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Volume 12 Number 3 Spring 2006

Great Blue Heron by Arthur Morris, 2006

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

Bienvenidos a Todos - Hemispheric Connectivity & Communication; Greater Than the Sum of Its Parts

"Great Salt Lake is the site of one of the largest shorebird concentrations in the world. Each individual bird arrives at the lake with its own history. If a light were lit where each shorebird began its journey, a map of Alaska, Canada, and the northwestern United States would shine as with stars in the night sky. Add a light for each destination and the map would glitter from Utah south through Mexico and Central America to the tip of South America. These shorebirds funnel to the lake like grains in a giant hourglass. Here they feed and fatten on a teeming, concentrated brew of biological energy. Then once again they disperse – a spectacular hemispheric drama."

Ella Sorensen - Seductive Beauty of Great Salt Lake

Yo soy Lynn de Freitas, directora ejecutivo de los AMIGOS de Lago Salado. En nombre de los AMIGOS y el Lago Salado, quiero darles la bienvenida a todos ustedes al sexto foro bienal de asuntos del Lago Salado.

Durante los dos próximos días, hablaremos de la amplia gama de aves migratorias preservadas y del papel de Salado en encontrar relaciones con el hemisferio oeste.

Mientras nos centramos en este importante tema, la migración de primavera tiene lugar en todo el planeta, haciendo de este foro una ocasión aun más interesante.

Tenemos el honor de contrar aquí con nosotros con amigos de Canada, México, y lugares lejanos de los Estados Unidos, a las orillas del Lago Salado.

La perspectiva de este hemisferio de reunir personas, lugares y procesos para explorar modod con los cuales podamos fortalecer nuestros esfuerzos, programas, e investigar para proteger nuestras aves migratorias y sus habitats es muy emocionante.

Bienvenidos a todos.

On May 4, 5 & 6th, along the shore of Great Salt Lake, hemispheric partners and friends gathered at the James V. Hansen Wildlife Education Center at the Bear River Migratory Bird Refuge. We shared information about research, conservation programs and practices that are being implemented in Canada, Mexico, the United States and South America which strengthen range wide conservation of migratory birds and their habitats.

It was intimate, and precious, and productive.

For many of us, it was the first time we had met, but ironically, it felt much more like a family reunion. Meeting those distant cousins and uncles that you don't see very often but when you do, they're keenly interested in catching up with you and learning about what you've been doing with your life.

Perhaps, in this case, this kindred spirit comes from our common interest in our birds and our habitat connectivity. And that we understand the kind of parallel generational imperative that also characterizes the work of conservation - indispensible, intrinsic and vital.

As we lunched and took breaks with the Lake, it was interesting to note that the threats and challenges that face GSL are almost identical throughout the hemisphere.

Dr. Maunsel Pearce, chair of the Great Salt Lake Alliance, categorized these threats as the Four D's - disinterest (ignorance), discharges (water quality), development (growth and loss of habitat) and diversions (reducing inflows into riparian habitats and wetlands).

The pattern recognition of these common threats provides a focus for our collective work so that we can identify opportunities and objectives that can effectively address the issues. And even with the political and social complexities that are a part of working internationally, we all agree that the benefits that come from this unique partnership strengthen both the momentum and the will to accomplish good things for conservation.

And in that spirit, we pledged to explore ideas for spreading the model of linking partnerships to other communities along other migration routes. The hope is to saturate the migratory medium with interest and abilities that make a difference.

Since 1996, when FRIENDS hosted its first Great Salt Lake Issues Forum, our goal was to encourage constructive dialogue about the future of the Great Salt Lake Ecosystem and to illuminate the complexities involved in research, management and planning for the Lake.

Engaging in this hemispheric conversation not only helps to magnify the significance of Great Salt Lake, but also builds the Lake into a bigger context that is both extremely dynamic and delicate. A context that hinges on the ability of integrated commitments to protect ecologically important areas and to achieve measureable outcomes that verify that the work we are doing is making a difference.

Opportunities to build awareness about these special places come in many forms. The 2nd International Migratory Bird Festival in Nayarit, Mexico and the 8th Annual Great Salt Lake Bird Festival in Farmington, Utah are growing in their attraction and generate an economic outcome that communities can understand.

Developing educational linking partnerships such as the U.S. Fish and Wildlife Service's Shorebird Sister Schools program uses migratory shorebirds to build community connectivity between school children in Mexico and Utah. Next January, four bilingual teachers from Utah will be going to Nayarit during the 3rd International Migratory Bird Festival to observe classroom activities and develop additional projects to expand this model even further.

The 4th Doyle Stephens Scholarship was awarded to Misty Rose Riddle. Misty is currently studying for her Bachelor's degree in the Biology Department at Westminster College. She is working with Drs. Brian Avery and Bonnie Baxter to study the microbes that live associated with brine shrimp in Great Salt Lake, particularly those associated with the gut of adult brine shrimp. If she finds a relationship between these salt-tolerant microbes and brine shrimp, it would be the first time that microbes have been linked to the Great Salt Lake food chain.

Twenty one people signed up for an Eco-tour to Chaplin Lake in Saskatchewan in the spring of 2007. On May 24th, a working partnership of public and private interests gathered together along the south shore of Great Salt Lake to dedicate the Lee Creek Natural Area. This adds another important and impressive piece of conservation shoreline to the Lake.

And in the spring of 2008, the year of our next Issues Forum, FRIENDS and the International Society for Salt Lake Research will be hosting a joint conference in Salt Lake City. This partnering event will continue to add an international perspective to our conversation about Great Salt Lake and the importance of saline systems around the planet.

As a Utah linking partner, FRIENDS is committed to continuing our work in support of the preservation and protection of the Great Salt Lake Ecosystem. But we also understand that it is only through hemispheric connectivity and communication that our efforts at home will truly have meaning.

