

# FRIENDS of *Great Salt Lake*

P.O. Box 2655, Salt Lake City, Utah 84110-2655  
www.fogsl.org

801-583-5593

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*American Avocet* by Sungyeon ©2008

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The mission of FRIENDS of Great Salt Lake is to preserve and protect the Great Salt Lake ecosystem and to increase public awareness and appreciation of the lake through education, research, and advocacy.

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# EXECUTIVE DIRECTOR'S MESSAGE

## PIECES OF THE PIE AND THE FUTURE OF THE GREAT SALT LAKE ECOSYSTEM – WHEN DO WE SAY THERE IS NO MORE TO GIVE AWAY?

*“Less than 1 % of the entire State of Utah is wetlands. 75% of those wetlands are located in and around the Great Salt Lake Ecosystem. Since the 1950's, wetland habitats in Utah have declined from 1.2 million acres to 558,000 acres.”*

US Fish & Wildlife Service, 1995

The Salt Lake International Airport Master Plan identifies three key factors that will drive a decision to expand the facility in the future. These factors are population growth, income, and employment. When and if those planets align, current operations, which consist of approximately 400,000 flights (900/day), could almost double by 2025 or perhaps sooner.

The Airport is already experiencing some growing pains. However, if growth, income and employment continue to rise, coupled with increased demand for longer international travel, the Airport Authority would see this as justification to create additional capacity to meet the market demands and to minimize delays for passengers as they travel through Salt Lake International.

On average, delays for the 22 million people currently passing through the Airport is 3 minutes. That could be bumped up to 15 minutes in the future if those projections hold true.

Providing additional capacity in Airport terms translates into many things. For Salt Lake International, it would include a new terminal, gate-hold and taxi ways, and extending the length of Runway 2 from 12,000 ft to 15,000 ft. to accommodate heavier aircraft for longer international flights.

In 2007, the Salt Lake City Department of Airports purchased 352 acres of undeveloped land west of the Airport boundary and north of Wright Brothers Drive, near the International Center. That parcel increased the land size of the existing footprint of the Airport to 8,030 acres. It will likely be used for concourses or another runway in the future.

In 1994, when Runway 3 was being built, more than 300 acres of prime wetlands along the south shore of

Great Salt Lake were directly impacted by this construction. One of the most productive ponds of the Black Hawk Duck Club adjacent to Runway 3 was wiped out by the expansion. But as we know, direct impacts are only one part of the picture. Beyond the footprint of the runway, additional acres of wetlands were deliberately dewatered to destroy habitat for nesting birds in order to reduce the potential for bird strikes with aircraft.

Most assuredly, if the Airport chooses to build another runway further to the west, the Black Hawk Duck Club will become history. Extending Runway 2 by another 3,000 ft. is not without its consequences because the Black Hawk is only one of 13 contiguous duck clubs located along the south and eastern shoreline of the lake. These wetland managers oversee more than 13,000 acres of prime habitat for 30% of the ducks of the Central and Pacific Flyways that use Great Salt Lake. It would only be a matter of time before ossification of these wetland properties becomes a reality and another piece of the Great Salt Lake Ecosystem is lost forever.

When do we say there is no more to give away?

If and when Runway 2 is extended and a new runway further west is considered, the existing power corridors and fuel pipelines that border the Airport property will also need to be moved beyond the Airport's sphere of influence. Currently, Holly Corporation in Dallas Texas, is working in concert with UNEV Pipeline, Inc to prepare an Environmental Impact Study for a proposed pipeline around the duck clubs and Airport south to Las Vegas. Fuel consumption in Vegas is projected to increase by 25% over the next five years. This project is anticipated to begin construction in 2009.

It might interest you to know that the mitigation for

the direct impacts to those 300 + acres of wetlands by the Airport back in 1994, has not yet passed muster with the Army Corps of Engineers. And that the Airport is surrounded by high functioning 404 jurisdictional wetlands that are protected under the Clean Water Act. It begs the question of where, how and if successful mitigation for future Airport expansion could even be achieved? And it begs the question of whether it's worth the risk to gamble with these prime wetland habitats to accommodate increased demands for Airport use.

When do we say there is no more to give away?

Speaking of risks - fold this scenario into the existing management practices of the Division of Forestry, Fire and State Lands. Armed with a 12 year old Mineral Lease Plan and an 8 year old Comprehensive Management Plan for the lake, the Division has a history of approving leases for resource development on Great Salt Lake without requiring site specific analysis of cumulative impacts. The Division is required by state law to ensure that the uses of sovereign lands and the protection of the public trust values are not superseded in the name of economic development. The Division's cavalier approach to protecting our hemispherically important ecosystem is disturbing.

