



FRIENDS of *Great Salt Lake*

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With our backs to the Sun by Keith Vaught

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

RAILROAD CAUSEWAY PROPOSAL RE-EMERGES BUT IS IT THE BEST PROPOSAL FOR THE LAKE?

“We can only do what we can do with what we can do.”
-Kathleen Anderson, Regulatory Assistant, U.S. Army Corps of Engineers

On November 30, 2012, the Union Pacific Railroad must submit a “final compensatory mitigation and monitoring plan” to the U.S. Army Corps of Engineers for approval. This plan is a necessary component of Union Pacific's work to repair the railroad causeway that crosses Great Salt Lake. The plan is part of the terms and conditions as defined by the Corps in its authorization of a Nationwide permit (NWP-14) issued on August 29, 2012.

More on this later, but first a little background -

The railroad has been seeking a Nationwide permit since 2011 because the West and East culverts in the causeway have had a history of reoccurring cracks. Concerned that this could be cause for the interruption of train traffic across the causeway or ~ even worse ~ a derailment, Union Pacific was anticipating a fairly streamlined approval process with a favorable decision by the Corps to proceed. In place of the culverts, the railroad was proposing to build a 150' long concrete-pile supported bridge on the western end of the causeway ~ known as the Rambo alignment ~ where the lakebed is more stable. Theoretically, this bridge would maintain the flows and salinity exchange between the North and South Arms of Great Salt Lake that the culverts currently provide.

Confident that authorization would be granted, Union Pacific was anticipating that the construction of the bridge would take place from June 2011 to September 2011 - a fairly ambitious timeline, to say the least.

FRIENDS has been tracking this issue since February 2011, when Union Pacific first submitted a preconstruction notification (PCN) to the Corps. This PCN was part of a pre-application process for a Nationwide permit. A number of factors must be considered for a project to qualify for a Nationwide permit. A preconstruction notice is required. Total permanent impacts must be under ½ acre with only minimal individual and cumulative adverse effects on the aquatic environment. The Corps must then review the project proposal to ensure that the adverse environmental impacts are minimal, and that there is no significant change to the hydrology of the receiving water body. Finally, the Corps must determine that mitigation for those impacts is appropriate under Special Conditions which mandate specific environmental requirements in order to minimize impacts under section 404 of the Clean Water Act.

If the impacts cannot be minimized, or if the project is contrary to the public interest, it may not be able to proceed

under a Nationwide permit and would thus require either a regional General permit or Standard Individual permit. This would expand the process to include the development of an Environmental Impact Statement with various alternatives under NEPA (National Environmental Policy Act) based on the purpose and need of the project, and provide opportunities for the public to comment. It would also require a 401 Certification from the Utah Division of Water Quality to guarantee that Utah waters are protected from impairment. In other words, it would provide the opportunity for a full public process.

Although a Nationwide permit does not require external agency coordination or public comment, the Corps responsibly hosted a series of meetings and phone conferences with state and federal agencies during this pre-application process. They did so again in July 2011 when the railroad submitted its formal application. In both cases, the goal was to identify any major concerns with the project. All these state and federal agencies have some form of jurisdictional and stewardship responsibilities for Great Salt Lake, including environmental protection, management of our sovereign lands, wildlife resources, water quality, and other beneficial uses of the Lake. The U.S. Geological Survey Utah Water Science Center, the Great Salt Lake Advisory Council, the Great Salt Lake Technical Advisory Group, mineral evaporation operations, the brine shrimp industry, and FRIENDS were also involved.

After careful scrutiny of the proposal and in formal written comments to the Corps, the consensus of opinion was that there was insufficient analysis of the bridge design and location, and a general lack of confidence in the modeling Union Pacific used to predict the bi-directional flow of salts from north to south once the culverts were closed and the bridge constructed. The proposal also raised concerns about impacts to migratory waterfowl, impacts to mineral extraction industries, the potential to increase the amount of methylmercury in the system, unknown effects on the brine shrimp, and whether a Nationwide permit was the appropriate permitting option.

It is also unclear whether or not Union Pacific actually has an easement to build the bridge. According to the Division of Forestry, Fire and State Lands, which has jurisdictional responsibility for managing Great Salt Lake, Union Pacific is unable to provide documentation that verifies a right to an easement for the Rambo section of the causeway where the bridge would be located. Until this issue is resolved, the



railroad does not have permission to build the bridge on sovereign lands. On October 16, 2012 the Division had still not been contacted by Union Pacific.

Because the bridge design will have a significant influence on the ecology of the Lake, it is critical that the potential effects of any new openings, or any closure of existing openings in the railroad causeway be simulated in a coherent manner. The prevailing perspective from the agencies and other Great Salt Lake stakeholders is that the best tool for the job is the Salt Balance Model developed by the U.S. Geological Survey Utah Water Science Center. However, this model hasn't been updated since the report was published in 2000. Although the cost of updating the model is significant, the cost of constructing a bridge that proves to be detrimental to this hemispherically and economically important ecosystem is much, much higher.