This strength fortifies the work that all of us are able to do as we make contributions to support the range-wide conservation of migratory birds and their habitats.

And as partners, we all understand the power that our future generations hold in helping to perpetuate this commitment and to keep the dream alive.

It is a dream with wonderful possibilities and the potential for responsible outcomes. The satisfaction and reward that comes with the hard work we should all be willing to do for migratory birds and their habitats, will translate into a hemispheric language that we can all understand.

En muchas salinas,

Lynn de Freitas

FRIENDS ORGANIZATIONAL STATEMENT

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.

FRIENDS has a very active Board of Directors and an Advisory Board consisting of professionals in the scientific, political, literary, education, and broadcast communities. Founded in 1994, we have organized and sponsored an array of programs, activities, and materials in pursuit of our mission.

Since 1996, we have sponsored a biennial Great Salt Lake Issues Forum that provides a gathering for policy makers, researchers, planners, industry and other stakeholders who are involved in and concerned about the Great Salt Lake.

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.

In 1997, we hired Bruce Thompson as our Education Director and initiated 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." Over 11,000 people in the five counties surrounding Great Salt Lake have seen the program.

We hope that the DVD version of The Lake Affect, and Project SLICE, a 4th grade curriculum using Great Salt Lake as a system of study, will achieve a positive, long-lasting impact on the future of the Great Salt Lake and those who dwell upon its shores.

In 2003, FRIENDS awarded the first Doyle W. Stephens research scholarship. Until his death in May 2000, Stephens served as a research hydrologist for the U.S. Geological Survey. He is particularly remembered for his work toward increasing public awareness of the Great Salt Lake Ecosystem.

FRIENDS was awarded the Conservation Achievement Award by the Utah Chapter of the Wildlife Society in 1998.

On the Cover

Great Blue Heron by Arthur Morris, 2006

Arthur Morris is a free-lance nature photographer, writer, and lecturer specializing in birds. He photographs, travels, speaks, and teaches extensively all over North America. He has taught school in New York City, conducted shorebird surveys at Jamaica Bay Wildlife Refuge, and is now a Canon contract photographer, part of their "Explorers of Light" program.

Among his many prizes, he won BG plc Wildlife Photographer of the Year Competition in 1997 and 2000. He appeared in a Canon EOS 1N television commercial that aired worldwide, and has been featured in six episodes of the "Canon Photo Safari" television show. More than 11,000 of his photographs have been published in various magazines, calendars, and books.

Arthur Morris www.birdsasart.com

Snowy Egret in Marismas Nacionales, Mexico by Gary Crandall

Friend of the Lake Award

Al Trout

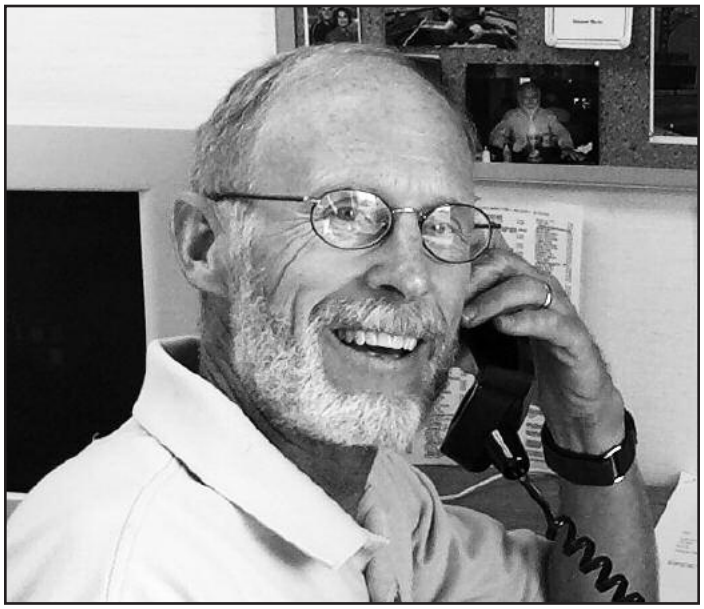


Photo Courtesy of USFWS / Bear River Refuge

Al Trout, recently retired manager of the Bear River Migratory Bird Refuge was the recipient of the 2006 Friend of the Lake Award. The award was presented during the 6th Biennial Great Salt Lake Issues Forum held on May 4, 5 & 6th at the James V. Hansen Wildlife Education Center at the Refuge.

Al has done a stellar job in not only elevating the importance of the Refuge as a special place in the national wildlife refuge system, but in elevating the importance of Great Salt Lake and its wildlife resources.

When Al arrived in August 1989, the Great Salt Lake had risen to well over 4212'. The high water had destroyed the existing infrastructure of the diked ponds, water control systems, bridges and buildings. Salt water had also inundated the uplands and fresh water systems on the property, destroying habitats for resident wildlife and for the millions of migratory birds that rely on the Refuge for resting, staging, nesting and foraging.

There was virtually no staff, no funding, and no equipment, and during his 17 years with the Refuge, Al was responsible for helping to resurrect the Refuge. With professional know-how and a sense of tenacity, Al was the magnet for a community of determined and resourceful people who wanted to see the Refuge restored.

Today, the property of the Refuge is larger than it was before he arrived and is a well tuned machine operating with diversified staff and volunteers. It's also home to this James V. Hansen Wildlife Education Center, a world class facility that provides a bridge for the public to the Refuge 14 miles to the west.

Al has always been generous with his time providing special Refuge outings for FRIENDS, speaking at our monthly programs, and participating in our Great Salt Lake Issues Forum. He has also never backed away from controversy. He has been a strong advocate for sound conservation practices, our migratory birds, and the preservation and protection of the Great Salt Lake Ecosystem.

