



# FRIENDS of *Great Salt Lake*

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[www.fogsl.org](http://www.fogsl.org)

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*Unmistakably Springtime* by Charles Uibel

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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

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## STOP, LOOK, AND LISTEN - REQUIRING A STANDARD INDIVIDUAL PERMIT FOR THE RAILROAD CAUSEWAY CONSTRUCTION IS THE RIGHT THING TO DO

"UPRR has stated that the proposed bridge is designed to maintain flows under "worse case" scenarios, yet this condition is impossible to define without context. The needs of mineral extraction, the brine shrimp industry, and the Great Salt Lake Ecosystem must all be considered before "worse" or best case scenarios can even be defined. UPRR has designed the bridge to mitigate flow, yet salt and mineral exchange is far more critical and this cannot be understood by the maintenance of flow alone."

- The Utah Division of Water Quality in comments sent by the State to the U.S. Army Corps of Engineers on the proposed railroad construction

Each year, the Great Salt Lake Technical Team generates a list of "hot topics" for Great Salt Lake research proposals. Funded by the Division of Forestry, Fire and State Lands in the Department of Natural Resources, the research proposals are supposed to help the Division make "defensible" management decisions in support of maintaining the Great Salt Lake Ecosystem - in perpetuity - as a public trust for the people of Utah. (You can read more about the GSL Tech Team and hot topics at (<http://www.ffsl.utah.gov/sovlands/greatsaltlake/gsltechteam.php>))

The "hot topics" not only reflect the ecological complexities that comprise this unique and dynamic system, but identify imminent factors that could affect those dynamics. Factors with potential consequences that could impair this hemispherically important ecosystem that contributes \$1.3B annually to the GDP of Utah. (I love that number).

Topics you would expect to see include, brine shrimp, water use and climate change, mercury, salinity balance, wildlife habitat, mineral extraction and phragmites. However, a welcome addition to the 2014 Hot Topics List just released by the GSL Tech Team is the "Potential causeway modification impacts." A controversial project that involves the U.S. Army Corps of Engineers, the Union Pacific Railroad, and Great Salt Lake. This proposal has gone through twists and turns since February 2011. And it has generated great concern from federal and state agencies, the brine shrimp and mineral industries, and FRIENDS because of impacts the reconstruction of the railroad causeway could have on the ecology of the Lake. (For more background about the project visit [www.fogsl.org](http://www.fogsl.org)).

The proposal was initiated in 2011 by Union Pacific because of a history of structural problems the railroad was experiencing with two existing 15' wide culverts. The west and the east culverts provide bi-directional flows between Gunnison Bay (North Arm) and Gilbert Bay (South Arm)

of the Lake. Subjected to constant freight loads and located in the deepest part of the Lake where background seismic activity occurs in the lakebed, the culverts were cracking and sinking. Despite efforts to repair them, the railroad requested a Nationwide Permit (NWP) from the U.S. Army Corps of Engineers to streamline the process to close the culverts. To mitigate for the loss of flow, the railroad proposed the construction of a 150' bridge (which morphed into 180') on the west side of the causeway near an existing breach where the Lake is more shallow.

If you didn't know better, you might think that what the railroad is proposing to do to address the safety issue and restore the bi-directional flow sounds like a good idea. However, if you know anything about the Lake and the historic imprint the causeway has created both on the Lake's surface and to its system, then you can understand why these stakeholders, and in fact all of us should be concerned. We should expect a thorough analysis and rationale for the location, the structure, and the monitoring and mitigation of this work before it can move forward.

Much like the Wicked Witch of the West said as she contemplated removing Dorothy's ruby slippers, "These things need to be done delicately." We need to be sure that the dynamics and complexities of the ecosystem are accounted for. We need to be certain that other Lake uses aren't jeopardized. And we need to be clear that the onus must be on the railroad to prove that any causeway modifications will do no harm to our public trust.

Among the written comments submitted by stakeholder interests to the Corps was a letter from a mineral extraction operation in the South Arm. It raised numerous questions about basic assumptions in the design documents that were a part of the pre-construction application process for a NWP. There wasn't enough data to either prove or disprove the engineering assumptions that were being proposed. And the assumptions also seemed to sug-



gest that the calculations were based on a finite point in time, and did not consider the ongoing dynamic system response of the Lake as it comes to equilibrium.

With a request for the Nationwide permit pending, the Corps weighed the collective input it received from the Union Pacific Railroad, the agencies, industry and FRIENDS. Using its discretionary authority it notified the railroad in a letter on March 15, 2012 that the work would require authorization under a Standard Individual Permit. This would cast a wider net of stakeholder involvement, improve the analysis of the project, and bring additional tools to the table that would include updating the U.S. Geological Survey Salt Balance Model. At the same time, the Corps would work with the railroad to develop options that would address the culvert issue.

Pushback from the railroad on the Corps' decision led to a meeting in Sacramento with the District Regulatory Division that proved fruitful for Union Pacific. On August 29, 2012, the Corps reversed its decision, authorized a Nationwide Permit, and gave the railroad permission to close the west culvert asap. However, the railroad still needed to resolve differences with the Division of Forestry, Fire and State Lands over an easement issue on sovereign lands. And it would need Corps approval of a Compensatory Mitigation and Monitoring Plan before the east culvert could be closed and the bridge construction begin. That's one for Union Pacific – zero for the Corps.

The west culvert was closed on November 10, 2012. It required several dump trucks with fill and 60 cement trucks (570 yards of concrete) to plug it up. By Thanksgiving, Union Pacific was expected to submit its Draft Mitigation and Monitoring plan for review by the Corps but took an extension until January 4, 2013. Which brings us to where we are today.