Our position has always been that a train derailment because of structural failure of the culverts would be tragic and should be avoided. However, it is important to remember that we have a divided Lake today because the railroad causeway has made it so. And although the railroad would argue that the culverts were never intended to provide salinity exchange between Gunnison and Gilbert Bays, when they weren't clogged with detritus from the Lake, they did in fact facilitate some exchange. This is a good thing because if you think about it – in a 21 mile rock-fill causeway that is essentially impermeable – the 3 existing openings (2 culverts and a breach) provide only about 330' of potential bi-directional flow. If the USGS Salt Balance Model can deliver important insight for building the best bridge compared with a single calculation offered up by the railroad, then it would be prudent to update the model.

In a March 15, 2012, letter to Union Pacific responding to the July 2011 application for a Nationwide permit, the Corps exercised its discretionary authority to require that the application be processed for authorization under a Standard Individual Permit. It also recommended that the railroad consider updating the USGS Salt Balance Model while continuing to develop options that will temporarily stabilize the culverts. This recommended course of action was countered when Union Pacific requested a meeting on August 1, 2012 with the District Regulatory Division in Sacramento to discuss reconsideration of its Nationwide permit proposal and Preconstruction Notification.

On August 16th Union Pacific sent a letter to the meeting participants confirming the key points that were discussed. In the letter, the railroad asserts that its responsibilities and interests are limited to keeping the trains moving across the causeway. It contends that updating the Salt Balance Model would require a costly adaptive management approach for constructing the bridge. And it believes that the “best available current information” would suffice. It also argues that

since the proposed bridge is not necessary to facilitate train operations on the causeway, the only reason it is willing to construct it is to accommodate “other interests.”

In partial response to that meeting, the Corps authorized a Nationwide permit (NWP-14) on August 29, 2012. This permit was authorized before the Final Compensatory Mitigation and Monitoring Plan is approved so that Union Pacific can move forward with an emergency closure of the West culvert of the causeway because of imminent structural failure. To compensate for this closure, Union Pacific is required to construct a 180' long concrete pile-supported bridge on the west end of the existing causeway. It must also fulfill special conditions prescribed by the Corps to address appropriate monitoring tools and adaptive management measures to minimize impacts on the circulation of salts between the North and South Arms of Great Salt Lake.

Sadly, this Nationwide permit authorization directly contradicts the Corps' statement of discretionary authority that was expressed in its March 15, 2012 letter to Union Pacific.

So where are we now?

When Union Pacific submits its Plan to the Corps it is likely that the state and federal agencies will have another opportunity to provide input – not that it seems to matter very much. And it will be interesting to see how the easement issue is resolved. Will Forestry, Fire and State Lands hold the line? Throughout this entire ordeal Union Pacific has taken a condescending and myopic approach to making any concessions that could benefit the Lake even though it is responsible for the impacts to the Public Trust that exist today. I am reminded of the signature quote from the 1967 Paul Newman film *Cool Hand Luke* – “What we've got here is failure to communicate.” Let's hope in this case there's a better outcome.

In saline,

Lynn



What you can do:

More information about this issue, including correspondence obtained through a Freedom of Information Act request (FOIA) filed September 17, 2012 can be found at www.fogsl.org. Stay tuned!



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 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 refine the Project SLICE curriculum and expand education outreach into the Great Salt Lake community.

On the Cover

With our backs to the Sun by Keith Vaught, 2011

I bought my first digital camera and an annual state park pass in the spring of 2003. The unique beauty of the Great Salt Lake drew me out to Antelope Island State Park as a frequent hiker and photographer. In 2007, fellow photographer Charles Uibel suggested that I send some pictures in to KSL TV. For about one year, my pictures were frequently featured on the weather segment of the nightly news. Whenever possible, I like to tell people about Antelope Island and the Great Salt Lake. To me, the island is a place of solitude and peace and the Great Salt Lake is the perfect palette, reflecting the magnificent Wasatch Range and the ever-changing skies over northern Utah.

Contact Keith at keithvaught@msn.com



LAKESIDE LEARNING STRIKES AGAIN!



Jumping at "Crystal Beach" by Andrea Nelson



THE LAKE IS STILL MY BACKYARD

GROWING UP NEAR GREAT SALT LAKE

Growing up, the Great Salt Lake was my backyard. From birth to age twenty, I lived in a small company town on the former site of the Morton Salt Company-Saltair plant, located approximately six miles west of Salt Lake City on North Temple/Highway 40. (The current Morton Salt Company plant is located west of Grantsville.) My father, Myron Sutton, was a foreman at the salt plant, overseeing solar salt production up to the point of delivery to the plant for processing. The solar evaporation process began with pumping water from the Great Salt Lake into concentrating ponds, where it remained until the brine reached a concentration close to 26.8 on the Baume scale, when salt begins to precipitate out of the brine. The concentrated brine was then transferred to shallow garden ponds, which had a deep permanent salt floor, where the salt precipitated out of the brine. As the concentration of the brine approached 31 on the Baume scale—when other minerals would begin to precipitate out—the brine was pumped back into the lake. Using machinery adapted from the agricultural industry, workers harvested the salt crop from late summer through fall.

The use of farming language is not something I created. It is a vernacular that I learned from my father and that he likely learned from an earlier generation of salt farmers. It aptly described our relationship to the Great Salt Lake as the source of my family's livelihood. Like other farm families, we were attuned to the seasonal nature of our lives from the growth of the crop to its harvest. A change in the weather—a long wet spring, a drenching summer storm, or a cold spell—would impact the timing and the success of the year's salt production. My father maintained a weather station to monitor precipitation, temperature, wind, and evaporation rates.