The Friend of the Lake Award is given to a person, organization, or business performing outstanding work in education, research and / or advocacy to benefit Great Salt Lake.

There is a vibrant and active community of people working on behalf of the Lake. They help increase our understanding and awareness of our big, salty neighbor. The more we understand the Lake, the more likely we will be to preserve and protect it.

To recognize these talents and contributions, FRIENDS of Great Salt Lake has established this award to be presented at our Biennial Great Salt Lake Issues Forum.

Congratulations Al and thank you for being such a friend to Great Salt Lake.

Mercury

Wise Energy Use Can Reduce Atmospheric Emissions

Mercury exploded on the front pages in early 2005 when, first, major news outlets such as the Washington Post and the New York Times reported on how the Bush administration had politically altered a first-ever EPA rule to regulate mercury emissions from coal-fired power plants, the largest single source of mercury in the country, over 40 percent. Needless to say, the final rule was far less restrictive than what EPA scientists wanted, which is why 11 state attorney generals have sued the Bush administration. Stay tuned on this one.

Then it was revealed that the Great Salt Lake contained the highest levels of methylmercury (the most toxic form) of any body of water in the lower 48 states. About the same time, the Utah Division of Water Quality issued fish consumption advisories for several water bodies, followed by a "Do Not Eat" warning from the Utah Division of Wildlife Resources for two species of ducks that inhabit the Great Salt Lake.

To make matters worse, 2005 also saw the horrendous news coming out of Nevada in which five of that state's largest gold mining operations were releasing exorbitant amounts of mercury in the air, as high as 21,000 lbs. in 2001.

To put that in perspective, Utah's single largest source of mercury at present is the Intrmtn. Power Plant in Delta, 100 miles southwest of Salt Lake City. With emissions in the range of 300 pounds of mercury per year, it is dwarfed in magnitude by what's possibly coming at us from NV. That does not mean IPP or other power plants and industrial facilities are off the hook, and here's why.

Mercury is by most definitions the most toxic, concentrated heavy metal on the face of the planet. As little as 1/70th of a teaspoon is enough to potentially contaminate all the fish in an average 25-acre lake. The EPA's own benchmark for potentially unhealthy fish consumption is when that fish tissue tests for more than 3 parts of mercury per million. Very minute amounts.

Fortunately, several of the NV gold mining operations have, for the last five years, voluntarily reduced their mercury emissions to levels far below what was reported in 2001. Furthermore, the NV Department of Environmental Protection recently passed a new rule that will, for the first time anywhere in the U.S., implement mandatory reductions on the gold mining industry.

Many of us in the environmental community remain very concerned that the rule does not, among other things, provide targeted caps on each facility. Nor does it require adequate monitoring in order to determine if indeed the operations are making actual reductions. But we remain committed to the process and most agree that this new rule is only the real first step towards meaningful reductions that will actually protect public health.

But there is more bad news. While the NV gold mines are the single largest source of mercury in the intermountain west, the coal-fired power plant industry requires more scrutiny on a U.S.-wide scale. Approximately 1,100 such facilities across the nation provide over 50 percent of our electricity, with that figure jumping to 95 percent in Utah. Another 150 more plants are being planned across the country by an industry that has a very favorable ear in the White House. Four are proposed here in Utah with four more in NV. And an estimated 250 years of coal in the ground in this country represents billions of dollars in profit to some. So it's easy to see that the mercury problem could be with us for a long time to come.

Mercury is just one of many external costs associated with our addiction to coal, costs the industry passes on to current and future generations. That is one major reason why the Sierra Club and other organizations are fighting hard to push this nation towards cleaner and more sustainable sources of energy, along with serious measures in energy efficiency and conservation. These should be priority #1 while building more coal power plants should be considered only as a last resort.

Mercury is a serious health concern for our children and those yet to come, particularly to Utahns in light of existing and planned sources of the toxin. Consequently, it is imperative that we carefully plan now for our energy future with a vision that includes those individuals. We are at a crossroads on this critical issue and the direction taken can really be affected by all of raising our voices and staying involved. Let your municipalities, elected leaders, and state regulators know how you feel on these issues. Future generations depend on it.

Tim Wagner,
Conservation Coordinator, Utah Chapter of the Sierra Club and Director of Utah Smart Energy Campaign.
Tim.wagner@sierraclub.org

Tooele SAMP Plan

A Tool For Conservation

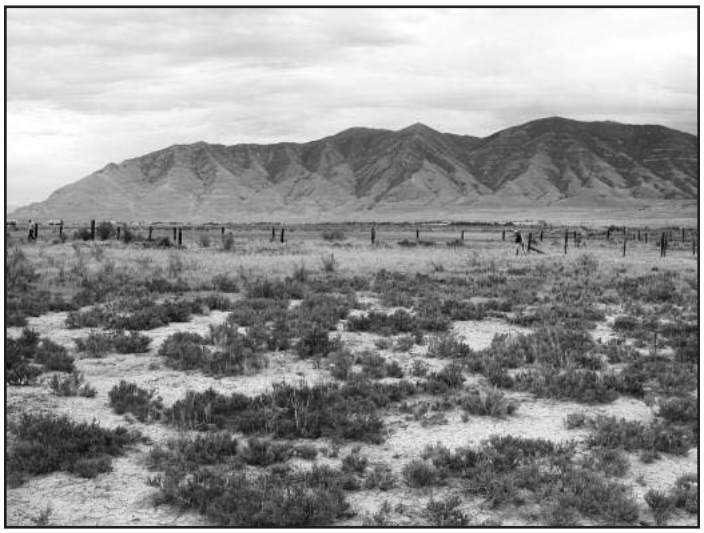


Photo Courtesy of SWCA Environmental Consultants

Mineral flats, wet meadows, and spring-fed emergent marshes. Light industry and commercial centers, single-family housing developments, and a commuter transportation corridor. Balancing environmental protection with urban growth is often associated with the Wasatch Front but this same issue challenges other parts of Utah. In 2002, in an attempt to solve this conundrum in their "backyard," Tooele County began the process of creating a Special Area Management Plan (SAMP) for approximately 65,000 acres between Route 138 and the shores of the Great Salt Lake.