In the last two years, the Division not only opened up 175, 000 acres of the lakebed of Gunnison Bay, Great Salt Lake for public offering of oil and gas development, but added insult to injury when it single handedly approved a 23, 088 acre lease for the expansion of Great Salt Lake Minerals Corporation in the same part of the lake. Toss in an additional 8, 000 acres in Bear River Bay, one of the most productive and highest bird use areas on the lake, and the result is a stunning footprint of development equivalent to the size of Salt Lake City (119 sq.mi.).

What is the rationale for this approval? The rationale is to allow the company to nearly double its existing operations from 43,000 acres to 76,000 acres for the purpose of increasing its production of potassium sulfate, a fertilizer. With the expanded operations, 50 new jobs would be created and the state would receive an increase in royalty payments of approximately \$5M per year.

FRIENDS and a host of other stakeholders, including national and international shorebird conservation interests, believe that at the very least, this is in violation of the Public Trust. Our analysis is that the cumulative

impacts from this development may not be fully realized until it's far too late for this complex and fragile system.

When do we say there is no more to give away?

A process is underway by the Army Corps of Engineers to develop an Environmental Impact Study on the project. This is required because of the direct impacts to the aquatic resources, navigable waters, wildlife and their habitats, and water quality. However, much akin to the horse and the barn door, we believe that the due diligence and necessary analysis of this project should have been done before any decision was made. And that decision should have been grounded in sound science instead of outdated management tools and a business as usual approach.

"If you don't measure it, you can't manage it."- Mac McKee, Director, USU/ Utah Water Research Laboratory

On Earth Day, FRIENDS and Western Resource Advocates filed a protest with the State Engineer over a water rights change application submitted by Great Salt Lake Minerals. We protested this application because our research indicates that Great Salt Lake Minerals appropriates huge amounts of water – both fresh and saline – from Great Salt Lake and its ecosystem. The state has never assessed the impacts of these significant water withdrawals on the lake's ecosystem, recreation or the public interest. Until a satisfactory analysis is undertaken, how can the state possibly expect to gauge what promises to be significant adverse effects on the lake and the public interest?

If we only rely on the economic factors to drive our decisions, then the tendency will always be to go for the trend - the world needs more fertilizer, Las Vegas needs more fuel, the Airport needs more runways, and oil and gas leases on Great Salt Lake will generate revenue for the state.

We live together along the shores of something great – the Great Salt Lake Ecosystem. If economics is the only basis for our decisions, then these decisions will be at the risk and at the potential loss of Great Salt Lake.

When do we say there is no more to give away? 🍄

In saline,

Lynn de Freitas

# FRIENDS ORGANIZATIONAL STATEMENT

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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.

In 2005, FRIENDS hired Katie Pearce as Assistant Director, who 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

*American Avocet* by Sungyeon, 2008

Sungyeon is 10. He is a student in Becky Carruth's 5th grade class at Wasatch Elementary School in Salt Lake City. He moved with his family from Korea and arrived at Wasatch sometime during the 4th grade.

The inspiration for drawing the American Avocet came from a class trip to the Tracy Aviary in Salt Lake City. The Aviary initiated a pilot program for 4th and 5th grades focusing on Utah birds, including the migratory birds that come to Great Salt Lake.

Students studied the range and habitats of the birds, as well as the physical and behavioral adaptations. Sungyeon chose the avocet because of its long legs.



*A Few Steps into the Future* by Charles Uibel

# 10TH INTERNATIONAL CONFERENCE ON SALT LAKE RESEARCH & 2008 FRIENDS OF GREAT SALT LAKE ISSUES FORUM

UNIVERSITY OF UTAH - SALT LAKE CITY, UTAH, USA,  
MAY 11-16, 2008

The joint conference will take place at the University of Utah, Ft. Douglas campus, and will cover all topics relevant to the science and management of inland saline ecosystems. The meeting will provide a stimulating mix of scientists, environmental groups and managers with a common interest in the conservation and scientific management of saline ecosystems. 19 countries are represented.

**Register Now - [www.fogsl.org](http://www.fogsl.org)**

Thanks to the many sponsors who have helped to make this event possible

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Mono Lake Committee  
National Science Foundation  
The Nature Conservancy  
The Tides Foundation  
US Geological Survey  
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# SHOULD DILUTION BE THE SOLUTION TO POLLUTION?