My father was also an avid amateur naturalist. The Great Salt Lake was not only his workplace. It was his fascination. He spent many solitary hours inspecting the salt ponds, measuring the salt crop, sampling salinity. As for the lake itself, he told me, "I've been blown in, thrown in, and I've fallen in, but I've never gone in voluntarily." The southern edge of the former Morton Salt property abutted what was then the location of the Union Pacific and Southern Pacific railroad tracks, which had a canal between them. This location and the plant's location are now beneath the expanded tailings pond maintained by Kennecott/Rio Tinto. The brush lined canal, and the salt ponds themselves, were a thriving waterbird habitat. During the summer when I was out of school, my father took me with him to inspect the evaporation ponds or to reveal some special surprise—a blue heron in the canal, avocets, killdeer, and plovers visiting the ponds, or the rarer sight of phalaropes swirling in the water eating brine shrimp. He reminded me that avocet bills turned up, while curlew bills turned down. A mother bird doing the broken wing act would hobble in front of the jeep



Author, age 10, at Saltair Resort 1963,
photo courtesy of Karen Thompson

to lure us away from her nest hidden in the pebbles at the side of the road. I recall coming home from school on the bus and seeing a flock of white egrets in a field. I burst into the house to tell my father, who had been watching them all day. Every evening seagulls flew overhead in noisy groups returning to the lake on calm skies or fighting against storm winds. Pheasants lived in the fields, and ducks swam in the canal. I recall hunting wild asparagus by the lakeshore, waiting there in the cold for an evening primrose to open so my father could photograph it, and walking along with my father when he was examining boy scouts for their nature merit badges.

I have now lived in the city longer than I lived near the lake. I can barely estimate the location of my former home by drawing an imaginary line south from the KSL transmitter. Yet, I do not feel like a city person. I did not grow up in this compressed, noisy space. I inherited both my father's urge to seek solitude and my mother's easy friendliness. I seek out the mountain and lake views. It is a short walk from my home on the city's east bench to a place where I can see the lake as a thin, luminous line on the horizon. From a favorite spot on the Rowland Hall campus, I have an unobstructed view across the Salt Lake and Tooele Valleys, past Antelope Island, to the Stansbury Mountains and beyond. The new Natural History Museum of Utah frames a lake view in its Great Salt Lake exhibit. The lake is still my backyard.

Karen Thompson



SHARING THE LOAD

WORKING WITH THE PEOPLE WHO VALUE THIS AMAZINGLY UNIQUE RESOURCE

Over the Thanksgiving holiday in 2009 I took a trip to Capitol Reef National Park with my family and friends. While the group went hiking through Capitol Gorge in the crisp fall air I perched myself on top of a boulder to work on a proposal for the Great Salt Lake Comprehensive Management Plan Revision. Who would have known that sitting alone with my laptop in the desert would have led me to where I am today?

After working for a brief time as a planner in Summit County, I joined SWCA Environmental Consultants in 2005. It was at that time my work on the Great Salt Lake began. Working with the Legacy Nature Preserve Collaborative Design Team on the Legacy Nature Preserve's Adaptive Management Plan, I began to examine the intersection of the ecological, economic and political complexities of the lake. I was intrigued by the wondrous body of water. I was also interested in the regional planning and coordination that is necessitated by the expansive lake. So, when the opportunity to submit a proposal to the Department of Natural Resources Division of Forestry, Fire and State Lands (FFSL) for Great Salt Lake Comprehensive Management Plan Revision came about I was eager submit a proposal and serve as the SWCA's project manager. SWCA was awarded the project and we got to work in the spring of 2010.

As most of you know, the two year revision process for the Management Plan and Mineral Leasing Plan has been dynamic and a shift from the previous 2000 management plan revision. I have truly enjoyed working through the process with FSSL, the Planning Team and the Great Salt Lake stakeholders.

Working with FFSL on the Management Plan, I have also enjoyed learning about the responsibilities and challenges of managing the State's other sovereign land bodies. I appreciate the challenges that accompany multiple-use mandate required on many of our public lands in the West.

When the opportunity to join FFSL presented itself in spring of 2012, I had a hard time refusing. I felt like it was there that I could put my education (Masters of Public Administration with an emphasis in environmental management) to the best use. With my interest in planning for multiple land uses at a regional level and collaborative planning processes, I couldn't think of a better professional fit for me. I look forward to completing the Great Salt Lake Comprehensive Management Plan at FFSL rather than for FSSL. I also look forward to my continued work on the Great Salt Lake with the people who value the amazingly unique resource.

In hindsight, missing out on the trek through Capitol Reef with my family and friends was worth it as it set me on a new and exciting path of my own.

Laura Vernon, AICP
Sovereign Lands Planner/
Forest Legacy Coordinator
Division of Forestry, Fire
and State Lands



Laura Vernon



A SISTER SALINE SYSTEM

MASTER PLAN FOR OWENS LAKE IS A WORK IN PROGRESS

Owens Lake is wild . . . again.

Left for dead as a result of the diversion of nearly the entirety of its freshwater inflow, the lake has experienced a rebirth in which it has regained its place as an important avian resource for the Great Basin. Located some 180 miles south of its sister lake, Mono, Owens Lake covered 110 square miles of lakebed in 1913. The City of Los Angeles began diversion of Owens River water in that year and, by 1927, the former lake was a desiccated playa. Still, Owens Lake would not go away, or rather it would, and that was the problem. The surface soils of the dried lakebed are extremely friable and provided the material for enormous dust storms which rose up to ten thousand feet above the valley floor and extended for up to 75 miles from their source. Owens Lake became the largest single point source of pm 10 emissions in the United States.