This area is a transition zone between historic rangeland and the saline open water of the Lake, which, because of limited development to date, contains many high functioning wetlands. In addition to these wetlands are uplands, which together form a mosaic that supports resident and migratory wildlife but could provide much needed space for a growing community. Due to the high ecological and economic value of this area, the primary goal of the SAMP is to preserve, restore, and enhance wetlands while also allowing for responsible development.

SAMPs, while relatively new to Utah have been applied in other parts of the country. As early as 1989 comprehensive wetland planning of this type began in the Meadowlands of northern New Jersey but failed in 2002 after stakeholders failed to reach consensus. Additional projects have achieved greater success in California (San Diego Creek SAMP), Wisconsin (Superior SAMP), Washington (Mill Creek SAMP) and Alaska (Juneau SAMP). Closer to home, Brigham City and Salt Lake County have begun the SAMP process in an attempt to guide aquatic resource protection and economic development.

Four years and a comprehensive review of wetland resources later, the Tooele SAMP Steering Committee, made up of landowners, local government leaders, conservation interests, and state and federal agency personnel, is ready to identify priority preservation zones, potential restoration areas, and the least environmentally damaging locations for proposed projects and development. In theory, the end result of this scientifically informed and community-based decision-making process will be two zones within the SAMP area. Zone A will be considered an "impact avoidance area" subject to regulatory protocol outlined in Section 404 of the Clean Water Act and under the jurisdiction of the Army Corps of Engineers. Contingent upon the ecological integrity of Zone A, development will be concentrated in Zone B. For actions within this zone, a local Wetlands Review Board will be responsible for assessing impacts to wetland resources and administering the mitigation and restoration guidelines outlined in the SAMP.

The four preliminary criteria used to establish Zone A include, 1) lands below 4217' in elevation, 2) lands considered as range, agricultural or open space in previous regional planning exercises, 3) high functioning wetlands with a 1000-foot protective buffer, and 4) streams and an associated 90-foot wide riparian corridor.

In addition, much of the northern end of the SAMP area is below 4217 feet. Including these lands in Zone A as potential wildlife habitat is prudent given that the Great Salt Lake rose to 4212' in the mid 1980s. Wetland areas, plus uplands not contained within high functioning wetlands will make up Zone B.

However, few public processes with diverse stakeholders reach consensus easily. The exact demarcation between Zones A and B is still being decided. Also, because the SAMP is administered federally through a Clean Water Act General Permit the public will have the opportunity to provide input on the findings. In a future newsletter, FRIENDS of Great Salt Lake will provide you with the date by and manner in which to file your comments with the Army Corps of Engineers regarding this process.

Brian Nicholson,
SWCA Environmental Consultants

USGS Public Lectures

Atmospheric Deposition and Mercury in Great Salt Lake

Every year, the Water Resources Discipline of the USGS sponsors a lecture series that presents new and scientific relevant USGS research results from throughout the Nation. This year's USGS National lecture series has two presentations that are relevant to emerging issues in the Great Salt Lake ecosystem as well as other areas of Utah and the Rocky Mountain region. The titles of these lectures are: (1) Atmospheric deposition: It's not just acid rain anymore and (2) Great Salt Lake, Utah: Mercury methylation factory or hemispheric bird habitat. The talks will be presented on Tuesday, July 11th in the evening at Westminster College (1840 S. 1300 E.) Salt Lake City. Check the FRIENDS and USGS website for exact location. The talks are free of charge and open to the public. An abstract of each talk and biographical information about the USGS scientists giving the lectures are presented below.

Atmospheric deposition: It's not just acid rain anymore

Presented by Donald H. Campbell,
USGS, Colorado Water Science Center

Acid rain was one of the big environmental issues of the 1980's, and it made us aware of the importance of atmospheric transport as a source of pollutants to sensitive ecosystems. Since then, controls on emissions of sulfur dioxide have resulted in substantially less acidic precipitation in North America and Europe, and many ecosystems are recovering from acid rain. Meanwhile, concerns about deposition of nutrients, mercury, and organic contaminants have increased. These pollutants are found in air emissions from many different sources including transportation, industry, energy production, and agriculture, and their fate in the atmosphere and the ecosystem is controlled by complex biogeochemical processes. They are often transported over great distances in the atmosphere, and their impacts are far more ubiquitous than those of acid rain. Many are potent at very low concentrations, and can bioaccumulate in the ecosystem. New methods for measuring atmospheric pollutant inputs, identifying their sources, and tracking their fate in the ecosystem are improving our understanding of the relation between air and water quality. USGS studies are contributing to the science and helping shape cost-effective policies that protect human health and ecosystems.

Don Campbell has studied atmospheric deposition throughout the Rocky Mountain region since the early 1980s. He conducts basic and applied research with scientists and resource managers from USGS, other federal agencies, state and local government, and universities.