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In mid 2004, the Utah Division of Water Quality (DWQ) organized a steering committee to oversee a study of selenium contamination in Great Salt Lake. The steering committee's main objective was to develop a scientifically defensible water quality standard for selenium in Great Salt Lake that would protect aquatic and avian wildlife. The impetus for conducting the selenium study was the need to issue a Utah Pollutant Discharge Elimination System (UPDES) permit for waste loads resulting primarily from the cleanup and treatment of mining-contaminated groundwater in southwest Salt Lake County .

In June 2008, after four years of carefully reviewing scientific research and monitoring activities, in collaboration with a panel of nationally-recognized selenium experts, the steering committee will finally recommend a numeric water quality standard for selenium to the Utah Water Quality Board. The Board will evaluate the recommendation, will invite and consider stakeholder input, then will adopt a final standard. This standard will be used by the DWQ to arrive at permissible point-source discharge concentrations of selenium into Great Salt Lake.

The DWQ frequently allows the use of "regulatory mixing zones" when developing discharge permits. These are areas within water bodies where concentrations of pollutants are allowed to exceed established water quality criteria. Although common in many states, mixing zone policies represent a major loophole in the Clean Water Act (CWA) and should be prohibited. In the case of selenium in Great Salt Lake, the use of mixing zones to develop discharge permits may result in the creation of selenium "hot spots" that pose a direct threat to existing and future generations of aquatic and avian wildlife.

According to the CWA, effluent limits must be set at the point of discharge, meaning that the use of mixing zones to dilute pollutants should not be allowed. Despite specific language in the CWA, the EPA has determined that the use of mixing zones does not violate federal law provided the mixing zones do not eliminate beneficial uses in the water body as a whole . Currently, every state has mixing zone regulations or policies that allow pollutants to be diluted before being measured for compliance. This practice serves to weaken established water quality standards.

Regulatory mixing zones are regions within public waterways that surround a discharge structure, such as an outfall pipe, submerged pipe or diffuser line, where

pollutants are discharged into a receiving water body and allowed to disperse and become sufficiently diluted through mixing with ambient water to meet water quality standards. In general, mixing zones are comprised of multiple dilution zones, with regulatory limits, or criteria, established at each dilution zone boundary. It is assumed that when pollutants finally reach the outer boundary of the entire mixing zone they are sufficiently diluted to meet all water quality criteria and standards established for the water body as a whole.

When waste loads are discharged into a receiving water body, two general types of mixing occur. Primary mixing occurs as the waste load exits the discharge structure. In the primary mixing area, mixing is mostly dependent upon physical parameters such as the momentum and buoyancy of the waste load and the physical dimension of the outfall pipe or diffuser line. Within the primary mixing area, acute aquatic life criteria are likely to be exceeded, while at the outer boundary of this area, these criteria must be attained. According to Utah administrative rules, acute mixing zones cannot exceed 35 feet in lakes and reservoirs .

As waste loads flow beyond the primary mixing zone, they undergo further mixing. In the secondary mixing area, mixing is mostly dependent upon ambient characteristics of the receiving water. Within this area, chronic aquatic life criteria are likely to be exceeded, while at the outer boundary (of the entire mixing zone), the chronic aquatic life criteria must be attained. Utah's administrative rules limit chronic mixing zones to 200 feet in lakes and reservoirs .

Mixing zones are calculated and designed through mathematical modeling prior to the issuance of a NPDES permit and subsequent discharge of pollutants. The actual size and boundaries of mixing zones are often unknown, and may change dramatically on a daily or seasonal basis. Tides, currents, topography, salinity, temperature, background water quality and the nature of the pollutants themselves contribute to the cumulative uncertainty for modeling mixing zones. As a result, mixing zones vary widely in size, shape and dilution efficiency.

Determining the impacts and risks to an aquatic ecosystem from mixing pollutants with receiving waters at levels that exceed water quality standards is extremely complex. The procedures employed by different states to calculate



and measure regulatory mixing zones are as varied as the types of pollutants discharged. In some cases, regulatory mixing zones may be simply back-calculated to directly address the needs of the discharger. In other cases, mixing zones may be banned altogether. In November of 2000, the EPA officially banned the authorization of new mixing zones for waters entering into the Great Lakes for a variety of bio-accumulative, persistent toxic chemicals.

