

FRIENDS of *Great Salt Lake*

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Pelicans by Gary Crandall 2009

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

GREAT SALT LAKE AS A PUBLIC TRUST RESOURCE - IF WE CONTINUE TO DRAW DOWN THE PRINCIPAL, THE ENDOWMENT WILL DISAPPEAR

"It is a desert of water in a desert of salt and mud and rock, one of the most desolate and desolately beautiful of regions. Its sunsets, seen across water that reflects like polished metal, are incredible. Its colors are of staring, chemical purity. The senses are rubbed raw by its moonlike horizons, its mirages, its parching air, its moody and changeful atmosphere."

- Wallace Stegner Dead Heart of the West

Conventional wisdom tells us that Great Salt Lake is an acquired taste. Like most saline systems around the world, it's complicated. Rough-hewn landscapes, peculiar complexity, and unpredictable temperament reinforce the popular notion that because it's too problematic and difficult, it's probably best to simply keep it at arms length and under control. As a consequence, preserving and protecting this hemispherically important ecosystem and its global sister lakes is a hard sell when you attempt to draw comparisons with other natural jewels like Yellowstone, the Tetons or Grand Canyon.

Because those particular ecosystems have such a tremendous level of adoration and popular appeal, they reap the benefits of an unquestioned expectation by the public for responsible stewardship and management practices that support the perpetuity of these systems for future generations. That's an enviable position to be in, especially as pressures from population and resource development continue to mount.

Although there is reason to suggest that some degree of awakening about the protection of Great Salt Lake is occurring, the rate at which any real substantive measures are being implemented to forestall a growing trend toward industrialization of the system, is kind of like watching cement dry – it's barely discernible.

Currently, in the overall scheme of things, the preservation and protection of Great Salt Lake is essentially a competing beneficial use with development and discharges. Unless we are willing to recalibrate what constitutes a measure of success in the way the system is managed, we may well find ourselves regretting that we did too little too late for our public trust resource.

If you keep drawing down the principal, eventually the endowment disappears. That's why it's imperative that the foundation for sound lake management should come from what constitutes good Great Salt Lake health (the principal). Establish indicators of ecological health for the lake and measurable goals for each indicator. This will ensure that the principal remains intact and in fact grows. With that growth, all users benefit.

So when HB 343 – Great Salt Lake Advisory Council – sponsored by Rep. Ben Ferry in the 2010 Utah Legislative Session was signed into law, it was disappointing. Disappointing because it did not reflect the accord that Governor Huntsman's Great Salt Lake Advisory Council recommended to the governor in June 2009. After nine months of careful evaluation and deliberation of existing lake management practices, Huntsman's Council determined that a GSL Commission that would work to keep the ecological integrity of the lake as a cornerstone of decision-making was necessary. To achieve this, the lake needed a legislative champion to advance the "Recommendations on the Establishment of A Great Salt Lake Commission". Unfortunately, the response to that call was tepid and halfhearted. It was a missed opportunity that the lake can't afford. Instead of embracing the recommendations as proposed - working to keep the principal intact – HB 343 is an indication that we are still in denial about our overall commitment to Great Salt Lake's sustainability. Some say it's a start, but at this point in time, we need more than that.

In conjunction with this "start" will be the public scoping process for the revision of the Great Salt Lake Comprehensive Management Plan and Mineral Lease Plan. Sometime this spring, a series of these meetings will be scheduled in the 5 counties that surround Great



Salt Lake. Written comments will be collected from a wide range of resources and, circa 2012, both revised plans will emerge.

Ideally, the Great Salt Lake Advisory Council will be organized, have bylaws in place and be prepared to assist in this important endeavor. Had a Commission been in place, one of its specific tasks would have been to participate in the review and/or development of these plans, and identify gaps and priorities necessary to achieve the goals of Great Salt Lake health. Such collaboration would foster working documents that help implement strategies for sustainable use and protection of Great Salt Lake and its ecosystem.

As a result, what we would expect to see in these plans is a clearly stated rationale of how the Division of Forestry, Fire and State Lands will use them to fulfill its sovereign lands management responsibilities, and clarify how it will act to protect public trust resources of the lake over all other uses. In doing so, this improved functionality of the plans would serve to guide the Division in determining which land use/lake use proposals are worthy of consideration and why.

Targets and reference conditions for the lake that underscore responsible public trust management practices would be included. The plans would address capacity limits for the system. Not far behind would be clearly developed assessment methodologies for monitoring impacts and appropriate responses to these impacts.