Great Salt Lake, Utah: Mercury methylation factory or hemispheric bird habitat

Presented by David L. Naftz,
USGS, Utah Water Science Center

Despite the fact that saline water bodies contain 47 percent of all the water in the world's lakes, their ecology is poorly understood. Terminal lakes are susceptible to anthropogenic impacts because they accumulate nutrients and other pollutants. For example, Great Salt Lake (GSL), in the western United States, is a highly saline, terminal lake with a surface area that can exceed 5,100 km2. The open water and adjacent wetlands of the GSL ecosystem support millions of migratory waterfowl and shorebirds from throughout the Western Hemisphere, as well as a brine shrimp industry with annual revenues exceeding 70 million dollars. Despite the ecologic and economic significance of GSL, little is known about the biogeochemical cycling of trace contaminants and nutrients, and no water-quality standards currently exist for this highly saline, but ecologically important system. Previous publications have referred to GSL as a "natural disposal system" with respect to heavy metal inputs to the lake. The USGS and USFWS have found elevated levels of mercury and other trace elements in water and biota. Recent geochemical and isotopic data collected from GSL will be presented and discussed in the context of impacts from anthropogenic influences, as well as lake management practices and natural geochemical processes that potentially enhance metal toxicity. Potential remediation scenarios for GSL will also be presented.

Dave Naftz has been conducting geochemical research on Great Salt Lake for the past five years. In addition to his duties at USGS, Naftz is an adjunct faculty member at Utah State University and the University of Utah.

Utah Waterfowl Association

Working to Protect & Restore Utah's precious Waterfowl Resource

Ducks in Flight by Gary Crandall

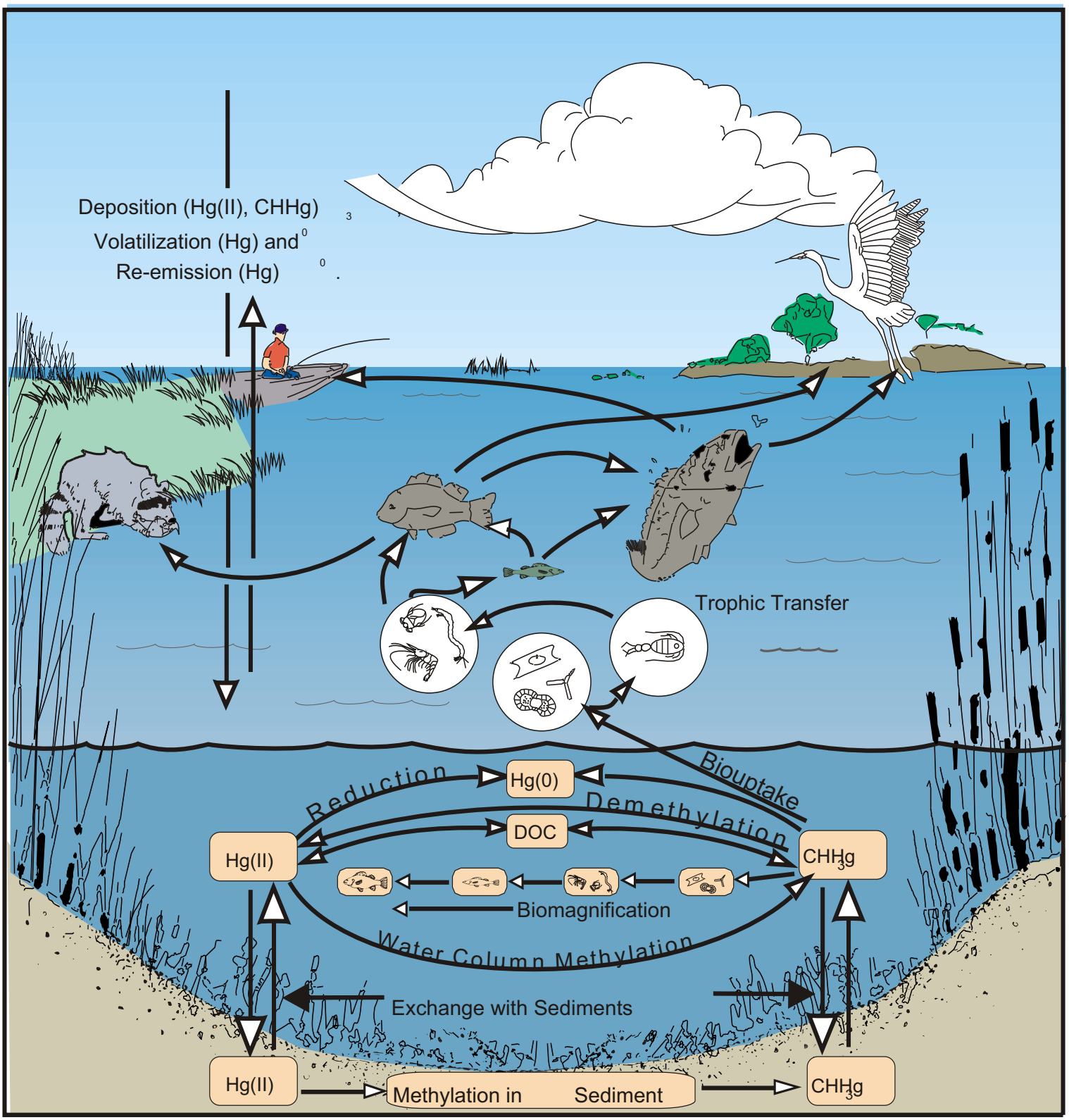
For over a hundred years, Utahns have been concerned about the health and vitality of waterfowl habitat and the migratory birds that use it. But for most of that time, efforts by waterfowl enthusiast to affect these local issues were sporadic and individualized. At the same time, threats to the existence and health of our local waterfowl habitat have multiplied. In response, the Utah Waterfowl Association (UWA) was recently formed to preserve and protect Utah's waterfowl, its unique and rich habitat and its rich heritage.

The UWA is focused on local habitat, regulatory and political issues that often fall outside the mission of national wetland and waterfowl organizations. For instance, the UWA has taken an active role in responding to the threat of mercury contamination in the Great Salt Lake. This issue strikes us doubly hard as it not only assaults the wild lands and wildlife we cherish but also literally becomes part of us as we and our families enjoy (i.e. eat) the lake's bounty.

