Alfred Lambourne's Great Salt Lake, on view now through June 15, presents a nineteenth-century romantic realist appreciation of the lake's beauty and mystery through a gathering of paintings, sketches, and texts by Mormon pioneer artist Alfred Lambourne. Center for Land-Use Interpretation: Great Salt Lake Landscan and Tacita Dean: JG, both of which open January 24, explore the lake's contemporary reality from different technological approaches.

"These exhibitions present multiple experiences of the lake and encounters of different textures that ask: How do we collectively and individually relate to a site of this vast scale and this epic geological history?" says Kerry O'Grady, UMFA's director of education and engagement.

The Savage Poem Around Me: Alfred Lambourne's Great Salt Lake

Alfred Lambourne painted some of the West's most famous landscapes but found his muse in Utah's unique "inland sea." His visual and written works signify his deep reverence for the lake's protean beauty and its power to evoke powerful emotional responses.

Lambourne, a British-born convert to the Church of Jesus Christ of Latter-day Saints, walked the Mormon Trail to Salt Lake City with his family in 1866, at the age of sixteen, sketching much of the route. Primarily self-taught, by the 1880s he had become a well-known local artist who traveled to and painted the panoramic landscapes of the American West with Thomas Moran and Albert Bierstadt.

Enraptured by Great Salt Lake, Lambourne painted many views of Black Rock, shipwrecks, and the lake's variable weather. He eventually homesteaded alone on Gunnison Island. In his book *Our Inland Sea: The Story of a Homestead*, Lambourne describes the awe, and anxiety, of the first day of his fourteen-month self-exile: "Although I had lived these days by anticipation, no sooner had the sails of the departing yacht vanished below the watery horizon . . . than I realized at once, and with a strange sinking of the heart . . . the savage poem around me."

Donna Poulton, UMFA's curator of art of Utah and the West and organizer of the Lambourne show, says that no other artist before or since has painted Great Salt Lake "so deliberately."

"Lambourne's work depicts a heroic view of nature—its strength, destructive force, and beauty," Poulton says. "By the time Lambourne homesteaded Gunnison Island, his technique had changed from a hard-edged, enameled style to a more loose-edged and painterly approach, all the while maintaining the romantic dramatization of the Rocky Mountain School. His art and poetry reflect the vogue for picturesque bits of sublime wilderness."

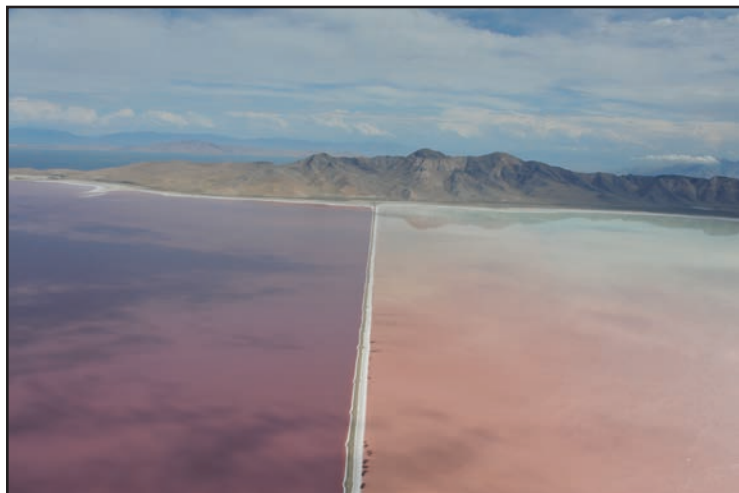
Center for Land-Use Interpretation: Great Salt Lake Landscan

A century or so after Lambourne, a "landscan" commissioned by the UMFA and produced by the Wendover/Los Angeles-based Center for Land-Use Interpretation (CLUI)



takes a documentary approach to the lake, capturing an otherworldly landscape deeply altered by human industry in ways the viewer may find both beautiful and disturbing.

CLUI's landscans are video portraits of landscapes too large to render wholly in a still photograph. Shot from a helicopter in November 2013, CLUI's Great Salt Lake Landscan offers a rare and stunning visual survey of the southern reaches of the lake, with its industrial infrastructure and vividly hued salt concentration ponds.



CLUI Lakescan courtesy of CLUI

Commissioning the landscan—which is now part of the UMFA's permanent collection—allowed the Museum to support CLUI's research interests while fulfilling the UMFA's own mission to inspire critical dialogue and illuminate the role of art in people's lives.

"CLUI is interested in understanding the nature and extent of human interaction with the Earth's surface so that we can better understand who we are and what we are doing," says Whitney Tassie, UMFA's curator of modern and contemporary art. "Similarly, the UMFA studies the art and artifacts of humans to better understand who we are. We're especially committed to investigating our local landscape and the ways in which it has inspired artists throughout time, whether it's pottery made from Utah soil, Jonas Lie's nineteenth-century rendering of the Bingham Copper Mine, or Robert Smithson's Spiral Jetty in Great Salt Lake."

Tassie hopes that presenting what is technically a research project within the context of a fine arts museum will encourage visitors to question definitions of art. "CLUI's work is inherently visual in that it uses tactics of display to support its mission," Tassie says. "The landscan is a stunning piece visually, and having it in a fine art institution will encourage many viewers to consider its aesthetic qualities and content."

Tacita Dean: JG

No twentieth-century visual artist may be more closely associated with Great Salt Lake than Robert Smithson, who created his most famous artwork and one of the finest examples of Land art, Spiral Jetty, in 1970 along the lake's northern shore.

JG, a new 35mm film by acclaimed British artist Tacita Dean, aims to decipher some of the mystery of Smithson's iconic earthwork, his fascination with time, and the nature of artistic inspiration. Shot mostly at Great Salt Lake, Utah's West Desert, and Salt Lake City's Hogle Zoo, JG explores the nature of time through the lens of Spiral Jetty and the J. G. Ballard science-fiction short story "The Voices of Time" (1960). Altering the film's imagery using stencil-like masks through her patented "aperture gate masking" technique, Dean attempts to parallel the effects of both Ballard's and Smithson's respective works.

Dean first saw Spiral Jetty in 1997, when she was a fellow at the Sundance Institute's June Screenwriters Lab, and eventually had a series of conversations with Ballard about the meaning of the work. Before Ballard died in 2009, he encouraged Dean to explore her questions about Spiral Jetty through the medium of film.

This exhibition, for which the UMFA constructed a 35mm projection booth, was produced in collaboration with the Salt Lake Film Society, which, like all theaters, faces a "digital deadline" by which it must convert its 35mm projectors to digital to meet an industry mandate.

For more information about these exhibitions please visit umfa.utah.edu or call 801-581-7332.

Mindy Wilson is the Public Relations & Marketing Manager at the Utah Museum of Fine Arts (UMFA)



Film still from JG courtesy of Tacita Dean





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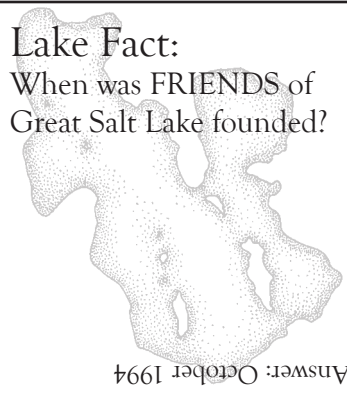
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