The plans would also acknowledge the passive and non-use economic values of the lake to offset the perpetual tug of war between development and preservation. The beauty of all of this would be that we would have a far greater understanding of what constitutes success than we do now. And what that success would look like would be a strong and growing principal.

In the meantime, there's work to do.

The threats that would come from the proposed expansion of Great Salt Lake Minerals are many and have the strong potential to alter the basic ecological processes of the system. GSL Mineral's application for a consumptive use water right of 353,000 acre/feet/annually (more than the volume of water that comes from snow-pack in the Wasatch to recharge the entire Salt Lake

Valley) is pending until after the revisions of the two management plans.

Jordan Valley Water Conservancy District is applying for a UPDES permit to discharge selenium, mercury and other pollutants into Gilbert Bay as a part of contaminated ground water clean up.

Great Salt Lake still needs a water right to ensure the system has its own water. 🌵

"Wholly apart from the folklore, the lake has an obstinate and fascinating identity of its own. It has its own history, a startling history. But also in three centuries it has been a part of the written history of men. Spaniards and mountain men sought it out: the Mormons fled to it for a promised land. Its salt waters and the blazing deserts of its making, lying athwart the American westering, forced trails and roads, and railroads north and south around it. A barrier sea, fascinating and strange, implacable and wayward!"

- Dale L. Morgan *The Mountain Sea*

In saline,
Lynn de Freitas

What you can do – Visit www.fogsl.org - to find out.

FRIENDS ORGANIZATIONAL STATEMENT

FRIENDS of Great Salt Lake was 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 GSL awareness in the community.

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

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

In 2000, Project SLICE, a 4th grade curriculum using Great Salt Lake as a system of study was initiated. It consists of 7 units of study, a Speakers Network, Teacher Training Workshop, and Lakeside Learning Field Trips. Currently work is being done to expand the curriculum into other grades.

Emily Gaines, Education and Outreach Director is working to refine the Project SLICE curriculum and expand education outreach into the Great Salt Lake community.

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

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

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

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

On the Cover

Pelicans Gary Crandall 2009

"A squadron of pelicans but feel a lift of breeze and they sense at once that here is a landing in the geologic past, a refuge from the most relentless of aggressors, the future. With queer antediluvian grunts they set wing. Descending in majestic spirals to the welcoming waste of a bygone age." - Aldo Leopold

At Farmington Bay, American White Pelicans usually arrive in late winter or early spring – sometimes before winter ice has completely melted. There they can sometimes be seen at close range while foraging for fish.

Contact Gary Crandall at 801-296-9393 and see more images at www.wildspiritsparkcity.com





Pre-History by Charles Uibel

2010 GREAT SALT LAKE ISSUES FORUM

KEEPING THE LAKE WET: A WATER APPROPRIATION FOR GREAT SALT LAKE

April 28, 29 & 30th - University of Utah

Visit www.fogsl.org for more information and online registration

Projected population growth, increased water diversions, water quality, predicted trends in climate change, and increased industrialization on the lake are compelling reasons to consider a “conservation pool” for Great Salt Lake. It’s time to start asking the hard questions about how much water is needed to maintain the ecological integrity of the lake and sustain the delivery of ecosystem services. The goal of the 2010 Great Salt Lake Issues Forum is to begin a process. A process that focused our attention on the future of the lake and how water fits into that picture.

**Keynote Speaker – Lance Gunderson, Emory University,
“Nurturing Resilience – Lessons from Managing Complex Ecosystems**

Many thanks to our sponsors

The Community Foundation of Utah
Great Salt Lake Brine Shrimp Cooperative, Inc.
Great Salt Lake Institute/Westminster College
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WILLARD SPUR

A WILD AND UNREGULATED MARSH



Avocets by Bridget Olson

The best view of the Willard Spur is from atop the cliffs that rise above Highway 89. They are sheer and craggy and to stand near the edge is to have a sense of flight above the vast map of the Great Salt Lake Valley beneath you. The towns of Perry and Willard appear in miniature and I am always inclined to think that they are inhabited by the Whos of Whoville. The I-15 corridor, almost silent from this distance, carries an endless stream of anonymous traffic. Beyond, the dikes of Willard bay extend like lines of a diagram, and then the lake reflecting the sky and the mountains.