We are also working to fund studies that will better define how to restore what we see as the currently dismal productivity of the Great Salt Lake's marshes to their former glory. We promote efforts by the state to improve habitat on its Waterfowl Management Areas. We are seeking to participate in community and regional planning to protect the Lake's varied habitats. We understand that we share these and related goals with thousands of other Utahns who care deeply about the Lake, but do not hunt, and we hope to work with them.

For many waterfowlers, the process of waterfowling is deeply embedded in our personal heritage and identity. We feel bound to the wetlands we have protected, nurtured, and waded into for generations. We feel connected to the waterfowl, the annual cycle of marshes and the migrations. Now, we are organized to fight for them.

Jack Ray
Vice President, Utah Waterfowl Association



Mercury in the Environment - USGS Factsheet #146

Created by David P. Krabbenhoft

Mercury in the environment comes from both natural and industrial sources. Atmospheric deposition of mercury can circulate for years and distribute mercury over the landscape. On land or in the water, the mercury can be converted into methyl mercury and enter the food chain of fish and animals or be released back into the atmosphere through volatilization.

2006 Great Salt Lake Teacher Workshops

workshops designed to help 4th grade teachers

The Nature Conservancy and FRIENDS of Great Salt Lake are pleased to offer two full-day workshops designed to help teachers meet state guidelines for science core curriculum. By participating in BOTH courses, Workshop participants will:

- Learn about the Great Salt Lake Ecosystem and wetlands ecology.
- Explore ways to use local natural parks and preserves to enhance classroom learning.
- Walk away with creative lesson plans, activities and curriculum for in-class use.
- Become an enthusiastic partner with local environmental education and conservation groups.

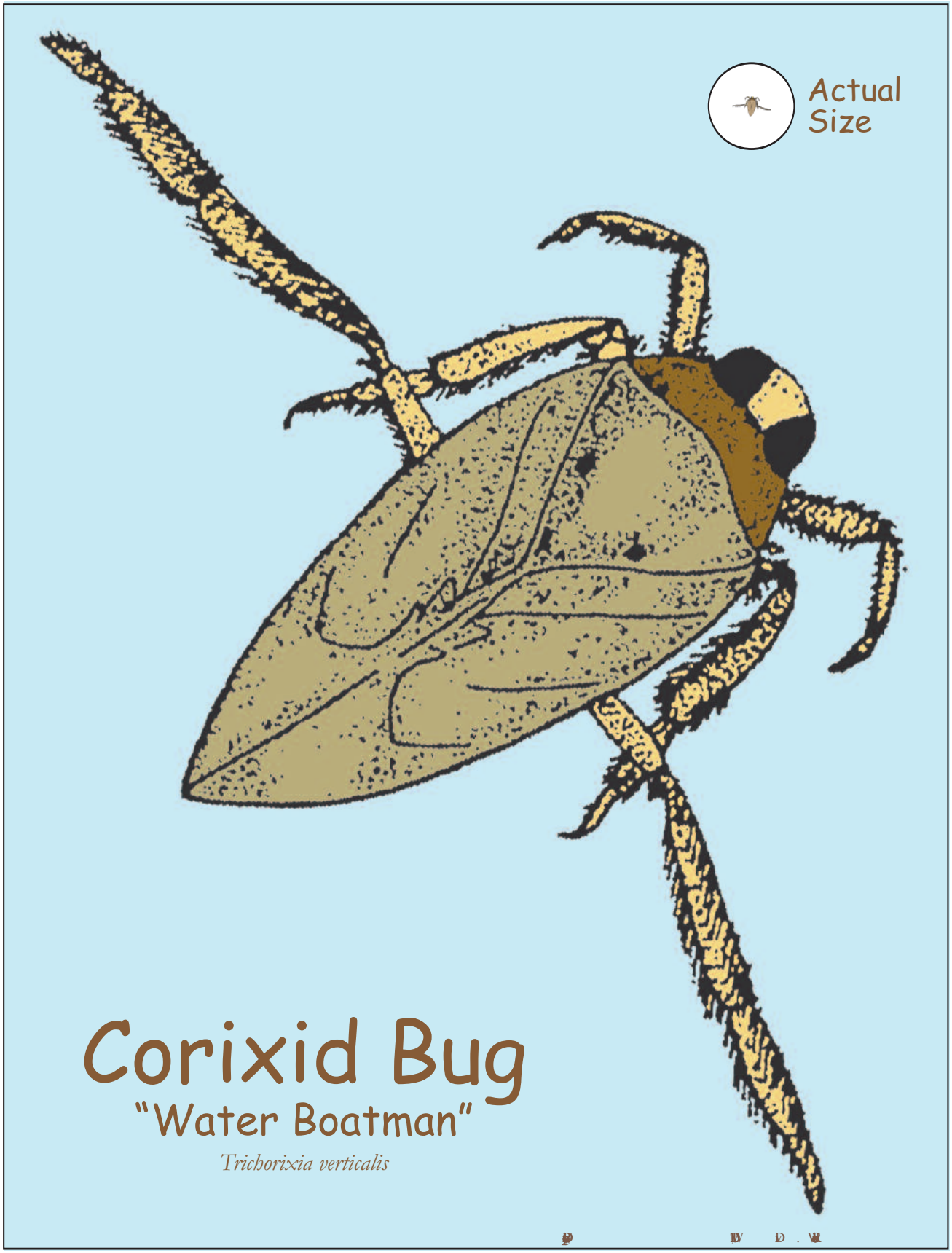
Wings and Water: Integrating Your Wetlands Fieldtrip into the Classroom
Saturday August 5, 2006 8:30am -4pm
Great Salt Lake Shorelands Preserve Visitor Center
Cost: FREE - 4th Grade
The Nature Conservancy's Wings and Water Program is a cost-free, comprehensive wetlands education package that includes pre- and post-tour activities to help teachers meet science standards for 4th grade wetlands education, a naturalist guided tour of Great Salt Lake Shorelands Preserve and a Student Discovery Guide for use in class and during the tour. This workshop is an essential element of the Wings and Water program. It is designed to give teachers interested in participating in the program the inside scoop on using the Great Salt Lake Shorelands Preserve and other tools of Wings and Water to effectively and creatively teach your students about Utah's wetlands.