Mixing zones are difficult to measure and monitor with any degree of certainty for compliance and enforcement purposes. Complete mixing within a regulatory mixing zone cannot be guaranteed to meet modeling expectations. Commonly, target parameters for mixing zones are not accurate or relevant to localized conditions. Few mixing zones are adequately evaluated or monitored to assess the impacts of the mixing zone on the aquatic environment. Mixing zones also create economic disincentives for the discharger to implement best available technologies for treating waste loads or improving operational efficiencies, and discourage effluent reuse and product substitution.

Mixing zone policies undermine one of the primary objectives of the CWA, which is to eliminate all toxic discharges in public water bodies. By creating localized plumes of polluted water that exceed established water quality criteria they allow regulators to shift the point of compliance from the “end of the pipe” to the outer boundaries of a dilution zone. As a result, mixing zones cause contamination of phytoplankton, zooplankton and algae, which are fundamental elements of the food chain; threaten sensitive aquatic species that drift or swim through dilution zones; threaten avian wildlife that spend prolonged periods feeding or resting in the contaminated plumes; and dramatically alter submerged plant communities and wildlife habitat. Mixing zone policies also fail to provide for the protection of threatened or endangered species from exposure to concentrated waste loads, which can attract resident, migratory and invasive species to a polluted dilution zone.

The Utah Division of Water Quality has a history of allowing the use of mixing zones when developing discharge permits. If they proceed with this “business-as-usual” approach to the new numeric standard for selenium in Great Salt Lake by allowing mixing zones in discharge permits, they will undermine the four years and \$2M of focused research, evaluation and decision making that

has gone into the Steering Committee’s final recommendation. For this reason, along with many others, the Steering Committee must insist on a numeric selenium standard sufficiently low to minimize the negative effects of a mixing zone.

The solution to pollution should never be dilution. 🐼

Jeff Salt, Executive Director, Great Salt Lake Keeper

See [http://www.deq.utah.gov/Issues/GSL\\_WQSC/selenium.htm](http://www.deq.utah.gov/Issues/GSL_WQSC/selenium.htm). In general, water quality standards are the sum of the designated beneficial uses provided by a waterbody, water quality criteria, which are numeric or narrative limits on pollution sufficient to protect the designated beneficial uses assigned to the waterway, and an antidegradation policy.

See Southwest Jordan Valley Groundwater Cleanup Plan, <http://www.deq.utah.gov/Issues/nrd/index.htm>. See also, Developing A Selenium Standard For Great Salt Lake, Walt Baker, October 2005, [http://www.deq.utah.gov/Issues/nrd/docs/SWJordanValleyCleanupProjectStakeholder'sForum\\_101205.pdf](http://www.deq.utah.gov/Issues/nrd/docs/SWJordanValleyCleanupProjectStakeholder'sForum_101205.pdf)

See Clean Water Act, 33 U.S.C. §§ 1251-1387.

See Clean Water Act (1994), 33 U.S.C. §§ 1251-1387, at 3, § 1312(a).

See EPA, Policy and Guidelines On Mixing Zones, 63 Fed. Reg. 36, 788 (July 7, 1998)

See Utah Administrative Code R317-2-5, Mixing Zones.

Generally, Acute Aquatic Life Criteria is the concentration of a known toxic substance that causes a threshold percentage mortality in samples of a species over period of exposure. See also, Development of Aquatic Life Criteria For Selenium: A Regulatory Perspective On Critical Issues and Research Needs. Keith G. Sappington. Aquatic Toxicology Volume 57, Issues 1-2, April 2002, Pages 101-113. doi:10.1016/S0166-445X(01)00267-3. See also, EPA Technical Support Document for Water Quality-Based Toxics Control (TSD.) See also, EPA, Water Quality Standards Handbook, Second Edition. (EPA-828-B-94-005A, 1993.) See also, C.E. Stephan and others. 1985. Guidelines for Deriving Numeric National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses. US Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratories, Duluth, MN, Narragansett, RI, Corvallis, OR. EPA 822/R-85-100.

See Utah Administrative Code R317-2-5, Mixing Zones.

Generally, Chronic Aquatic Life Criteria is the concentration of a known toxic substance that causes a measurable effect on growth in samples of a species over a specified period of exposure (at non-lethal doses). See also, Sappington, April 2002. See also, EPA Technical Support Document for Water Quality-Based Toxics Control (TSD.) See also, EPA, (1993.) See also, C.E. Stephan and others. 1985.

See Utah Administrative Code R317-2-5, Mixing Zones.