In 1998, The City of Los Angeles was ordered to control the dust source and embarked on a program to accomplish this mandate. One of the techniques which was approved and implemented was to cover the lakebed with a flooding of freshwater in order to keep the surface moist and in place. The source of this water is the aqueduct carrying the Owens River to L.A. Water began to arrive at the lake in the year 2001 and, by 2002, the Lake had been named an Important

Bird Area by Audubon California. At this point, more than nearly 30 square miles have been flooded and a single day count in April, 2012 tallied more than 77,000 migratory and nesting birds.

The development of avian habitat has been, to use a Los Angeles Department of Water and Power (DWP) phrase, “incidental and unintended” to the dust project. The current lake landscape has emerged from a series of pulses which correspond to dust control orders made by the Great Basin Unified Air Pollution Control Board. There has not been a coherent vision of the lake and its possibilities. In 2008, concerned over the future of the wildlife habitat, Eastern Sierra Audubon, Audubon California and The Nature Conservancy convened a working group of regulatory agencies and other stakeholders to attempt to create a “Conservation Action Plan” for Owens. Two years of work revealed that concentrating solely on habitat did not adequately respond to range of issues presented at the lake. These included a need to develop innovate means of controlling dust which would allow DWP to reduce the amount of water, potentially up to 95,000 acre feet per year, which is removed from the aqueduct.

In March 2010, more than seventy people, representing upwards of forty stakeholders gathered at a meeting facilitated by the Center for Collaborative Policy. They com-



Owens Lake Planning Committee field trip by Michael Prather



mitted to the development of a Master Plan for the lake, created a planning committee for that purpose, agreed to engage agency heads in California's capital to participate in an agency forum which would help guide the process and assure commitment from crucial regulators and began to assemble information, formulate objectives and alternatives and write the document.

The Master Plan, which is undergoing an initial draft review, comment and revision, addresses these major issues: Public Access, Education and Research, Economic Activities (such as grazing and mining), Potential Renewable Energy Generation, Innovations in Dust Control, Water Conservation, Use of Groundwater as a dust control resource and Wildlife Habitat. Of particular interest to Eastern Sierra Audubon, is the habitat section which contains a "Habitat Suitability Model" based upon six species groups or guilds which are grouped according to their shared habitat requirements. These characteristics were then modeled to create a numerical rating scale which was used to inventory and map the habitat resources located on the entire historic Owens Lakebed. Each location received a ranking which represents its habitat richness. These rankings were then multiplied by the area in which the habitat is found, yielding a results which is termed "value acres". This process was done for each guild and together, they form the Owens Lake Habitat Suitability Model.

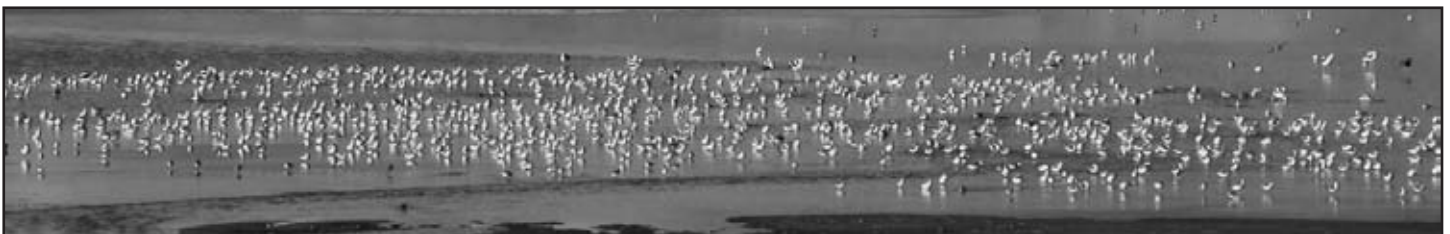
The most striking feature of Owens Lake Habitat is its industrial quality; the entire system is heavily managed and manipulated. There is no natural inflow, water is moved from place to place via an elaborate system beginning with 5' diameter intake pipes at the aqueduct and ending in more than 4000 miles of ¼ inch drip tubing studded with emitters. For more than a decade, this infrastructure was managed to achieve dust control objectives. A fundamental principle of the Master Plan is that the system will now also be consciously managed for habitat maintenance and improvement. In order to reach the other concurrent goals of the plan to control dust and achieve a significant reduction of the use of fresh water for that purpose, the landscape will have to continue to be manipulated and modified. The Master Plan commits to "no net loss" of existing wildlife resources in the future. However, the location and config-

uration of these resources can be subject to geographical change as the other goals are achieved. As the lakebed is modified, the Habitat Suitability Model will be employed to direct the enhancement of existing resources or development of new ones to assure that the overall number of value acres is not reduced.

Anyone who has been involved in a process of this type knows that the low hanging fruit is plucked first and those devilish details are reserved for the end. We are now at the end of the process and the discussions have become a bit more difficult and contentious. Still, no one has left the table. In fact, stakeholders have been added throughout the two and a half years of conversation. Difficult issues remain to be resolved in terms of potential groundwater use and mechanisms to expedite the approval of new, less water intensives methods of dust control. Also of concern are the mechanisms by which the plan will be implemented and its provisions enforced. This will require a process which is transparent, inclusive and in which regulatory agencies will have to figure out how to share or jointly exercise their authority so that the parties will have a clear understanding of what will unfold on the lakebed for the next twenty or more years.