A brace of wind can deliver the scent of brine into the mountains of Willard Basin and on it, from time to time, the slow tan mosquitoes of the salt marshes. Eagles, too, ride these winds ascending from the wetlands below, where they have hunted and scavenged, to a mountain refuge. At dawn they depart, often by the hundreds, barely flapping as they glide out to the shoreline and delta of the Bear River Bay. In this topography it is possible for an eagle to roost in a fir tree above a covey of blue grouse and, a few minutes later, strike and kill a pintail, or scavenge a stranded carp on the valley floor 3000 feet below.

The bay is most famous for the Bear River Migratory

Bird Refuge, where the lake's largest tributary ends. This stream of fresh water combined with the drouth and flood of the lake create the most biologically diverse and productive wetlands of the lake. The refuge, for all of its wildlife and productivity, is a highly engineered irrigation system controlled by dikes, canals, diversions, and head gates.

The Willard Spur, a little known shallow between Willard Bay and the southern units of the refuge, is a wild and unregulated marsh, sometimes mud flat, other times a field of alkaline bull rush, and, at other extremes, open water. All of the major deltas of the lake are mostly regulated by flood irrigation: Farmington Bay, Ogden Bay, and Bear River.

The Willard Spur is among the few expanses where the cycles of flood and drought are unmitigated and the wild communities respond in sequence. A coordinate on this shore may host a flock of redheads foraging in a bay of bulrush in November, and in May of another year that same coordinate might be the perfect nesting site for a colony of avocets who like to lay their eggs just a little bit above the water level on the valley floor.

For a closer look at the spur you can go down the northern dike of the Willard Bay impoundment, perhaps with the half considered intent to catch a walleye for dinner, but instead walk west until you can't any more, and there you are, on the edge of the spur. On the edge of someplace that, for all its proximity to engineering and management, is wild and unmaintained, maintaining on its own what in other places we have had to go out of our way to create. 🦋

Rob Wilson is a teacher and biologist living in Salt Lake City.

WETLANDS IN THE SOUTH SHORE AREA OF GREAT SALT LAKE

AN EVALUATION OF THREATS POSED BY GROUND-WATER DEVELOPMENT AND DROUGHT

ABSTRACT

The south shore area of Great Salt Lake, which contains the Farmington Bay wetlands in Davis County and wetlands along the margins of Great Salt Lake in Salt Lake and Tooele Counties, is in a formerly rural area that is now largely urban and continues to undergo population growth. Most of the development in the area uses municipal water sources, principally wells, and some agricultural wells continue to be used for irrigation and stock watering. The population growth and concomitant increase in municipal ground-water pumping could significantly decrease the amount of ground water discharged from the principal aquifer system (where most wells are completed) to the shallow unconfined aquifer system, which is the source of water for the south shore wetlands.

Shallow unconfined aquifers overlie confining beds above the principal aquifer system in the south shore area, and provide water to springs and about 150,000 acres of wetlands in ground-water discharge areas. Decreased recharge to the shallow unconfined aquifers from the principal aquifer systems due to increased ground-water pumping could reduce water supply to these springs and wetlands. Also, water supply to the springs and wetlands is affected by climatic conditions and Great Salt Lake levels. Drought conditions during 1999-2004 reduced the amount of recharge to ground-water aquifers across the state, negatively impacting wetlands. In 2005, the elevation of Great Salt Lake declined to near its historic low stand reached in 1963, allowing some parts of the south shore wetlands to dewater.

To evaluate the potential impacts of drought and increased development on Great Salt Lake's south shore wetlands, Utah Geological Survey researchers used existing data to estimate water budgets for the wetlands area as part of three separate studies. Water-budget changes for the wetland areas were evaluated using existing regional, three-dimensional, steady-state and transient MODFLOW models for Farmington Bay, Salt Lake Valley, and Tooele Valley. The modeling suggests that subsurface inflow into the wetland areas in the Farmington Bay area and northern Salt Lake Valley would be most affected by decreased subsurface inflow

due to long-term (20-year) drought conditions, but subsurface inflow would also decrease due to increased municipal and industrial well withdrawals over the same time period. In northern Tooele Valley, the modeling suggests that subsurface inflow into the wetland areas would be most affected by increased ground-water withdrawals, and discharge from springs feeding the wetlands would be most affected by further drought conditions. Therefore, the worst-case scenario for the wetlands in all three areas would be a combination of both increased ground-water withdrawals and further drought. If the goal is to meet the U.S. Environmental Protection Agency's goal of no net loss of wetlands (in terms of both acreage and function), the wetlands areas should be managed to maintain their current water budgets, which are estimated to include at least 16,000 acre-feet per year of recharge as subsurface inflow in the Farmington Bay area, 52,420 acre-feet per year in northern Salt Lake Valley, and 98,000 acre-feet per year in northern Tooele Valley.