Alas. After careful review of the draft Plan by the Corps and federal and state agencies, it appears that Union Pacific once again failed to get high marks for being thorough. Differences persist between the Corps and the railroad about the roles and responsibilities in the monitoring process and performance standards. There are different expectations about when monitoring should begin and how long the railroad is required to monitor to achieve success criteria. Real time water quality data to capture seasonal climatic and lake circulation patterns was not addressed. There was no mention of monitoring reports. And insufficient details in the adaptive management plan, bonding and reclamation plan put the dot on the “i” in the word “inadequate”.

In short –things are right back where they started. Union Pacific has failed to work in earnest with the Corps to address agency and stakeholder concerns about potential impacts to the Lake and its water quality. And the railroad has still not resolved the easement issue with the Division of Forestry, Fire and State Lands.

Throughout this entire ordeal, state agencies, industry, FRIENDS and even EPA have advocated for a Standard Individual Permit to ensure that the project will not make matters worse for the Lake. Had the Corps stood its ground when it first asserted that such a permit would be required, we wouldn't be in the fix we're in today. But wait! There's more.

After much deliberation, the Corps realized that under the parameters of a Nationwide Permit it was not able to determine whether the proposed project would cause no more than minimal adverse effects to Great Salt Lake. As a consequence, once again invoking its discretionary authority, it notified Union Pacific in a letter (February 21, 2013) that the project will be processed through a Standard Individual Permit. The last I heard, the Corps and railroad will be meeting in mid April. On Tuesday, April 23, the Corps will provide a update to the Great Salt Lake Technical Team on the Union Pacific causeway application process. Keep your fingers crossed.

In saline,

Lynn

*What you can do:*

*Be prepared to engage in a broader stakeholder process on this issue. Keep you eye on our website: [www.fogsl.org](http://www.fogsl.org)*



# FRIENDS ORGANIZATIONAL STATEMENT

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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 slide-show 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.

## On the Cover

Unmistakably Spring by Charles Uibel

This is Antelope Island, shrouded in mystery. No socially networked pop-up smartphone widgets. A look at the island clears your mind of trending topics, politically incoherent marketing mayhem.

Just a beautiful island in a beautiful lake, plus springtime. These are ingredients of healing, quiet, rejuvenation. Use them to dislodge the encroaching crusts of civilization. Visit the quiet places more often.

Charles Uibel

Contact Charles at <http://www.greatsaltlakephotography.com>





## “HOLD IT LIKE AN ICE CREAM CONE.”

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*Banded Burrowing Owl, Antelope Island by Rosalie Winard*



# ART AND GREAT SALT LAKE

## CONNECTING US TO THE UNIVERSAL ELEMENTS OF OUR ENVIRONMENT

A favorite evening hike for many of us who love this place is up above the Avenues in Salt Lake City, to several spots that provide views of the Wasatch Mountains to the southeast, the sky above, and the Great Salt Lake to the west. These are some of the few viewpoints in our nation where you can watch the sun fully illuminate the magnificent faces of a 10,000 foot range of peaks, and then set beautifully into the sea, even though it's an inland sea and not an arm of the ocean as early travelers sometimes thought.

Experiences like these connect us to the universal elements of our environment: earth, sky and water. But these views also add another aspect, the very visible former levels of the lake carved into the slopes above the shore by ancient waves, what we call the "benches." We live on the bottom of ancient Lake Bonneville, which once covered much of western Utah and parts of Idaho and Nevada, and which gave us the Great Salt Desert, the West Desert, and Bonneville Salt Flats. These views and remnants of past Great Salt Lake stages, together with other tangible remains of earlier epochs, stimulate our imaginative human brains and lead us to recreate those former worlds in our minds, to envision what might possibly come again, to add our own interpretations, and to just enjoy and experience the constantly changing beauty.

It has been this way since the earliest humans passed this way, and they left many of their expressions for us to consider. Some rock art, effigies, tools, baskets and other items made in this environment go back at least 10,000 years, perhaps even 30,000. They include both realistic and fanciful representations of human experiences in the world they found here, and continue from the deep past to the present works of both native peoples and later arrivals. Their art, adornment, rituals and religions have always been deeply influenced by this place.

There is a basic dichotomy in a desert lake. The Lake is alive, with birds, animals, plants, insects, reptiles, and sometimes water critters. The Lake may also appear dead or dying, when it dries up or water doesn't reach the surface, or when it is just a remnant of a once much larger system such as the current Great Salt Lake. In fact, desert lakes are often transitory, disappearing during dry years and returning in wetter cycles. While it's unlikely that Lake Bonneville will ever return, the level of the historic Great Salt Lake has certainly experienced significant fluctuations.

On encountering the Lake, many 19th Century explorers and travelers created their own artistic expressions in books and journals, visual works, photography and even music. Notable early painters include Thomas Moran, Alfred Edward Lamourne, and Walter Paris. Two important contemporary painters are Oscar Campos and Sean Toomey.



Black Rock by Michael Slade

Within five years of the first immigrant settlement in the Great Salt Lake valley, the Social Hall was built in 1852 for music, theater and dance, making it the first theater west of the Mississippi. The Utah Arts Institute (now the Utah Arts Council) was the first state arts agency in the United States, created by the legislature in 1899. When every state undertook a major project in celebration of the nation's bicentennial in 1976, Utah's was one of the few that focused on the arts, with the construction of Abravanel Hall and the Salt Lake Arts Center (now the Utah Museum of Contemporary Art), and the renovation of the Capitol Theatre as only the second theater in the country specifically designed for dance. The Utah Arts Festival was one of the very first state arts festivals when it was created in 1977.