It is hoped that the Master Plan will emerge for review, comment, adoption and environmental review in early 2013. It is testimony to how difficult it is to work through the questions posed by the existence of saline lakes in the arid west. The collaborators in this process are historically adversaries; indeed legal and administrative contests continue between individual planning committee members even as plan development continues. Those parties are still working together to find a mutually agreeable vision for the lake. The birds know nothing of these challenges. They continue to find haven and sustenance at Owens Lake in greater numbers each year. It is our mutual obligation to assure that they can continue to do so.

Peter Pumphrey
President, Eastern Sierra Audubon



Flock of Avocets by Michael Prather



WORKING UPSTREAM IN THE GREAT SALT LAKE WATERSHED

RESTORING THE OGDEN RIVER



At work on the Ogden River, photo courtesy of Justin Anderson

One of the most precious gifts bestowed on humankind is clean water. It is life sustaining, soothing, quenching, peaceful, powerful, and beautiful. Humans are drawn towards it, as if by an unseen hypnotic mesmerizing force. It can speak to our inner being, quench our soul and unfortunately at times cry for help.

The Ogden River through the center of town has been crying on deaf ears for many years, its quest for cleanliness has been unanswered and had become nothing more than a nuisance. Something needed to be done, a restoration of its former greatness!

Happen it did and the great news is that the Ogden River restoration now connects people with nature and improves the quality of life by creating and enhancing community green space, much like the Great Salt Lake.

For over 20 years, community master plans have identified the need to clean up this reach of the Ogden River. The restoration created a healthy, robust stream in 1.1 miles of the river by removing decades of industrial waste, thousands of tons of concrete levees, old cars and mountains of tires and litter. The restoration reconnected the river to a restored

flood plain and provided new wildlife and migratory bird habitat throughout a 17-acre riparian corridor.

Incredibly, the restoration also anticipates buffering storm water discharge from future development by installing 9 “wetland basins”; filtering storm water before it flows into the river. At low flows, a defined low flow channel will provide deeper water for aquatic life, while at high flows, the widened floodplain will provide overbank flooding that no longer threatens structures on private property.

To bring this project to fruition Ogden City coordinated a strong stakeholder process that raised awareness of the potential to successfully complete the project among agency staff and likely funders. The City worked with private property owners to secure easements. Over \$5.6 million was secured from a variety of enthusiastic public and private sources and the restoration became a reality, all the while generating public attention and excitement about the numerous benefits of this incredible natural resource in the heart of Ogden City and Weber County.

The Ogden River restoration broke ground in January 2010 and reached completion during the summer 2012. The proj-



ect finished with heavy construction in the riverbed and along the banks in early spring of 2012. In June, the Ogden River and Ogden City were awarded the 2012 Calvin K.Sudweeks Award by the Utah Water Quality Board for outstanding contributions in water quality efforts.

While to some, this may seem like a simple clean up and beautification project, it is anything but simple. Restoring habitat and recreational opportunities in a river this size is a major engineering, excavation and building feat.

It included improving the flood capacity of the channel by remapping the floodway and the floodplain in conjunction with FEMA, channel restoration and bank reconstruction. The construction included building storm water return areas, and pedestrian paths, which created needed space for wildlife and river enthusiasts alike. To accomplish this, thousands and thousands of tons of concrete levees and litter were removed from the bed and banks of the river.

River construction also included removing invasive species, building storm water return areas that incorporate wetland vegetation, installing board walks and planting hundreds of trees plus thousands of shrubs, and grasses. All construction activities provided for full implementation of appropriate storm water pollution prevention control and Best Management Practices for in-stream construction.

The Ogden River is on its way to being restored to its former greatness and its cries for help have been heard and in a collaborative effort, and the peace, power and beauty have been restored all the while its new found health and cleanliness will be felt immediately in Ogden and Weber County, as well as all the way downstream. This project is many things, but most of all it is a symbol of “stewardship” a symbol of what can be done by working together for both the present and the future.

Justin Anderson, P.E. Ogden City Engineer



Ogden River restoration, photo courtesy of Justin Anderson



GREAT SALT LAKE EDUCATION

SALTY EXUBERANCE DESCRIBES 2012 LAKESIDE LEARNING FIELD TRIPS

We are walking single file, slowly, quietly, through the Great Salt Lake playa at the entrance of Antelope Island State Park. Fifteen fourth grade students and I are observing a pair of killdeer, who are understandably annoyed about our presence. Suddenly, one student whispers, "Look!" All heads turn in the opposite direction to see a small fluff of feathers standing on two toothpicks. "Baby killdeer!" The excitement is tangible as the students discover one, two, three little killdeer chicks. The students observe the killdeer family, and over the course of the trip, I hear the words "baby killdeer" more than a few times.

FRIENDS' Spring 2012 Lakeside Learning field trip season was a huge success! And Fall was even better! Thanks to a grant from the Union Pacific Foundation and support from our generous members, we were able to increase the number of students who could participate (900 spring + 960 fall) and pick up some new schools as well. But the demand continues to grow And for good reason.