CORMIX and PLUME are commonly accepted mathematical models used to predict the fate of waste loads and effluent in mixing zones. See EPA, Technical Support Document for Water Quality Based Toxics Control, p. 33, (EPA/505-/2-90-001, Mar. 1991).

Complete mixing is defined as the point at which there is less than 5% variation in a pollutant’s concentration within specified boundaries of the receiving waters.

# THE GILLMOR SANCTUARY

## VOLUNTEER OPPORTUNITIES



*The Sunset Heard Round the World by Charles Uibel*

Many Hands Make Light Work at the Gillmor Sanctuary: Help National Audubon Continue to Move Forward with the South Shore Property

Exciting things happened this past summer on the National Audubon Society's Edward L. and Charles F. Gillmor Sanctuary. A major restoration project began and by fall nearly 85% was completed.

The trail has been long and bumpy. It all began in 1995 when an anonymous donor made a generous land donation of 1,319 acres in the Brown's Island area to National Audubon Society. This generous gift was a huge catalyst. Slowly but consistently through the intervening years piece by piece has been added toward the creation of the South Shore Preserve a joint effort between Audubon

and The Utah Reclamation Mitigation Conservation Commission.

Twelve years of complex and complicated negotiations, most involving assistance from The Nature Conservancy, have resulted in acquisition or easements on 2,433 acres along the shoreline of Great Salt Lake. In addition rights to about 3,000 acre feet of water per year have been secured.

Over 2000 years have elapsed since the Jordan River flowed through the Brown's Island area, sculpturing channels and river islands. The river-carved topography is still amazingly intact but the old delta is dry; bereft of water as the river moved its course further to the east. Understanding the prehistoric geological processes in

the area lends insight into the uniqueness, charm, and special character of the Sanctuary.

In summer 2007, with the final land and water pieces in place the enhancement project moved forward and most of the new water delivery system is now completed. This included constructing fourteen berms, excavating over a mile of canal, and building the main control structure that will introduce water into the entire system. We are allowing the berms to settle over the winter and as soon as weather conditions permit, the remaining five water control structures will be installed. Funding for the Project came from NRCS, the Mitigation Commission Ducks Unlimited helped with design and ordering pipes and water control structures.

Sometime in summer 2008 when the final five water control structures are in place, the portals will be open, redirecting a portion of the Jordan River water back into the ancient waterways.

A call for volunteers to a remote, seldom visited site -

The Brown's Island Area lies near the highly populated Wasatch front but it is considered remote and few people have visited although many have flown over it on commercial flights to and from the Salt Lake City Airport. It has been protected for over a century by ranchers and other families.

Today the South Shore preserve is an area of wide open vistas, wildlife including antelope, curlew, short-eared and burrowing owls, brewers sparrows, meadowlark, black-tailed jackrabbit, coyotes, racers, and gopher snakes. A peaceful place where wildness still abounds. The future holds exciting water enhancements to attract birds to the low lying dry areas. The uplands will remain unaltered until a major revegetation effort can restore the native ground cover.

The time has come to begin to make this wonderful place of wildlife available to be enjoyed by more of the community. To begin this inauguration, Audubon will be initiating several volunteer projects:

#### Bird Surveys

Weekly surveys will be conducted to document the changes that take place when shallow water is seasonally introduced into low dry playa areas. The management goals are to create a diversity of saline, brackish and fresh water habitats that attract a wide range species

that breed, migrate and winter near Great Salt Lake. The surveys will continue in future years to aid in management decisions. Survey Points have been placed through out the Preserve. "Existing Conditions" surveys are currently underway. I am conducting the surveys but invite volunteers to accompany me and learn the technique, route, and schedule.

#### Water Tracking

In Summer 2008, when the remaining enhancements are completed, water will flow back into the delta after thousands of years absence. What an exciting event! The eastern portion of the Sanctuary consists of major channels of the prehistoric Jordan River and the water flow route is well defined. In the western portion, as the old river approached the stationary water of Great Salt Lake, it slowed and fanned out over a large wide area in spring flooding season. The area is so flat that our one foot contours are inadequate to predict where the water will flow. When water is first released an organized volunteer force will be strategically positioned through out the western portion of the Preserve. Some will remain stationary and record the arrival or non-arrival of the water at a given point. Others will attempt to follow and document the path of the released water. These important data will help refine and address potential modifications to the topography.