Great Salt Lake continues to inspire artists, as well as the rest of us, and in recent years three large projects have brought it international fame: Nancy Holt's Sun Tunnels south of Lucin; Robert Smithson's Spiral Jetty north of Promontory Point; and Tree of Utah next to I-80 near Wendover by Karl Momen of Sweden.

For many reasons, Great Salt Lake must be protected for its wildlife, its recreation and its economic significance to the State of Utah. But it must also be protected so it can continue to nurture and inspire all of us, including artists, and contribute to our enjoyment and understanding of this amazing place.

Barry Bonifas has worked in arts management for many years, and also in conservation. His major hobby is exploring and learning about the West.





# KEEP THE LAKE GREAT

## WORKING WITH THE PEOPLE WHO VALUE THIS AMAZINGLY UNIQUE RESOURCE

Why should state policy makers care about the Great Salt Lake? We could point to the \$1.3 billion dollars in economic activity and payroll generated by recreation, industry, and aquaculture on the Lake. We could note the almost 8,000 jobs that depend upon a healthy Great Salt Lake. We could mention the vital importance of the Lake Effect for the Ski industry on the Wasatch Front as the Lake pumps up the snow volume in our mountains. We could reach outside ourselves and speak about the millions of birds that depend upon the water and wetlands of the GSL in their annual migrations.

All of these reasons, and many more are important. Preserving jobs and promoting business activity is a positive attention-getter in the legislature, but the Great Salt Lake has a special meaning for me: my daughter came home from Chicago to marry the love of her life at Fielding Garr Ranch on June 21, 2009, the summer solstice. And I know that our family is not alone in holding a special reverence in our hearts and memories for this gem of the Great Basin.

To continue the great work already done by the Great Salt Lake Advisory Council, Rep. Larry Wiley asked the Natural Resources Appropriation Subcommittee to commit \$150,000 one-time for an Integrated Water Management Study to conduct research to quantify the impact on the health of the Great Salt Lake of various lake levels. The Natural Resources Committee made the Water Management Study \$150,000 its 13th and last request for one-time money, but the Executive Appropriations Committee only funded six of the thirteen requests from the subcommittee, and did not include any appropriation for the Integrated Water Management Study in the FY 2014 budget bill.

All was not lost: the final budget bill of the session, the Bill of Bills, ties up all the loose ends of next year's state budget. Democrats requested that some funding be placed toward studying the Great Salt Lake, and \$25,000 was appropriated.

One of my professors at the University of Utah told us to evaluate organizations by looking at their budgets. Mission statements are well and good, he said, but the true values of a group can be more honestly assessed by where and how they spend their

money. So what does it say about the Utah Legislature that for two years in a row it appropriated \$300,000 to a private company for the purpose of manipulating the flora and fauna of Utah by lobbying for the de-listing of wolves across the United States?

And now that we have started this list, it should not go unmentioned that the Legislature appropriated \$450,000 this year to study the state's proposed federal land grab, deemed unconstitutional by the legislature's own attorneys, along with \$1 million for the Public Lands Policy Coordination Office to continue litigating thousands of RS2477 road claims across the state, in addition to pursuing the transfer of federal forest and BLM lands to state control. These counter-productive appropriations say to me that we have more work to do with our friends, neighbors, and family members in helping them understand how important a healthy Utah environment is to keeping all Utahns physically, psychologically, fiscally and spiritually healthy.

I tip my hat to the FRIENDS of Great Salt Lake for their pioneering advocacy for the Great Salt Lake, and to all of you who help keep FOGSL in the public policy mix on these critically important issues. I look forward to seeing you on the Hill in 2014.

Rep. Joel Briscoe



FRIENDS trip to Spiral Jetty by Jeff Clay



## A RALLY TO PRESERVE COMMUNITY AND GREAT SALT LAKE - PROTESTING THE WEST DAVIS FREEWAY

A swirling snowstorm did not stop more than 250 people from showing up along Glover's Lane in Farmington on Saturday, Feb. 23, at a rally to protest the West Davis Freeway. Roger Borgenicht and I, representing Utahns for Better Transportation (UBET), attended the rally to support the effort.

The new road is being planned by the Utah Department of Transportation (UDOT) to address the projected transportation needs of the area through 2040, and would be built as a north extension of Legacy Parkway to reduce peak-hour vehicle delay in Davis County. Although no roadway alignment has been selected, two alternatives are under consideration near the south end.

The Shepherd Lane Alternative is a short segment that would impact many existing homes and some wetlands; the Glover's Lane Alternative is longer and loops out along the west edge of the county near Farmington Bay. This route runs through wetlands, farmlands, semi-rural areas, and would impact homes as well—but a smaller number, so the community there feels the threat. Selection of the alternative will be made later this year when the Draft Environmental Impact Statement (DEIS) is completed (Note: There will be a public comment period). Read more about the West Davis Corridor project here:

<http://www.udot.utah.gov/westdavis/>

The rally to protest the Glover's Lane Alternative brought out the community with their cars, trucks, vans, horse trailers, and air boats parked in a long line on the north side of the road. Throngs of people were gathered along the way, concerned about the potential impact to their neighborhoods, and the impact on the birds that depend on the wetlands and Farmington Bay.

The scene was reminiscent of a fall day 15-plus years earlier in 1997 when people gathered on the lawn in front of the Utah State Capitol to protest the Legacy Highway, the first segment of a road proposed by then Utah Governor Michael Leavitt that would run—at full build out—from Brigham City to Nephi. That was also the time that Utahns for Better Transportation (UBET), a coalition of groups (including FRIENDS of Great Salt Lake) promoting balanced transportation choices that support the future quality of life along the Wasatch Front, was formed. On that day in 1997, the protest signs said "Legacy is Lunacy" and "Leave it, Leavitt." On this day, a crowd of the concerned braved the snow and waved homemade signs with short messages like "No Road," and "Take Transit."