Each trip provides a unique adventure at Great Salt Lake. Last May, we saw over 30 species of birds with special guests making appearances every day. Students had first hand experiences with brine shrimp, brine flies, tiger beetles, gopher snakes, voles, lizards, algae, mule deer, and bison just to name a few. This up close and personal encounter helps students expand their understanding of our watershed, the

water cycle and rock cycle, Lake Bonneville, wetlands and saline ecosystems. And we always have tons of fun!

Valerie Garcia, a fourth-grade teacher from Kearns-St. Ann School, who joined us in May said, "My students loved wading in the water because it allowed them the opportunity to interact with the lake." Interacting with Great Salt Lake and its unique ecosystem is exactly the aim of the Lakeside Learning program.

We couldn't do this without our team of dedicated volunteers, along with our first Americorps Intern - Kimberly Taylor. Kimberly is from Benjamin, Utah and is currently pursuing undergraduate studies in Health Science at BYU-Idaho. She is an avid birder with lots of energy and passion for the Lake. It's such a great salty team to be working with.

So what about you? Are you an interested 4th grade teacher? Would you like to volunteer or help fund more schools who are waiting to participate?

After all - this is where developing Great Salt Lake awareness really begins - right?

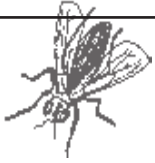
Please contact me at pelican@fogsl.org

Andrea Nelson, Education and Outreach Director



4th grade Lakeside Learning students, by Jeff Allred, Deseret News





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.



What Does a Cormorant Condo Have to do With Reducing Methylmercury in the Water Column?

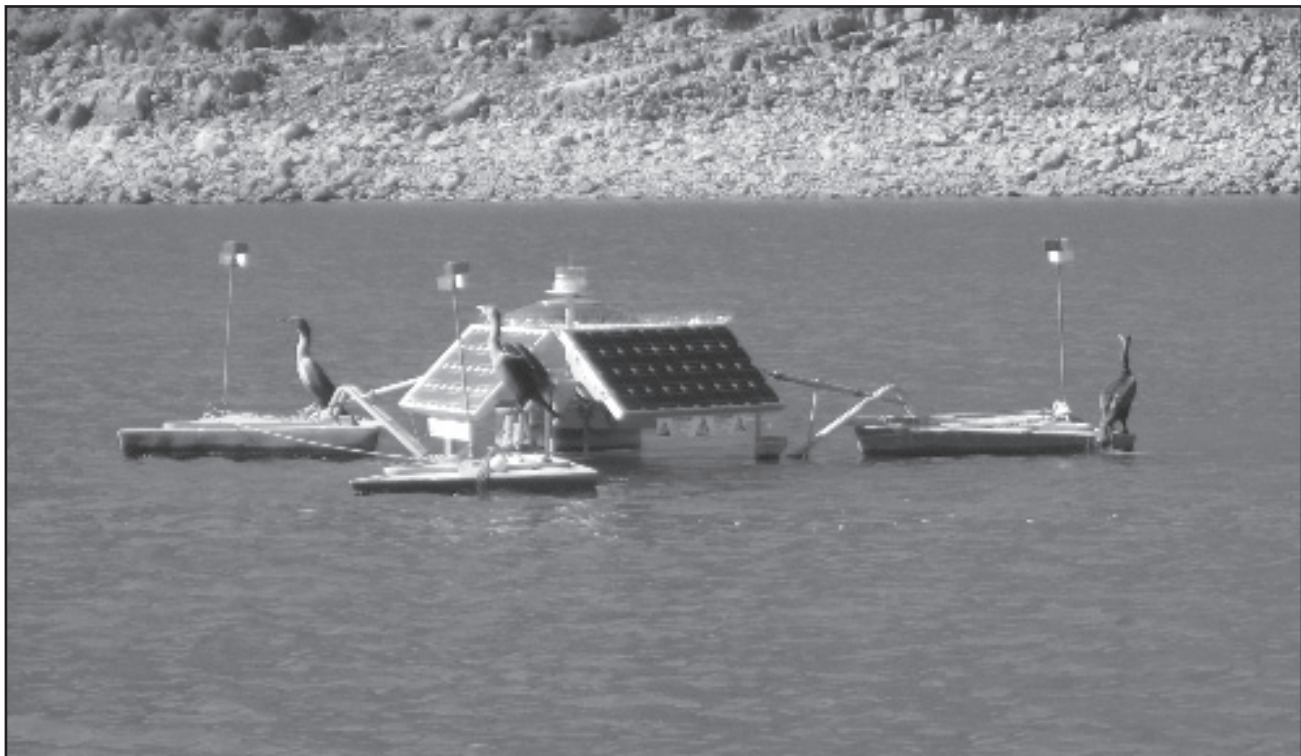
On a recent site visit to Newcastle Reservoir in southwestern Utah, we were surprised to see that three cormorants had taken up residence on the three pontoons used to support a recently installed solar pump. We are betting that these three birds are feeling pretty darn lucky to reside in this condo complex. After all, it has a nice lakeside diving platform to fish from and is well protected from any land-based predators. Upon closer inspection of these bird condos, we found evidence of recent fishing success, with some half-digested fish parts.