Led by environmental educational expert Bruce Thompson, we'll explore the visitor center mile-long boardwalk loop and 30 foot viewing tower in the morning using hands-on, curriculum based activities to discuss how the Wings and Water tour can help you teach wetland ecology, soil, plant and animal adaptations, water cycle and much more. In the afternoon, we'll head indoors to discuss how to use the pre- and post-tour activities and Student Discovery Guide to bring more focus and meaning to classroom learning. Go to www.nature.org/wingsandwater or contact KaRyn Daley at (801) 238-2339 for more information.

Lakeside Learning: Using Great Salt Lake as an Outdoor Classroom
Saturday August 12, 2006 8:30 am -4:00 pm
Antelope Island State Park
Costs: $20.00 - 4th GRADE and 9th GRADE
FRIENDS of Great Salt Lake offers a unique place-based educational approach to teaching Utah's science core curriculum using the Great Salt Lake Ecosystem as our focus of study. Teachers will learn how to plan and implement a positive educational field experience at Great Salt Lake using a full unit of study with integrated pre and post-field trip activities for real and measurable learning outcomes. Teachers will have a direct on-site overview of Great Salt Lake with specific activities focusing on many of the unique features of our inland sea. For example: we will explore state geography and maps; we'll do interesting chemistry experiments using Great Salt Lake's own oolitic sand; and we'll study exceptional plant and animal adaptations to explore the amazing web of life that surrounds Great Salt Lake.

Join us to discover the wonders and mysteries of our big salty neighbor and learn how to teach your students interesting ways to do real science right in their own back yard. Go to www.fogsl.org or call Katie Pearce at 801-322-3216 for more information.

A Slice of SLICE



A product of Project SLICE: The Friends of Great Salt Lake Initiative for Conservation Education
Produced br Bruce Thompson / EcoTracs, Salt Lake City, Utah 801/467-3240 ecotracs@aol.com revised 09/25/01

Dedication of Lee Creek Natural Area

by Ella Sorensen

The following piece was recited by Ella Sorensen during the dedication ceremony of the Lee Creek Natural Area on May 24, 2006.

Let your eyes wander as I give this reading

to the land
to the lake
to the sky above and especially to the birds flying by on the wing.

Is there any one among us who has never dreamed of flying like a bird? To leave behind the cares of the world and go soaring in flight above?

Occasionally here, I see a falcon fly by. Falcons are masters of flight.

Horus, a god revered by ancient Egyptians, was a falcon. From the very beginning of their civilization, the pharohs of Egypt were identified with this god Horus. The eye of Horus is a ubiquitous symbol in ancient Egyptian art. It is found chiseled into colossal limestone temple walls, incised into pink Aswan granite obelisks- pointed monuments that soar hundreds of feet into the sky or painted on walls of royal tombs.

The name Horus means "He who is above"

And what attributes did this bird-god represent to the great civilization?
Horus- a god of the sky, a god of soaring flight represented wholeness healing strength and perfection.

The birds we see flying by are answering the call of wildness in their wings.

A wildness that words can not explain.

For wildness knows now definition. It is in us and around us

Watch and listen and feel the wildness the dwells within you respond.

Today Audubon and all the many many partners proudly open a healing Lee Creek Area to wildlife compatible activities.

A gift to wildlife
A gift to the community.

A place
A place of land and water and wide open sky.
A place where the human spirit can fly and soar like a bird.
A place to learn and feel Great Salt Lake and wildlife that call it home.
A place of great beauty where YOU can come and find YOUR strength YOUR healing and wholeness.

Fly bonny birds. Soar wildly on your wings. Show us the way and we will follow you over the sea to sky.

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 Amy Marcarelli at amym@cc.usu.edu

What Controls Germination of Pickleweed?

One of the most interesting plants along the shoreline and playas of Great Salt Lake is the pickleweed (Salicornia europa var. rubra). Its unique, opposite branching stems with highly reduced leaves are filled with a salty solution that allows it to survive while living with its roots in water of over 5 percent salinity, the same as sea water. It is the mangrove of Great Salt Lake. It can absorb more pure water out of this "seawater" by storing dissolved salt in the central vacuole of its cells, thus lowering the plants osmotic potential and allowing it to keep stomata open for photosynthesis. This annual plant grows from dormant seed on the soil surface, often around the parent plants from the previous year. It is unknown how long the seed can lie dormant in salty soil. It germinates in March when spring rain and snowstorms sweep across the area, sometimes in such massive numbers that the ground is covered in tiny reddish-green jewels with two fleshy seed leaves. If spring precipitation conditions on the playas are just right; not too much to flood the germinating seeds and not too little to dry them out, the population will survive into summer and fall to produce a magnificent, scarlet carpet in October. Millions of seeds develop from rudimentary flowers along the naked stem tissue. Later in the fall and winter, Canada Geese will stop by to strip the tiny seeds from the stems.

Many members of the chenopod family such as Four-wing Salt bush (Atriplex canescens), and Shadscale (Atriplex confertifolia) have chemicals in the embryo which prevent the seed from germinating. There must be sufficient fresh water available from precipitation to leach the dormant seeds of these inhibitors. This may explain why in some years there is massive germination of Pickleweed while in others there is very little. Like most chenopods, Pickleweed seeds are tiny, tightly coiled dormant embryos wrapped in a thin seed coat just waiting to burst after absorbing fresh water.