A flatbed truck parked in front of Bruce and Jeannie Bassett's home provided a stage for those who wanted to make comments. The Bassetts helped organize the rally, and live with their kids on the west end of Glover's Lane. If



Legacy Highway lawn sign by Lynn de Freitas



that route is selected, the freeway could be built through their back yard.

Carl Ingwell jumped onto the truck and stood at the mic. “We’re living in a state where our government is pointing the finger at us telling us to drive less, and at the same time a government agency is building more freeways. Does anyone see the irony in that?” A UDOT representative recently told him that if the Glover’s Lane Alternative is selected, the route of the new road would pass less than a half mile from the new Farmington Education Center, and within 400 to 500 feet of the wetlands. “What do you do with wetlands on the shoulder of a freeway?” he asked. “The road will drastically change Farmington Bay as we know it—for hunters, for air boaters, for birdwatchers. We will not know Farmington Bay anymore.”

The threat of a new road to the wetlands—a major source of food for millions of birds that migrate through this area each year—was a concern expressed by several residents. Nicole Atherton worries that an east-west road will ruin the birds’ north-south migration flight path; Jeffry Hicks got it right when he said, “If you put a road down to the wetlands, there’s no way to get them back—if we don’t protect them, they are gone forever;” and Marty Price noted that hunters and non-hunters alike are concerned. “Whether it’s hawks, falcons, eagles, water fowl—this is a major part of the Pacific Flyway. We gave up a lot for the Legacy Parkway and we don’t need this road.”

Tim Wagner, with the Sierra Club in Salt Lake City, stressed that it is the quality of life for the Glover’s Lane community that would be most impacted. “UDOT wants to build roads. They want to lay asphalt and concrete because that benefits them and the road contractors. But it degrades our quality of life—all those resources that we value so much. That’s why we need to put a halt to this project. We need to tell them we don’t need a road at all!”

But UDOT says we do. UDOT’s primary goal in building an alternative to I-15 is to reduce automobile delay at the peak travel times. But at what cost? What will the communities of West Davis lose in return for saving a few minutes on their commute? The freeway UDOT wants to build will bring more noise and more pollution. It will bring sound-walls, billboards, and heavy trucks. It will bring “big box” commercial development that, by design, will draw more



Glover Lane Rally by Ann Floor

vehicle traffic to the area, not less. It will turn these quiet, semi-rural neighborhoods into the very thing they moved here to avoid.

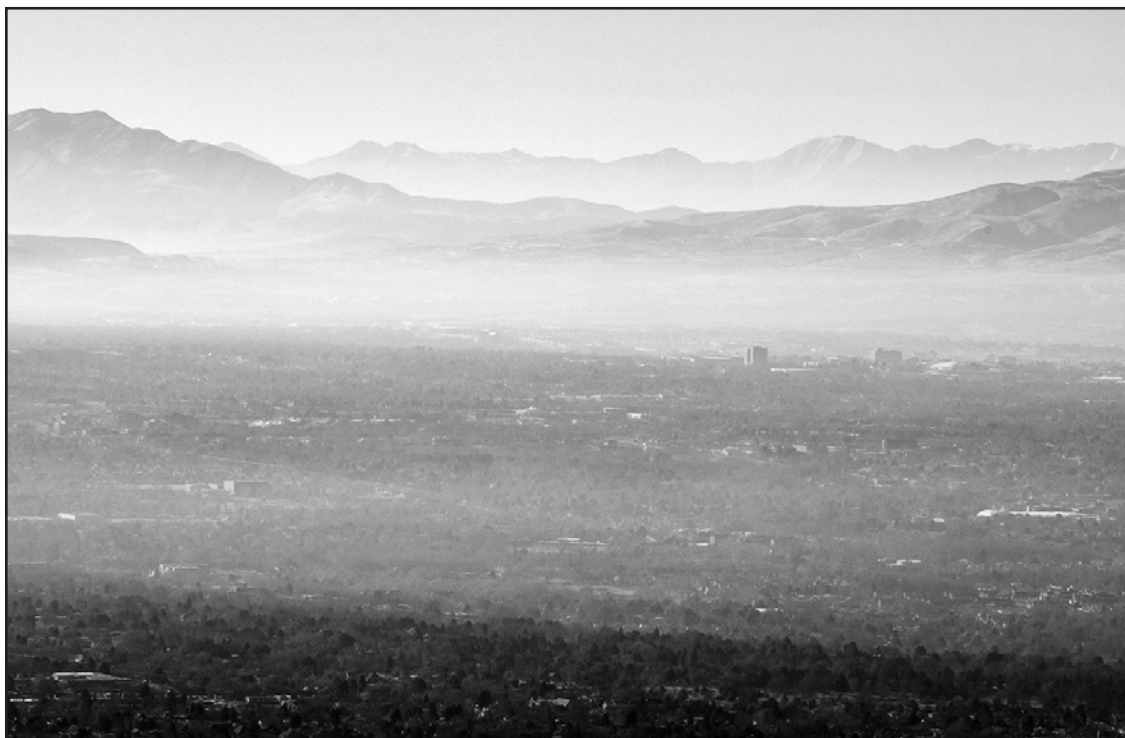
UBET supports a shared solution. One aspect of that is having UDOT undertake a comprehensive and robust study of a no-build alternative for West Davis that includes optimal expansion and improvements to the existing arterials for improved access to the I-15 and FrontRunner corridor. These “Boulevard Communities” are included as one of several corridor design options in Wasatch Front Regional Council’s Wasatch Choice for 2040 Plan. Using the latest thinking to explore how new and innovative designs of intersections might help alleviate delay—which would make a new road unnecessary—we believe this option has the potential to provide a more civilized development pattern and would better protect and preserve the quality of life for the communities located in West Davis County. Watch for the release of the DEIS and plan to make comments.