These studies indicate that either the acreage or functionality of wetlands in the south shore area of Great Salt Lake could potentially be reduced. The threats are from drought and increased development due to population growth, which could dramatically affect the amount of water the wetland areas receive. To reduce the potential for wetlands degradation, restrictions could be placed on development, such as allowing development only in upland environments or placing a non-development buffer around the wetland areas. Wastewater from sewers could, where possible, be reused or discharged upgradient of the wetlands. Enactment of water conservation practices would also be beneficial for the wetland environments. 🐼

Mike Lowe
Utah Geological Survey

LINKING COMMUNITIES AND EDUCATORS

USING BIRDS TO CONNECT HEMISPHERIC NEIGHBORS



Student Assembly at Fray Junipero Serra Elementary in San Blas by E. Gaines

Environmental education involves not only teaching about the environment, but also instilling in our students an interest in stewardship and an ability to make informed environmental decisions. A large part of this environmental literacy is developed when students begin to understand how ecosystems interconnect on a global scale. For instance, we know that the Great Salt Lake Ecosystem is interconnected with the Chaplin and Quill Lakes of Canada and Marismas Nacionales of Mexico as it forms a critical link in the shorebird migration route across these three sites.

In order to preserve and protect critical habitats in Canada, Utah, and Mexico, we must link these three countries through international collaboration and stewardship. The Linking Communities, Wetlands & Migratory Birds Initiative ("Linking"), which began in 1998, established partnerships between Saskatchewan (Canada), Utah, and Nayarit (Mexico). Among the many objectives of Linking was the goal to enhance environmental education and collaboration across the three sites. Through the efforts of Linking, we hope to build environmental literacy among students of all ages and nationalities.

In January, formal and informal environmental educators from Saskatchewan and Utah travelled to San Blas, Mexico to meet with Mexican partner teachers. Utah's exchange participants were coordinated by Education Committee Chair Yae Bryner and included FRIENDS of Great Salt Lake (Emily Gaines), Great Salt Lake Institute (Jaimi Butler), North Davis Preparatory Academy (Edna Moss), and South Clearfield Elementary (Spencer Rumsey).

During the week-long exchange program coordinated by Abel Castillo and Lupita Velazquez, the Utahn and Canadian educators learned through lectures, classroom visits, and student presentations of the many environmental education initiatives taking place in participating Mexican schools. We were inspired by the student assembly at the Fray Junipero Serra Elementary School, where there were beautiful bird posters and costumes; by the Monarch butterfly project at Francisco I. Madero Elementary School, where students raise and release caterpillars; by the Mangrove re-establishment project at the Telesecundaria Doroteo Arango, where middle-school students cultivate and transplant Mangroves in an effort



Mexican, Canadian, and Utah Educators After Workshop at Paraiso Miramar by E. Gaines

to restore native vegetation; and by the independent efforts of veterinarian Susana Casas, who rehabilitates injured animals and uses them to educate students about coexisting with native wildlife. It became apparent to all visitors that not only is there a universal need for effective environmental education, but that magical things can happen when students develop a sense of stewardship.

Thanks to Linking, we will continue to work with these special educators for years to come. We have established a letter exchange for the elementary, middle, and high school students of Mexican, Canadian, and Utah partners. We hope these letters will not only foster international environmental stewardship and literacy, but will also enhance cross-cultural understanding. We have also initiated a tri-site art project. In May, Utah will be the lucky recipient of student artwork from Canada and Mexico; the art will be displayed together with the work of Utah students at the Great Salt Lake Bird Festival. The traveling art exhibit will then head to Canada for the Chaplin Lake Bird Festival in June, and then to Mexico for the San Blas Bird Festival in January 2011.

The Linking exchange provided a valuable opportunity to exchange ideas and build lasting relationships among educators. It also instilled in us a great deal of hope. The students at Doroteo Arango told us that they were restoring the Mangroves so that their children's children's children could see and enjoy an environment with native vegetation and a healthy ecosystem. After encountering such dedicated and optimistic young people, who are accomplishing their environmental goals despite limited resources, there is no doubt that environmental education programs work, and that our planet will see a brighter future because of them. 🌿

Emily Gaines
FRIENDS Education and Outreach Director

For more information visit <http://www.utahlinking.org/>

Additional pictures from the recent Linking trip to Mexico are available on our Facebook page.