At Westminster College we have begun some preliminary experiments to see if Pickleweed might have germination inhibitors in the embryo which could trigger this massive germination in favorable years. However, artificial leaching and germination experiments on field-gathered seeds indicate that there is very little effect from leaching or temperature on germination percentages. They average about 50% after several one week, regardless of treatment. Apparently all that Pickleweed seeds need is a little fresh water for the embryo to imbibe and push its way out of the seed coat. There may be a positive stimulating effect of light on early embryo growth during germination. This makes sense since the dormant seeds are already at the soil surface and, like many garden weeds, germination may be stimulated by light.

Each Great Salt Lake playa and salt marsh plant species has its own unique evolutionary story and suite of adaptations which allow survival in one of the strangest places on earth.

Dr. Ty Harrison,
Westminster College

Photo Courtesy of FoGSL

Discovering Our Lake

The Bear River Migratory Bird Refuge

James V. Hansen Wildlife Education Center by Steve Greenwood

Bear River Migratory Bird Refuge is located at the northern tip of Great Salt Lake near Brigham City. Just a short 50 miles north of Salt Lake City is 74,000 acres of federally protected marshlands, open water, mudflats, wet meadows, ponds and upland vegetation reserved for millions of migratory shorebirds and waterfowl to rest, nest, and feast during their hemispheric journeys.

It all started in 1928 when congress designated the Bear River delta as a National Wildlife Refuge and construction began to build dikes and water control structures to restore the flow of the Bear River through a man-made delta.

In 1982 a new visitor center was dedicated to give people a chance to view the beautiful wetlands and birds. The center was completed just before record precipitation in the Great Salt Lake Watershed. As many of you may remember, the lake levels rose to destroy the new visitor's center and overrun refuge dikes thus contaminating freshwater habitats. The refuge was rendered inoperable for several years. But thanks to a committed group of volunteers and refuge employees, restoration began once the waters receded. By 2000, newly recovered habitat supported millions of migratory birds and completed a critical component of the Great Salt Lake Ecosystem.

Construction is now complete on a brand new wildlife education center constructed through a joint venture of the U.S. Fish and Wildlife Service and Friends of the Bear River Bird Refuge. The James V. Hansen Wildlife Education Center held its Grand opening on 21 and 22 April, 2006.

The center embraces a number of community-friendly features. The entrance opens into a broad hall to educate visitors about the world-class features of the wetlands at the Bear River Delta. It includes an exhibit hall with interactive displays and a diorama highlighting the many

Group Stroll by Dayle Record

bird species that make their homes at or near Bear River Migratory Bird Refuge. The center also houses meeting rooms, classrooms, an auditorium and a research lab.

Friends of Bear River operate the Avocet Corner Bookstore to offer wildlife-themed merchandise and books for visitors to purchase.

Other highlights of the center include an observation deck to view the wetlands and wildlife and an outdoor amphitheater. Call ahead to schedule tours and birding trips at the refuge. Or, you can explore on your own. There is 12-mile auto-loop that is bike-friendly and perfect for families. If you are a photographer, Friends of Bear River have constructed two photo blinds so you can get up close and personal with wildlife.

If you haven't been before, now is the time to do it. If you haven't been in a while, you will be pleasantly surprised will all of the new changes. The Refuge is open every day from sunrise to sunset year round, but the Wildlife Education Center is open Monday-Friday 8 - 5 pm and Saturdays 10 - 4 pm. The Center is closed on Sundays and all Federal holidays. For more information visit http://bearriver.fws.gov, eMail bearriver@fws.gov, or phone 435-723-5887 .

Betsy Beneke
Outdoor Recreation Planner
Bear River Migratory Bird Refuge

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Wally Vlasic
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Amanda Woodliff
Ron Younger

GREAT SALT LAKE PEOPLE

Taz Harrington, avid birder, conservationist and devoted supporter of FRIENDS died on January 24, 2006. Her gentle spirit and smiling face is greatly missed.

Congratulations to Joro Walker, director of Western Resource Advocate's Utah office, recently won first prize in the U.S. category at the Yves Rocher Foundation's Woman of the Earth" award ceremony in Paris. She was honored for her long-term advocacy for Utah's public lands, red rock wilderness and the Great Salt Lake.

WE want to thank **Matt Crawley Design**,

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

Making A Difference

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In memory of Mr. Bruce H. Waddell of Annandale, MN, father of Bruce H. Waddell, Jr, of Utah, who is a great supporter of FRIENDS of Great Salt Lake.

Special Thanks for the 2006 Issues Forum
Thanks to the following for making the Forum such a success!

Bear River Migratory Bird Refuge
For the use of the James V. Hansen Wildlife Education Center. It was a perfect setting to discuss migratory bird species and habitat conservation efforts.

The Alta Club
For always doing it right.

Art Morris
For your inspirational image of the Great Blue Heron as the Forum symbol.

Richard Johnson
For the wonderful flat bird carvings of avocets and stilts that were given to our hemispheric partners as a memento of the Forum.

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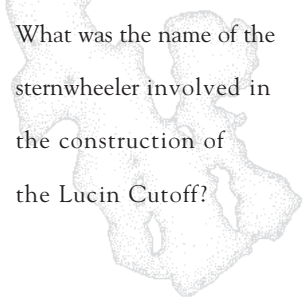
HELP WANTED!
FRIENDS is looking for new Directors for our Board and participants on the Education Committee and Science/Research Committee.
Contact Tim Brown with questions.

Lake Fact:

What was the name of the sternwheeler involved in the construction of the Lucin Cutoff?



Answer: The Promontory

Help us Help the Lake

Your donations go directly to the preservation and protection of Great Salt Lake. We can't do it without you. Please check the back cover to see if it's time to renew your membership. Thank you.