Ann Floor  
Co-Chair, Utahns for Better Transportation  
([www.utahnsforbettertransportation.org](http://www.utahnsforbettertransportation.org))



# OUR BUBBLE IS IN TROUBLE

## TRYING TO BREATHE IN THE GREAT SALT LAKE AIRSHED



Blanketed by pollution by Jeff Clay

With the arrival of 2013, local air quality quickly deteriorated with the familiar pollution spikes caused by high-pressure inversions. It's no secret that these deadly spikes in small bits of particulate matter are particularly harmful to human health and the environment due to their small size—about one-fortieth the width of a human hair. Most of us also know that these pollution spikes significantly increases the risk of area mortality—research indicates an increase of mortality of 14% for each 10 $\mu\text{g}/\text{m}^3$  (pollution is commonly measured in micrograms (one - millionth of a gram) per cubic meter air or  $\mu\text{g}/\text{m}^3$  increase. Recently local levels reached above 130 micrograms of PM<sub>2.5</sub> in area valleys—almost four times the federal standard (a standard widely acknowledged to insufficiently protect human health). Many have made the analogy that at these levels, we are being exposed to exactly the same kinds of negative health consequences as if we were breathing second hand smoke from a heavy smoker.

As these medical facts become more widely acknowledged by the public, the question becomes: are there any tools available to effectively deal with this problem? There is of course the Clean Air Act, but because this congressional act has been law since 1970, is there any realistic chance that this statute can solve or even alleviate this problem? There is no doubt that the statute has lofty goals that emphasize the protection of human health through the enactment and

compliance with national air quality standards. However, many areas frequently violate these standards with seemingly complete immunity. The question becomes how this can be changed?

These health based standards principally apply to point sources of industrial pollution and mobile sources, as well as different standards that apply to metropolitan areas that must meet or “attain” certain levels of air quality. Anecdotally, approximately 50% of the contribution to local spikes in pollution is due to automobiles. The regulation of these vehicles is arguably more challenging under the Clean Air Act, and instead, is perhaps more effectively regulated through fuel efficiency standards and the federal CAFE program which mandates federal fuel efficiency that auto manufacturers must abide by. A huge weakness in the law is the situation that Utahns are currently facing, where a metropolitan area does not “attain” the air quality standard, but the statute fails to deliver a prompt and enforceable remedy to achieve actual compliance with the standard.

The Clean Air Act provides that when an area is out of attainment (as we are for PM<sub>2.5</sub>) the state must prepare a state implementation plan (“SIP”) to create a plan of action to come into compliance with that standard within five years. Compare this situation to a hypothetical violation of



another law (i.e. a tax or traffic law) and imagine the option of citizens being able to delay compliance with that law, and then being given the option to devise a plan so that they finally meet the requirements of the law at a far-off date in the future. It does not seem fair that delayed and uncertain compliance would only be applicable to air quality rules. After all, we are literally dealing with matters of life and death.

Ignoring the seemingly unjust methodologies, the Clean Air Act allows states to put off complying with air quality rules; in our particular case, the state has until 2014 to attain PM2.5 standards. Although the PM2.5 problem has obviously existed for much longer than 2009, this is when the EPA designated the areas in Utah as not meeting the new 2006 standard, meaning that Utah has had a reasonable five-year period to comply. The recently released draft SIP (that has since been rescinded by the Division of Air Quality (DAQ) speculated that air quality standards for PM2.5 could be met no sooner than 2019. Little wonder that the state decided that this plan may not pass muster with the EPA and it is unknown what will result from the new draft SIP.

DAQ has signed off on well-publicized expansions at the Rio Tinto-Kennecott Bingham Mine, as well as at the Tesoro and Holly Oil Refineries, actions that leave the public to wonder where the state's loyalties lie—human health and compliance with federal law or facilitating corporate profits. Right now, waxy crude from the Uinta Basin is being transported by trucks to refineries in North Salt Lake City. The refined product is being sent to Las Vegas via a new pipeline. The Holly Oil Refinery expansion by itself will increase truck trips from 40 /day to 160/day, which will cause significant additional pollution from mobile emissions. Increased profits and a tax windfall for the state appears to run in this case from the Uinta Basin to Las Vegas via Salt Lake area refineries, and leaves the local public to contend with increased pollution.

It becomes hard to argue that the state is serious in its efforts to meet the public's health needs, not to mention meet federal requirements given these planned expansions. It is simple math that, given the predetermined need to fill a recently constructed gas pipeline to Las Vegas, the state will be hard-pressed to make the required cuts to emissions that will bring us within federal standards. Although local citizens demand that the State reject proposed expansions, only a court would be able to overturn these approvals from the Division of Air Quality. In addition, if a SIP is submitted that does not reduce small particulates, it appears only the U.S. Environmental Protection Agency can provide the hammer the public lacks in either rejecting a SIP that does not meet attainment requirements or by withholding highway funds until an adequate SIP is developed and implemented.

Lastly, some may question whether it is realistic to reduce pollution to the levels required to achieve compliance with health based standards given that doing so would be too costly. However, the EPA has found that benefits of compliance with the PM2.5 standard, in monetary terms, would range from \$88 million to \$5.9 billion a year while estimated costs are between \$2.9 million to \$69 million. Clearly the benefits outweigh the costs in this case. Sadly, it appears the state does not consider these costs, because they can be easily externalized to the public.