Aside from enhancing cormorant habitat, what is this solar pump doing on Newcastle Reservoir? The solar pump is part of a 3-year mercury remediation and demonstration project between the state of Utah (Departments of Natural Resources and Environmental Quality) and the U.S. Geological Survey. Newcastle Reservoir, along with three other reservoirs in southwestern Utah, currently have fish consumption advisories for people because of elevated mercury levels in a few fish species. The purpose of the solar pump is

to promote vertical mixing in the reservoir, particularly during the summer months when the bottom water loses much of its dissolved oxygen. Under these low dissolved-oxygen conditions, the inorganic mercury in the reservoir can be readily transformed into methylmercury, which is the form of mercury that can be easily bioaccumulated and biomagnified in the fish.

As shown in the diagram, the solar pump takes water from just above the bottom of the reservoir and transports it to the reservoir surface. In theory, the displaced bottom water (with low dissolved oxygen) is then replaced with water containing higher amounts of dissolved oxygen. A simple analogy to this process is having a stack of books and then removing the bottom book, which is then replaced with the book immediately above it.

The plentiful sunshine in southern Utah is used to move about 1,500 gallons per minute of water from the bottom of the reservoir to the surface. Onboard batteries are charged



Cormorant Condo by David Naftz, USGS



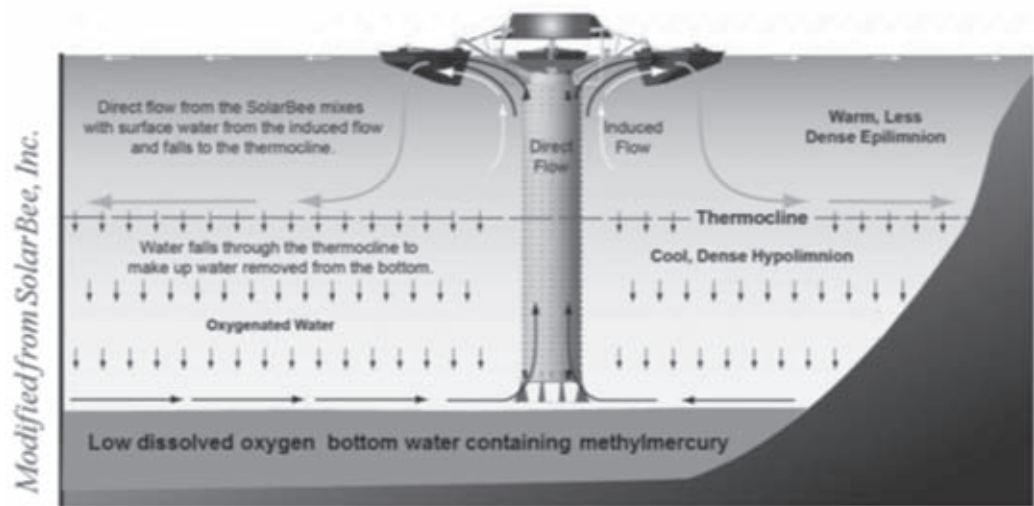
during the daylight hours to ensure that the pump operates 24 hours a day. While the sunlight powers the pump, it can also convert the methylmercury being pumped to the surface of the reservoir into less toxic forms, via a process called photodegradation. The photodegradation of methylmercury was recently confirmed during another study along the perimeter wetlands of Great Salt Lake (Naftz and others, 2011). This study was conducted by the state of Utah and USGS, as well.

The solar pump on Newcastle Reservoir has now been operating for 12 months and the preliminary data indicate measurable reductions in the methylmercury concentrations in the water column compared to pre-pumping data. While these initial data are promising, additional confirming data, in the form of bottom sediment, algae, zooplankton, fish tissue, and more water data are needed to assess the success of this remediation project. These post-installation samples have been collected and are in the process of being analyzed by the USGS National Mercury Research Laboratory in Wisconsin.

On a final note about the cormorant condo-the solar-powered warning light on top of the pumping structure gives off a warm, romantic glow after the sun sets. Perhaps just what a couple of love birds would like during next year's breeding season....

David Naftz & Cory Angerth, USGS, Salt Lake City, Utah
 Craig Walker, UDNR/DWR, Salt Lake City, Utah
 John Whitehead, UDEQ/DWQ, Salt Lake City, Utah

Editor's note: While the mercury issues in Great Salt Lake may be too large to treat with this technology, the state of Utah and USGS are currently investigating the flow dynamics of a bathymetric restriction in Gilbert Bay. This bathymetric restriction, commonly referred to as the "deep brine layer spillway," concentrates the methylmercury-laden bottom water into a 2-kilometer wide spillway. Depending on the flow dynamics of this area, it could be amenable to the same remediation techniques currently being demonstrated at Newcastle Reservoir.



Reference
 Naftz, D.L., Cederberg, J.R., Krabbenhoft, D.P., Beisner, K.R., Whitehead, J., and Gardberg, J., 2011, Diurnal trends in methylmercury concentration in a wetland adjacent to Great Salt Lake, Utah, USA: *Chemical Geology*, vol. 283, p. 78-86.

Lake Fact:
 How many bays of GSL are designated Important Bird Areas (IBA's) by National Audubon?