#### Noxious Weed Mapping

Russian knapweed, dalmatian toadflax, Scott's thistle, tamarisk are the major invasive species that need immediate attention. One of the first steps in control of these weeds is mapping the site and understanding the extent of the infestation. Volunteers are needed to help document location of infested areas. 🐿

Ella Sorensen, National Audubon/Mgr.  
Gillmor Property

Anyone interested in volunteering for any of these three tasks please call Ella Sorensen 966-0464, leave a message at 856-6254, or e-mail to [esorensen@audubon.org](mailto:esorensen@audubon.org).

# SELENIUM STANDARD

## NON TOXIC, NO EFFECT STANDARD FOR SELENIUM IS OUR RECOMMENDATION

The Utah Division of Water Quality (DWQ) is nearing completion of an historic first numeric water quality standard for Great Salt Lake (GSL). The decision to embark on this process was stimulated by public reaction to a discharge of ground water contaminants containing selenium into Great Salt Lake. The goal was to produce a water quality standard for selenium that would be protective of GSL water birds for the 40 year duration of the ground-water cleanup process and beyond.

Selenium enters GSL from discharges and tributaries and then becomes concentrated through food chain organisms to birds. Toxicity is exhibited in waterfowl and shorebirds by reproductive impairment. Two years of data collection has produced selenium measurements in Great Salt Lake water, sediment, food chain organisms, and water birds including eggs of nesting birds. Selenium loading and losses were measured and a mass balance model created. Research has been guided by a Science Panel of experts and overseen by a Steering Committee composed of stakeholders.

A water quality standard value will be developed by back calculating from an egg selenium concentration using site-specific transfer factors derived from the research. Funding of this \$2.6 million project has come predominately through the Utah DWQ which is responsible for monitoring GSL water quality and beneficial uses under the Clean Water Act.

Detailed information regarding the scientific process, data interpretation, science panel and steering committee members and decisions is available on the Utah Department of Environmental Quality website [www.deq.utah.gov](http://www.deq.utah.gov). See GSL Water Quality Steering Committee under "Issues to Watch", then click on selenium.

A decision by the Steering Committee on May 29 and later this summer by the Utah Water Quality Board will depend in part on the philosophical question "How protective should we be of GSL and its wildlife?" The research to date has shown no demonstrable egg toxicity in the California Gulls, American Avocets and Black Necked Stilts studied. The geometric mean selenium concentrations in gulls eggs was 2.89 micrograms/gram (ug/g) dry weight and 2.72 ug/g in shorebirds eggs. One shorebird egg collected near the Kennecott discharge site had elevated selenium to 9.2 ug/g. All birds had elevated blood and liver levels of both selenium and mercury. Reproductive effects to non-

nesting birds such as Eared Grebes could not be assessed. Elevated mercury levels have recently been found in some GSL waterfowl.

There are many reasons to be most protective of this resource. Great Salt Lake is a unique terminal water body of global importance to millions of water birds dependent upon its biota as a major food source during migration and nesting. Great Salt Lake is the most important inland site for shorebirds in North America and the major site of waterfowl nesting and migration in the intermountain west. Remediation of toxic levels of selenium once they occur in this terminal lake may be impossible.

The EPA as well as most science panel members have recommended that a water quality standard for Great Salt Lake which results in an average 10% reduction in hatchability or (EC10) would be protective with reasonable risk. However, with this standard comes statistical uncertainty ranging between 4% and 24% reduction in egg hatching. This 10% toxic effect would be additive every nesting season to other factors causing bird mortality. The mean egg selenium concentration associated with the EC10 is 12.5 ug/g which is over 4 times the currently measured egg level in GSL shorebirds.

Joseph Skorupa, The Clean Water Act Biologist for U.S. Fish and Wildlife Service and science panel member has made it clear that "A tolerably toxic approach for such a high value system is reckless" and recommends a standard at or below the no-effect concentration, called the NEC. He recommends 5 ug/g as the best estimate of a non-toxic standard.

As representatives of the conservation community on the Steering Committee, we believe that a non-toxic standard for GSL is both practical and fully protective of our unique resource. A non toxic, no effect standard is our recommendation. We do not agree that Great Salt Lake should be managed to a toxic standard that at worst case may be toxic to 24% of water bird eggs before impairment is reached.

Dr. Maunsel Pearce, Great Salt Lake Alliance  
Chris Montague, The Nature Conservancy

Alternates:  
Lynn de Freitas, FRIENDS of Great Salt Lake  
Bruce Waddell, Great Salt Lake Alliance



# THE UTAH AIRBOAT ASSOCIATION/UTAH AIR BOAT INC.

## WORKING TO RESTORE AND PROTECT THE GREAT SALT LAKE

The Utah Airboat Association (UAA), legally known as Utah Air Boat Inc. has a long history here in Utah. In the early 1940's, workers at the Bear River Migratory Bird Refuge in Brigham City built an airboat to help get around in the marsh. A local company, Anchor Marine, took heed and began building and supplying airboats to various bird refuges. These boats represented a huge improvement in waterfowl research and refuge maintenance.