Although it can be shown that the state squanders economic resources through noncompliance, one may wonder if the moral and ethical implications of saving lives will be considered when the new SIP is released. Sadly, it is reasonable to assume that given the state's commitment to industrial source expansions there may not be reasonably quick progress towards meeting federal standards.

Joel Ban is a Utah attorney working on air quality issues



Photo by Charles Uibel



# GREAT SALT LAKE EDUCATION

## LAKESIDE LEARNING FIELD TRIPS AND A GROWING TEAM

Spring Lakeside Learning is off to a chilly start! Already, several 4th grade school groups have dug in the oolitic sand, followed the path of water in our watershed, munched on pickleweed, spied many different resident and migrating birds, dipped their toes in the lake, and taken a up-close look at brine shrimp. Each trip is a special experience—we love to hear kids say, “This is the best field trip EVER!”

Spring 2013 will be our biggest Lakeside Learning field trip season yet. About 1,000 students from eleven schools and seven districts will participate, as well as many teachers and parents. Many thanks to Union Pacific Railroad for their generous grant—this money is used to help schools pay for transportation costs. Also, thank you to all our LOVE UT GIVE UT education donors, as well as our dedicated members! Thanks to your support, more students are able to head to the lake for hands-on, up-close outdoor education. This is where Great Salt Lake awareness starts!

In addition to our stellar group of volunteers, we are happy to announce that our Education team has expanded this season! We have three new team members to introduce. Marilyn Alcoba joined our saline squad as our second

Americorps Intern. Marilyn hails from Long Island, New York, but moved out west several years ago. She is studying education at the University of Utah, with emphases in Spanish and Art. She enjoys spending time in the outdoors, rock-climbing and exploring. We are so excited to have her!

Chris Komlos and Aileen Hagen-Riehle have also jumped into the briny fun. Chris just wrapped up his Environmental Engineering studies at the University of Utah, while Aileen is wrapping up her time working with the Open Classroom. Both have already proven themselves to be super Great Salt Lake guides! We are happy to share the great Lakeside Learning experience with them.

We would be happy to share this great experience with you, too! Are you an interested 4th-grade teacher? Are you interested in volunteering as a group leader? Would you like to help fund this program?

Please contact me at [pelican@fogsl.org](mailto:pelican@fogsl.org)

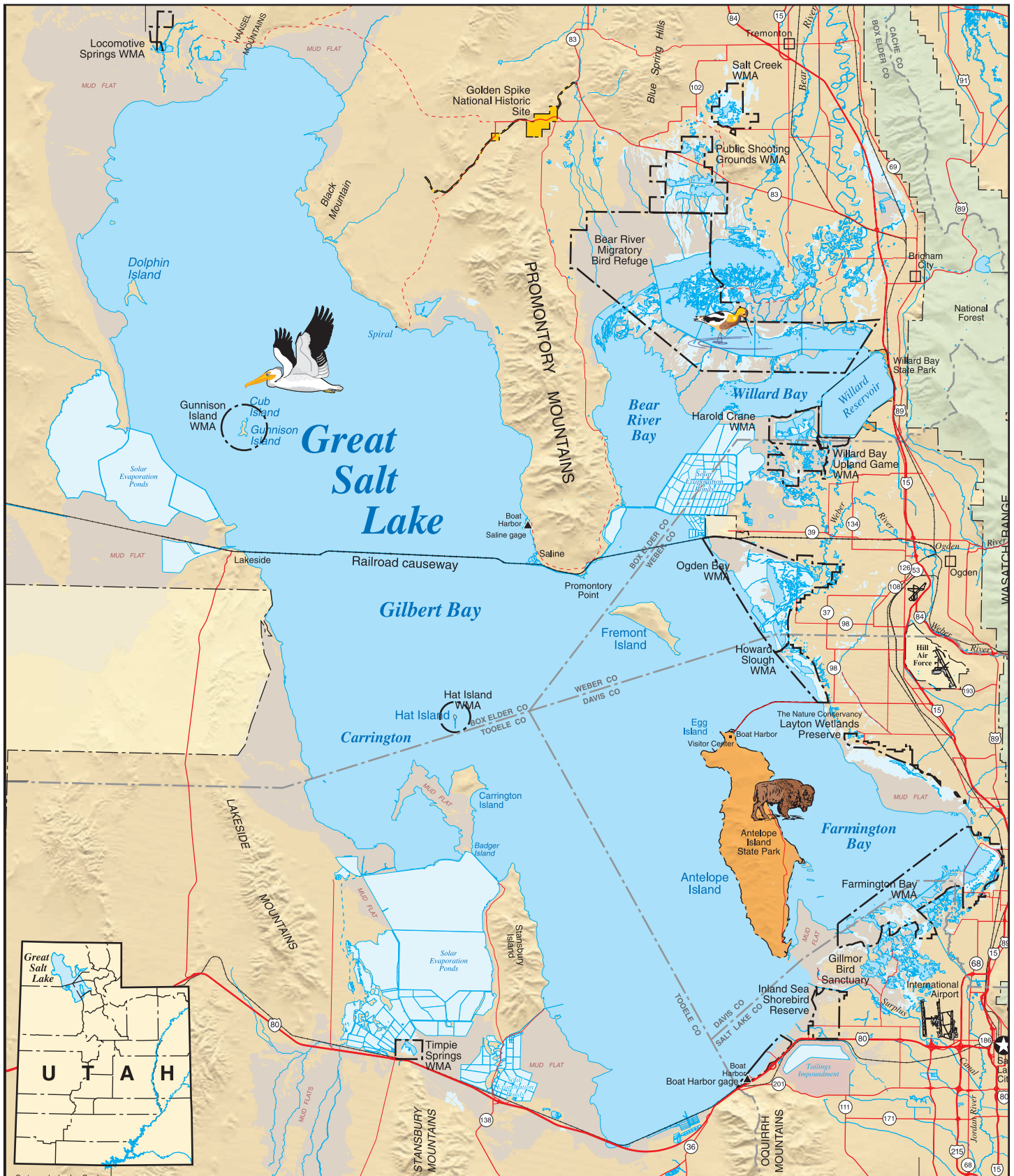
Andrea Nelson, Education and Outreach Director