DUCKS UNLIMITED'S CONSERVATION

HOW DU MAKES A DIFFERENCE IN UTAH



Waterbirds on Great Salt Lake

“Ducks Unlimited conserves, restores, and manages wetlands and associated habitats for North America's waterfowl. These habitats also benefit other wildlife and people.” - Mission Statement of DU

Ducks Unlimited, Inc. (DU) got its start in 1937, during the Dust Bowl when North America's drought-plagued waterfowl populations declined to unprecedented lows. Started by a group of concerned sportsmen, Ducks Unlimited has become the world's largest private wetlands and waterfowl conservation organization, delivering conservation projects in every state, all Canadian Provinces, and on key waterfowl habitats in Mexico. “DU's conservation initiatives span North America; wherever the birds go, DU is there. From Boreal Forest nesting grounds to the Great Salt Lake, waterfowl find habitat for nesting, staging, and wintering on DU projects.” Since 1937, DU and partners have conserved more than 12 million acres of North American wetlands and associated uplands.

In Utah, DU has been working with a wide variety of partners and funding programs including several local, state and federal agencies, private organizations such as The Nature Conservancy, private landowners, duck clubs, private foundations, and the North American Wetlands Conservation Act (NAWCA). The willingness and ability of these partners to support the mission and conservation goals of Ducks Unlimited is what has helped expand DU's wetland conservation efforts in Utah.

With limited funds available, DU biologists must make every effort to ensure that conservation dollars are spent as wisely, competently, and efficiently as possible. To ensure this, DU established a set of conservation priorities. The Great Basin wetlands, including the Great Salt Lake, are on the second tier of DU's Conservation Plan priorities, meaning these habitats are “continentally important areas towards which DU will allocate significant resources and undertake other complimentary actions as





Ducks, Ducks and More Ducks by Gary Crandall

appropriate to accomplish recognized regional conservation goals.” Proposed projects must fit the objectives of the Conservation Plan and must be feasible from biological, technical, and financial standpoints.

How a project will fit into and improve the landscape level wetland habitat conditions, whether or not a project will significantly sustain, add to, or otherwise promote waterfowl use in the area, and how the project improves the predominant waterfowl use in the area, in context of the flyway, should also be analyzed carefully before funding is devoted to the project. The Great Salt Lake ecosystem provides critical wetland habitat for millions of waterfowl, shorebirds, and other waterbirds annually. However, the vast majority use the Great Salt Lake ecosystem as stopover habitat during migration. Waterfowl production of both dabblers and divers does occur in and around the Great Salt Lake, but it is at a relatively lower rate than use during migration. DU conservation projects will focus on providing optimal spring and fall migration habitat, but may also include a breeding habitat component.

Recently, DU finished work on the Doug Miller Unit at Farmington Bay WMA. Project worked created a new approximately 400 acre impoundment and replaced the main water delivery system providing water to approximately 450 acres of wetlands. Project funding was provided by the Intermountain West Joint Venture, Rocky Mountain Elk Foundation, Utah Wetlands Foundation, Utah Dept. of Wildlife Resources, and private donations.

In July of 2009, DU submitted its fourth North American Wetlands Conservation Act (NAWCA) proposal for the Great Salt Lake ecosystem. NAWCA staff ranked DU’s Great Salt Lake proposal tying for #2 out of 35 applicants. Once funded, this proposal will deliver \$1 million of wetland protection, restoration, and enhancement projects around the Great Salt Lake. This proposal will help permanently protect 116 acres on The Nature Conservancy’s Great Salt Lake Shorelands Preserve, and enhance and restore 6,916 acres of critically important wetlands around the Lakes eastern and northern shoreline.

DU is delivering more wetland conservation projects in Utah than ever before, and it will only get better. With the continued support of dedicated volunteers, partners, and waterfowl enthusiasts across the state, Ducks Unlimited will continue to make a difference for waterfowl far into the future. 🦆

Craig Garner
Regional Biologist
Ducks Unlimited, Inc.

Visit www.ducks.org to learn more.

GREAT SALT LAKE EDUCATION

EDUCATION IN BLOOM



4th Graders Getting Their Feet Wet by Jeff Clay

A large component of FRIEND's mission is to increase public awareness and appreciation of the lake through education. As the spring season arrives, our education programs are jumping into action with field trips, classroom visits, and festivals.