Answer: 5: Gunnison Bay, Gilbert



DISCOVERING OUR LAKE

SOUTH SHORE EXCURSION FILLED WITH GEOLOGIC STORIES AND RICH HABITAT



Great Salt Lake Issues Forum field trip group at Kennecott's Inland Sea Shorebird Reserve, May 2012, photo courtesy of Eric McCulley

As a part of the 2012 GSL Issues Forum, I headed up a post conference field trip to the South Shore of Great Salt Lake. Joined by colleagues Ann Neville, manager of Kennecott's Inland Sea Shorebird Reserve (Reserve), Dr. Genevieve Atwood, U of U Dept. of Geography and Geophysics, and Steve Earley of the Ambassador Duck Club, the purpose of the outing was to explore the unique shorelines and wetlands there, learn about the typical plants and animals of this area, and see what the Ambassador Duck Club is doing to control phragmites,

On a beautiful clear day, we meet at the Reserve north of I-80, near the old site of Saltair and car-pooled past an interesting variety of shorebirds using the shallow water ponds along Lee Creek on its way to the Great Salt Lake's rather remote shoreline. At first glance a typical dry saline playa can look rather desolate and lifeless. But upon closer scru-

tiny of the landscape, the rich character of this special part of the Lake's ecosystem begins to emerge.

The famous Snowy Plover is known to use these shoreline playas for nesting where they can feed on numerous brine flies and other insects, but we did not see any on this day. They were farther out west along the remote, bare shoreline. Soon we noted the orb weaver spider webs in the vegetation bordering the playa and learned how these spiders may be accumulating mercury from their brine fly food. Although more study is needed they still provide a tasty food source for the birds. After walking onto the flat, salty playa, we were amused to find a number of Pronghorn tracks coming and going among the small rove beetle casting mounds. Pronghorn feed on grasses, small shrubs and flowers and often times blend in with the muted tones of the landscape. We chased some fast moving Tiger Beetles in front of us. These



interesting insects also feast on the abundant brine flies, pushed inland from the shoreline by the on-shore winds. Some of us marveled at the well preserved flotsam and jetsam including many rubber tires. Genevieve Atwood our lake geology expert explained why this woody flotsam is important in marking the high-water stage of the lake and how it should be left in place rather than cleaned up. Dr. Atwood's 2006 dissertation - Shoreline Superelevation: Evidence of Coastal Processes of Great Salt Lake, Utah, is a handy reference for understanding the difference between still-water lake elevation and shoreline expressions.

Leaving the flat playa, we soon arrived at the old, high-water spit which separates the playa from Great Salt Lake's oscillating shore. Over many years, wind and waves have created this interesting topographic feature above the historic 4212' high water of Great Salt Lake. This elevated barrier spit is composed of many broken pieces of white, bio-herm limestone, or calcium carbonate, created by photosynthetic algae or cyanobacteria growing in the shallow, transparent water of Great Salt Lake. Some people who love rocks took home pieces of this ancient fossil deposit as a souvenir of our excursion. These old beaches also contain windblown deposits of the unique oolitic sand, spheres of carbonates chemically deposited around brine shrimp fecal pellets on the floor of the Lake. We spent some time observing and appreciating the ecological zonation of the vegetation from the extremely salt-tolerant pickleweed (*Salicornia*) as the lowest shoreline level at the playa shoreline, to the slightly elevated saltgrass zone and finally the rabbitbrush, sagebrush and greasewood found on the rain and snow-leached, spit or shingle beach deposits. We saw the official state grass, Indian Ricegrass, as well as the beautiful Utah locoweed in flower here.

These dune-like deposits are home to a variety of small rodents like nocturnal kangaroo rats, which burrow in the more stabilized soil. Rodent predators such as hawks, owls, coyotes and snakes and we did see almost all of these animals or their tracks. We did see a large snake, tracks of coyotes and a few marsh hawks on the Reserve. On our return to the cars we stopped at a dense patch of salt grass to observe the network of meadow vole tunnels created under the cover of the grass. Almost every square yard has several such tunnels which you can follow along with your finger when the dense grass is parted. These abundant voles eat both insects and vegetation found in their protective grassy tunnels, and in turn are food for the same predators mentioned above.

A large buck Pronghorn, posing on a dirt pile for photos,

bid us all good bye as our car pool left the Reserve. We stopped briefly along the frontage road along the south shore of Great Salt Lake to see the recently fenced Lee Creek wildlife area, managed by the National Audubon Society to protect shoreland wildlife and now accessible to the public for education. Native oolitic dune vegetation with native grasses and wildflowers is re-establishing nicely here after a long period of off-road vehicle disturbance.

After a short lunch and drinks at the Great Salt Lake Marina, provided by our great staff of volunteers, we briefly visited historic Black Rock to find Great Salt Lake's waves gently lapping at the cement floor of the old swimming pool remnant located at the west base of this huge, detached dolomite piece of the Oquirrh Range.

Lead by Steve Earley, we then drove through the International Center to see the Salt Lake Airport mitigation wetland which is becoming progressively dominated by phragmites or common reed. He showed us the success which the Ambassador Duck Club has had on controlling this noxious invader which is displacing more valuable wetland vegetation all around the shorelines of Great Salt Lake. Many photos were taken of this and the controversial Bailey's Lake area of Salt Lake City's Northwest Quadrant. All these issues were appropriate for this successful post conference field trip which examined the "Changing Conditions and the Future of Saline Lakes"

Dr. Ty Harrison,
Emeritus Professor of Biology at Westminster College



Great Basin Gopher Snake,
photo courtesy of Eric McCulley





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