Antelope Island Bison, courtesy of Zach, Spectrum Academy



# GREAT SALT LAKE AT A GLANCE



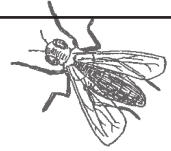
Courtesy USGS







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.



## Can the Causeway in the Great Salt Lake Be Used to Manage Salinity?

Southern Pacific's railroad causeway, converted to solid fill in 1959, divided the Great Salt Lake into Gunnison Bay to the north and Gilbert Bay to the south and changed the lake's water and salt balance. Gilbert Bay has a higher surface elevation and a lower salinity (typically 8-17%) because it receives nearly all of the fresh stream flow from the Bear, Weber, and Jordan/Provo watersheds. Bear River Bay is considered part of the south arm because the two are connected by an opening in the causeway. With little fresh water, but plenty of evaporation, Gunnison Bay is often completely saturated with salt (~27%). Some water and salt flows through the causeway at breaches and culverts as well as through the fill of the causeway, but this interflow is not enough to equalize salinity or the surface elevation between the north and south arms of the Great Salt Lake.

There is an inverse relationship with lake elevation and sa-

linity, so that as elevation rises in wetter years, salinity decreases (Figure 2). The salt threshold for Great Salt Lake brine shrimp is not well documented, but probably ranges between about 8 – 20%. Even less is known about the salinity threshold for brine flies, but the two species occupy similar habitats in the Great Salt Lake, and thus may have similar salt tolerances.

We wondered how much the railroad causeway alters natural conditions and what the salinity of the lake would be like had the causeway not been built. To calculate the salinity of the "whole" Great Salt Lake, we used lake elevations to estimate water volume and a measured salt content of 4.9 billion metric tons, until pumping to the west desert in the mid-1980s reduced it to 4.5 billion tons. Without the causeway, we estimate that the "whole" Great Salt Lake salinity would have exceeded the tolerance of brine shrimp



Figure 1. Railroad causeway with Gunnison Bay on left and Gilbert Bay on right, photo courtesy of S. Null





in 73% of the years between 1960-2011 (Figure 2B). The fresher Farmington and Bear River Bays would likely have supported brine shrimp during those years, but nevertheless, “whole” lake production would likely have been lower than what actually occurred in Gilbert Bay with the causeway. During those drier years with the causeway, Gilbert Bay had acceptable salinities and supported brine shrimp, brine flies, and the bird community dependent on these prey species. In the very wet years of the mid-1980s, Gilbert Bay became too fresh to support large populations of brine shrimp. Then Gunnison Bay, which at that time was less saline from heavy precipitation, supported brine flies and shrimp (as well as brine shrimp cyst harvesters).

This illustrates that the causeway provides some benefit by increasing the range of salinity levels throughout the lake during any given year. While the causeway in the Great Salt Lake has certainly altered natural conditions, it has also increased the resiliency of life in the Great Salt Lake by raising the chances that tolerable salinity levels will exist somewhere despite hydrologic variability. But there are tradeoffs. Mineral extraction companies in the south are hurt by a

divided and lake, whereas those in north benefit by having saturated brine to utilize. In years when “whole” lake salinity would have been within an acceptable range to support life, the divided lake had a much smaller area for brine shrimp and brine fly production. Another negative is that the causeway causes a deep brine layer to form under about half of Gilbert Bay where brine shrimp and brine flies cannot survive, and where toxic methyl mercury is produced.

If the railroad causeway separating Gilbert and Gunnison Bays were updated with a control structure to manage the flow of water and salt, the causeway might be a management tool to maintain salinity, aquatic life, and industry. Salt lakes worldwide are vulnerable to changes in salinity from hydrologic variability as well as human alteration from water regulation, land use, and climate change. A well-managed causeway could provide some resiliency from these changes.

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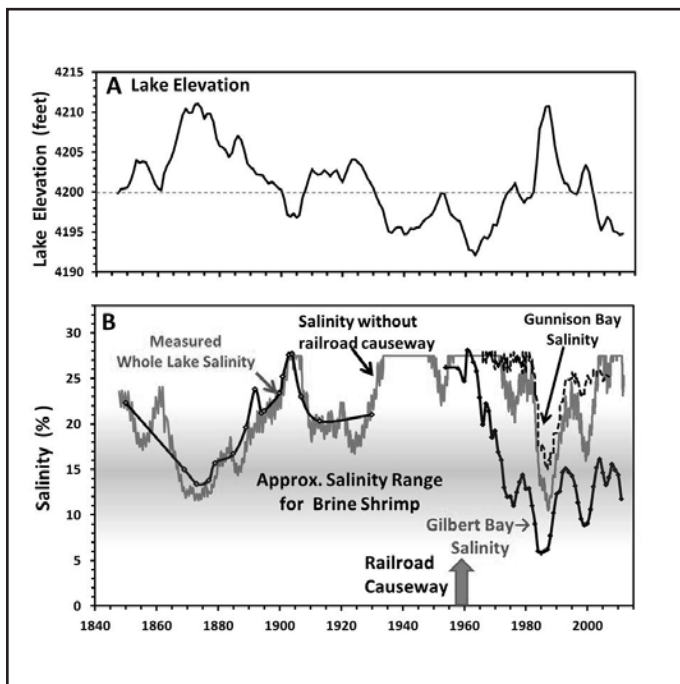
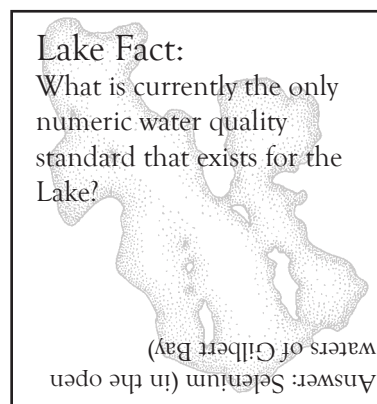