Lakeside Learning

Our 4th grade Lakeside Learning field trips to Antelope Island State Park will resume April 13th for our spring season. FRIENDS will bring 11 school groups out to the lake in April and May, totaling over 600 students. Our staff and volunteers will lead students through a series of activities where they visit the playa to learn about watersheds and wetlands, cross the causeway to observe birds, hike to the beach to investigate oolitic sand, and wade in the lake in pursuit of brine shrimp and brine flies. Our field trip program uses the Great Salt Lake Ecosystem to emphasize key core curriculum concepts. Our spring field trips are full, but we will be offering a Lakeside Learning field trip for families on May 22nd. We hope you will join us!

Traveling FRIENDS

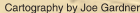
Due to difficulties with funding, scheduling, and logistics, many schools are unable to bring their students out to the lake. We are pleased to offer a new educational program to bring the lake experience into the classroom. Beginning this spring, Traveling FRIENDS will visit classrooms (grades k-4) to guide students through a hands-on lake learning experience. Students will learn about the Great Salt Lake Ecosystem while they observe live brine shrimp, brine shrimp cysts, brine fly pupal cases, and oolitic sand. It is our hope that the Traveling FRIENDS program will enable us to spread our mission of education to an even larger audience.

SALTY Summit

We are coupling our 2010 Great Salt Lake Issues Forum with a special SALTY event designed for younger audiences. FRIENDS, in partnership with Westminster College's Great Salt Lake Institute, will co-host the SALTY (Sharing All Lake Things with Youth) Summit on May 1st from 2-6pm. The Summit is free to youth of all ages and will provide a unique opportunity for k – 12 students and families to come together and learn about Great Salt Lake and the surrounding environs. This event will feature a live bird show, illustrated bird lecture by Rosalie Winard, live entertainment, science activities, art projects and a student share fair and competition. We look forward to the opportunity to immerse students and their families in fun lake-learning. SALTY will take place in Malouf Hall at Westminster College in Salt Lake City; registration is required. 🦋

For more information about our education programs, email pelican@fogsl.org or visit www.fogsl.org.





Courtesy of USGS



DR. EPHYDRA - WE WELCOME YOUR QUESTIONS VIA EMAIL OR PHONE

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.

Brought to you by the Science Committee to help explain the science surrounding Great Salt Lake. We welcome your questions via email or phone. Contact Lynn de Freitas at ldefreitas@earthlink.net

A Productive Lake:

The abundance of brine shrimp and their harvest in the Great Salt Lake.

Despite being saddled with the moniker of Utah's Dead Sea, the Great Salt Lake brings forth an explosion of biological production unrivaled by any of the mountain lakes and streams that grace postcards and await weekend campers. For thousands of years this lake has resided at the terminal end of three rivers, hoarding dissolved minerals and nutrients that in other lakes would have been piped out by an exiting stream or river. The accumulated nutrients support a food web that produces the lake's most recognizable and abundant form of animal life—the brine shrimp.

Standing on the shore of the lake, examining only the shallow water lapping at your feet, it is easy to underestimate the number of these organisms. Not so once you see the data. For instance, in June of 2008, brine shrimp densities peaked at 5.8 adults per liter of lake water. Assuming that each shrimp had an average wet mass of 0.0019 grams (Caudell and Conover 2006) and extrapolating across the entire volume of the south arm of the lake (Baskin 2005), an estimated 94,000 tons of brine shrimp were present in the lake at that time. That's the equivalent of 17 million twenty-inch rainbow trout. Or 13,400 bull African elephants.

The enormous biomass has important ecological implications. The collected nutrients in the lake fuel intense algae production that can reduce water transparency to less than a foot. Brine shrimp consume this phytoplankton and grow rapidly, swelling their ranks in summer and clearing the water column of algae that would otherwise decompose and become a water quality issue. Water that

a month ago was so green it hid your boat propeller from view is now opaline and transparent to fifteen feet, with a galaxy of shrimp swimming beneath you. By assimilating this algae and converting it into massive quantities of brine shrimp, these tiny crustaceans make the abundant nutrients in the lake accessible to several million birds that prey on them.

The abundance of brine shrimp also supports a substantial fishery that harvests a particular form of brine shrimp egg. Each fall as water temperatures drop and algal food resources decline, brine shrimp produce a durable form of egg known as a cyst. Once winter arrives, the adults are doomed. Not so the cysts. They float about in the lake, enduring frigid temperatures and osmotic dehydration, and await the warmer temperatures and freshwater rains of spring, when they will hatch and begin the life cycle anew. Throughout the fall and early winter, companies harvest the cysts and ship them to aquaculture operations across the world, where they will be used as food for raising table shrimp and fish for human consumption.