By the late 1950's there was a growing popularity of airboats in Utah and in the early 1960's a group of hunters decided to form an organization of like-minded individuals with airboats. The Utah Airboat Association was born out of the desire of these people to work toward wetland conservation as well as enjoying the hobby that they loved.

The Utah Airboat Association promotes the interests of airboating, cooperates with state and federal agencies for the enforcement of wildlife rules and regulations, and works toward conservation of wetlands and waterfowl.

After the flooding of the 80's, the UAA started building nesting platforms for ducks and geese at several Waterfowl Management Areas in Utah. Over the last 3 years, it has joined together with the Utah Waterfowl Association in their duck-nesting project at Farmington Bay WMA. UAA supplies manpower, airboats and fuel to install and maintain duck and goose nesting structures.

Each year, the Airboat Association performs service projects that have included lakefront debris clean-ups, beach clean-ups at Antelope Island, clean-up of Decker Lake, nesting structures, and boat ramp repairs/maintenance.

The Airboat Association has also been involved with spraying and control of the invasive species of Phragmites that is currently destroying the marsh along the Wasatch Front. This issue is of great concern because it has claimed and destroyed hundreds of thousands of acres of prime migratory bird breeding and staging habitat along the Great Salt Lake shoreline marshes.

Currently, the Airboat Association is involved in the fight to save Bear River Bay from development by GSL Minerals. Association members have written letters and attended meetings in an effort to make their views known to the Army Corps of Engineers. To better expose the issue, airboaters have also been taking reporters from the print and television media out to the area that is under threat.

The Utah Airboat Association members have a deep love and concern for the Great Salt Lake and it's marshes. With threats to the lake's complex ecosystem arising more and more frequently, airboaters feel it is vitally important to help protect this valuable and beautiful Utah resource. 🦋

R. Jefre Hicks  
Utah Air Boat, Inc.



*At Work by J. Hicks*

# GREAT SALT LAKE EDUCATION

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## EXTREME GSL ENVIRONMENTS FOUND IN THE CLASSROOM



L. Martin Gonzalez transferring lake water into test tubes at the Center for Integrated BioSystems, USU.

Biology students, Cristian Navas, Martin Gonzalez and Mario Clavel from Logan High School/South Campus are participating in an investigation into extreme environments as found in the Great Salt Lake.

The students work alongside the faculty of the Center for Integrated BioSystems at Utah State University. With the help of Dr. Bart Weimer, Dr. Steven Albee-Scott, Dr. Giovanni Rompato and Dr. Jacob Parnell, the students have isolated and sequenced the DNA of bacteria never before seen by man. They are in the process of writing up this research to submit to a peer reviewed scientific journal.