Figure 2. (A) Gilbert Bay elevation. (B) estimated “whole” Great Salt Lake salinity (thick gray line), measured Gilbert Bay surface salinities (solid black line) and Gunnison Bay salinities (dashed line).



# DISCOVERING OUR LAKE

## INTERVIEW WITH MATT COOLIDGE: CENTER FOR LAND USE INTERPRETATION

**Hikmet Sidney Loe:** Matt, thanks for the opportunity to talk with you about Center for Land Use Interpretation (CLUI) and how the work that takes place in Wendover intersects with Great Salt Lake. To start, can you tell us a little about CLUI: when was it first founded, and where?

**Matthew Coolidge:** The Center was founded in 1994, in Oakland, California, where we had our first office and exhibit space, in a run-down and wacky part of town, where 5th Avenue hits the water, south of Jack London Square. We did several exhibits there, a self-guided walking tour of the industrial waterfront around our office, and started our web existence, back in the era of Mosaic and Netscape. We opened a branch in Los Angeles in 1996, to work on our Land Use Database then the center of gravity shifted there.

**HSL:** What led you to develop an artist residency center in Wendover?

**MC:** In 1995 we went on a search for a place to develop a non-urban location for interpretive exhibits about contemporary land use, on a national level of resolution. We were looking for a place where “land” and “scape” dominated, where human activity and pre-human activity melded in compelling ways, an evocative and provocative place, where there were stories to tell. We looked at places we had on a list, over a week or so on the road, but when we came over the hill from the west, at the end of the basin and range of Nevada, there was Wendover, spilled out on the flats- that old airbase, and everything, and we thought “THIS is the place.” Over the course of a year we leased some of the old airbase buildings, and fixed them up - a little - and installed



This way to Wendover, photo courtesy of Hikmet Loe



Map of the region at abandoned visitor center on I-80, photo courtesy of Hikmet Loe

an exhibit about the region...points of interest in the 100 mile or so radius around Wendover. It was open to the public all the time, with a key code on the door. By calling a posted phone number you would get the code to enter.

We found the region SO compelling, so full of stories, and potential, that more creativity would be needed to explore it further. So we developed a residence program, to bring creative people to it. It's open to anyone. They propose a project that engages the landscape, the “land use,” and reveals some new ideas and notions about it - what it may be, how its perceived, etc - and if the review committee likes the proposal, and it seems feasible, then we bring them out, and help make it happen. It's kind of an interpretive R&D site, a proving ground for ideas about our individual and collective relationship to the planet.

**HSL:** What is the goal of the Wendover site that may differ from the other work CLUI does?

**MC:** Though we have fixed exhibits that serve as a kind of visitor “contact station,” and orientation facility (similar to what we do at other places) Wendover is the only place where we operate a residence program. The individuals and groups that come out, from all over the nation and world, bring their unique perspectives and apply it to this particular environment. They tend to leave their work, or evidence of it such as documentation, on site there, on the ground, or in an exhibit space, so others can see it. It also makes its way to the web and into exhibitions in other cities. All of the residence programming is archived at the Center for



Art + Environment at the Nevada Museum of Art in Reno, where its legacy is preserved.

**HSL:** Do many of the artists in residence engage actively with the lake?

**MC:** Over the years residents have looked at things like the flats of the Great Salt Lake Desert, and the phenomenology of emptiness, desiccation, salt, away-ness, bombing ranges, Dugway, the history of the Bomb at Wendover, the old airbase, the bifurcated town with its state line running through it, the casinos, the potash operation, Bonneville speedway, the railway, Land art, and much more, but not so much about the lake itself. We have a few programs coming up that might change that though. Stay tuned.

**HSL:** When did you first see GSL? was there a physical feature of the lake that stuck out in your mind, or struck you?

**MC:** Like many others, I semi-saw it driving by on Interstate 80, driving across the country as a kid. But I was probably distracted by Kennecott's stack, and Saltair, and missed the lake itself. The first time I really saw the lake, and got into it, was on a trip to the Spiral Jetty, probably 20 years ago. The Jetty was underwater then, but we walked it, getting wet up to our waists. As you know, the Jetty draws people who are not from the area to the lake. It's a doorway, a gateway site. It did not matter to me that the Jetty was submerged. What it did was get me to that remote place, and to meet the Great Salt Lake in all its wonder. The foam, the textures of the salt crusts and mud, the pelicans, the oil jetty... We stayed overnight, and the view looking across the water was one of the most amazing things I had ever seen. The haze and light was such that the horizon disappeared, the lake and sky merged. It was like looking at nothing – like looking straight into the void. A complete erasure. A cosmological reset.



Great Salt Lake Salt Flats, photo courtesy of Hikmet Loe





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