The harvesting of brine shrimp cysts is a fascinating process. During calm weather the floating cysts tend to aggregate in large slicks that can stretch several miles in length. Spotter planes and fast scout boats locate and claim aggregations of cysts and await the arrival of the harvest boats. The harvest vessels surround the slick with a large containment boom, gradually tightening the noose and corralling the cysts into a denser and thicker mass that can be pumped directly into large sacks. It appears to be a very effective process; this year



alone nearly 20 million pounds were harvested from the lake and its shoreline.

Twenty million pounds sounds like a lot of biomass, and it is (the yearly harvest has ranged from 2.6 to 25 million pounds since 1998), but the brine shrimp population has proven quite resilient to such harvest pressure. Research has indicated that in many years the outgoing generation of brine shrimp produces far more cysts than are needed to repopulate the lake the following year. The Great Salt Lake Ecosystem Program closely monitors cyst densities in the lake to ensure that overharvest does not occur, and to maximize the probability that a strong population of shrimp will emerge the next year to provide avian food resources and aquatic ecosystem services. Indeed, the brine shrimp population has rebounded strongly following heavy cyst harvests, suggesting that this productive lake can sustainably support this significant industry and retain its ecological integrity. Lake Tahoe may have its crystal clear waters and Lake Powell its motorized recreation, but the Great Salt Lake

has worked miracles with brine, creating a biological powerhouse of hemispheric importance and providing the resources for a robust and unconventional fishery. 🦋

Phil Brown,
Aquatic Biologist Great Salt Lake Ecosystem Program

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Brine Shrimp Harvest Work by FoGSL

DISCOVERING OUR LAKE

Salt Creek Wildlife Management Area



Viewing Area by Randy Berger

The Lay of the Land

Emergent marshes and open water habitat make up the 5,254-acre Salt Creek Wildlife Management Area (WMA) north of the Great Salt Lake. The property is owned by the Utah Division of Wildlife Resources (UDWR). This marsh is at the northern tip of the Great Salt Lake Ecosystem and is connected to the Bear River Arm of the lake by springs, streams canals and intermittently flooded salt playas. The original natural emergent marsh areas have been enhanced and expanded through a series of dikes and canals to create a diversity of topography and habitat types including: open water, shallowly flooded areas, nesting islands and upland areas planted with wildlife food crops.

Location

The WMA is located in Box Elder County, west of Little Mountain and approximately 6 miles southwest of Tremonton. From I-15, take the Corinne exit and travel west on SR-83 to Little Mountain. Immediately west of Little Mountain, turn north on a gravel road (11300 West). Signs direct visitors to the parking locations.

Key wildlife species occurring on the WMA

There are 155 bird species that have positively been identified on the area, 14 resident mammals, 5 species of snakes, 3 amphibians, one turtle and six species of fish.

Salt Creek WMA provides crucial year round habitat for the ring-necked pheasant (*Phasianus colchicus*), as well as waterfowl and other birds. It is also an important feeding area for bald eagles (*Haliaeetus leucocephalus*), in the winter. State species of concern, such as the short-eared owl (*Athene cunicularia*), utilizes the area sometimes without migrating during winter. The long-billed curlew (*Numenius americanus*), also a state species of concern, vacates the WMA in the winter, but returns in the spring. The WMA appears to be a staging area for a short duration during the spring migration with over 100 curlews staying for a period of 2-3 weeks.

Resident mammal species include: mule deer (*Odocoileus hemionus*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*), badger (*Taxidea taxus*), weasel (*Mustela* spp.), yellowbelly marmot (*Marmota flaviventris*), rock



squirrel (*Spermophilus variegatus*), muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), cottontail rabbit (*Sylvilagus* spp.), black-tailed jackrabbit (*Lepus californicus*), deer mouse (*Peromyscus maniculatus*) and prairie vole (*Microtus ochrogaster*).

Snake species include: wandering garter snake (*Thamnophis elegans*), western yellowbelly racer (*Coluber constrictor*), great basin rattlesnake (*Crotalus oreganus*), western gopher snake (*Pituophis catenifer*) and nightsnake (*Hypsiglena torquata*) that have been identified on the area.

Two frogs, western chorus frog (*Pseudacris triseriata*) and the northern leopard frog (*Rana pipiens*), and one toad, woodhouse's toad (*Bufa woodhousii*) have been found on the WMA. The western painted turtle (*Chrysemys picta*) has been seen on the area, but rarely and in small numbers.

Six fish species are suspected of or have been identified occurring on the area, redbelt shiner (*Richardsonius balteatus*), black crappie (*Pomoxis nigromaculatus*), common carp (*Cyprinus carpio*), fathead minnow (*Pimephales promelas*), western mosquitofish (*Gambusia affinis*) and channel catfish (*Ictalurus punctatus*).

What to See and Do

County gravel roads and Compton's Knoll are open all year to facilitate wildlife viewing. Other roads are only open during the waterfowl season. The ten acre year-round watchable wildlife use area is located on Compton's Knoll. This area has a parking area, vaulted toilet, visitor shelter area, and concrete and gravel paths. The site is elevated above the surrounding marsh and provides good viewing for waterfowl, shorebirds and raptors, especially during the migration seasons. Two viewing and photography blinds that can be accessed from Compton's Knoll have also been constructed within the emergent marsh. The wind shelter constructed at Compton's Knoll provides welcome escape from the elements as well as a spectacular view of the marsh.

Bald Eagles are visible during the winter months as they feed on carp. Salt Creek WMA hosts Bald Eagle Day and Tundra Swan Day wildlife celebrations in February and March respectively each year. During the 2010 events, visitors to Salt Creek thrilled to watch over 100 bald eagles and 1,500 tundra swans at these events.

A successful artificial nest box program to create nesting habitat for burrowing owls was started in the 1990's and there is now quite a population of owls that return every spring to nest on the WMA and on surrounding private lands. Active nest boxes and owls can be seen from the

Compton's Knoll viewing area during the late spring and summer months.

UDWR began acquisition of the WMA in 1961. The purpose of acquiring these lands was to establish a state managed waterfowl management area for the protection of the wildlife resources, propagation of wildlife, to provide recreational opportunities that are compatible with the purpose of a wetland ecosystem, and to protect and enhance the wetlands and associated uplands. UDWR management of this area strives to maintain a diversified plant community with a diversified vegetative structural component, and to create diverse habitat types. In order to reduce disturbance during the critical reproductive period for wildlife that utilize this area, public access is controlled to limit disturbances. The small area at Compton's Knoll is open to year round use for wildlife viewing and observing the changes in habitat through out the seasons.

Historic Uses of the WMA

The Salt Creek Gun Club was organized in 1912 and initially controlled approximately 1,540 acres in the Salt Creek WMA area. Their primary objective was to develop a better hunting area. The Club impounded Salt Creek by constructing a 7 mile earthen dike. This dike is still in use today and serves as one of the main water control structures on the WMA, along with a bypass canal that was constructed in 1998. The original dike was rebuilt and graveled by UDWR in 1963. Agricultural use of the marsh during the early years was livestock grazing.

Visitor Use:

- Hunting is limited to use of shotguns with non-toxic shot.
- Minimal access is available for launching small watercraft.
- Primitive rest rooms available.
- Compton's Knoll is a designated watchable wildlife site.
- Please Pack it in, pack it out.
- Camping allowed after the outer gates open for water fowl season.

For more information, please contact the UDWR Salt Creek at 435-864-3510 or the UDWR Northern Region Office in Ogden at 801-476-2740. 🐾

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Burrowing Owls by Ann Neville

12th Annual Great Salt Lake Bird Festival May 13-17 in Farmington, Utah

Author and naturalist Terry Tempest Williams will keynote at the Saturday Dutch oven dinner.

“Behind –the-Gates” guided field trips to the best birding hot-spots around the Great Salt Lake. Workshops by Joy Bossi, “Bird Chick” Sharon Stiteler, Ella Sorensen, Dr. John Cavitt, Hawkwatch International, Tracy Aviary and the Ogden Nature Center.

Utah’s Bird Guy- Bill Fenimore will be there, and a trip to Spiral Jetty hosted by Dr. Bonnie Baxter and Jaimi Butler from Westminster College on Monday, May 17th.

Friday and Saturday programs at the Davis County Event Center include free workshops, artists, booths, vendors, and lots of food and birding experience.

REGISTER TODAY

Visit www.greatsaltlakebirdfest.com or call 801-451-3286.

Submission Deadlines: Sept. 16 (Fall), Dec. 16 (Winter), Mar. 16 (Spring), and June 16 (Summer). Submit articles and images for consideration to Lynn de Freitas ldfreitas@earthlink.net or call 801-583-5593.



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Sprial Jetty by Jeff Clay, 2009