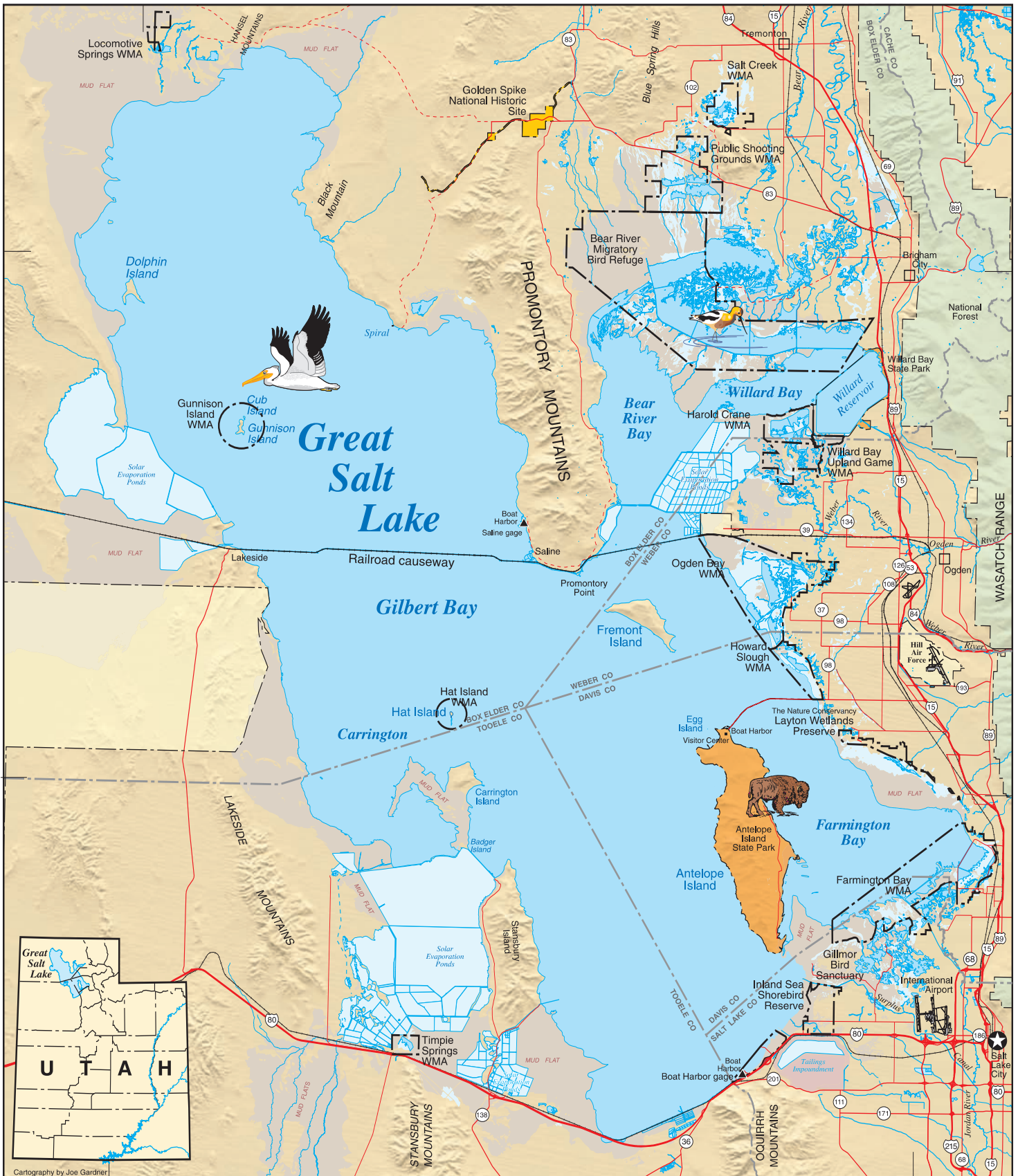
This curriculum was designed to integrate high school students into an existing Great Salt Lake research program. Students work as molecular biologists throughout the year where they isolate bacteria, extract DNA, sequence target genes and identify unknown isolates. They have all the tools a university researcher has available to them.

The beauty of this research is that it will not only help scientists understand such a unique environment but it will also help scientists understand how life responds to extreme environments as found in outer space and on other planets.

Stay tuned.

Dr. Steven Albee- Scott  
Utah State University  
Center for Integrated BioSystems

# GREAT SALT LAKE AT A GLANCE



Courtesy of USGS



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

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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](mailto:ldefreitas@earthlink.net)

## Salt Lakes, Living Lakes



Photo courtesy of the Mono Lake Committee

How would one go about achieving the vision that “all lakes, wetlands, and freshwater bodies of the world should be healthy ecosystems and where they are used by human kind that use should be sustainable and not damaging to the environment?” To start, you don’t do it alone. An idea hatched by a small collection of like-minded nongovernmental organizations (NGOs) in 1998, the Living Lakes Network has

fledged into an organization championing lakes protection around the world. Living Lakes’ mission is “to enhance the protection, restoration and rehabilitation of lakes, wetlands, other freshwater bodies of the world and their catchment areas.” These are lofty ideas, and what we’ve seen is that they’re also good enough to take flight. Now ten years old, the Living Lakes Network is comprised of 45 lakes in 52



countries around the world. It's really looking like a real flock.

Initially the Network had a goal of nominating one representative lake from each country. Clearly, every lake in the world is an important resource, but for the purpose of creating an effective network, each lake in the Living Lakes Network must have an NGO specifically charged with protecting that lake. As the network (as well as global awareness of the importance of lakes), has grown so Living Lakes has expanded its scope by creating sub-nets to encourage the sharing of knowledge within countries and regions to achieve its goals.

The Mono Lake Committee, itself a 16,000 member grassroots nonprofit organization and founding member of the Living Lakes Network, is working to develop a Living Lakes sub-net for the United States. There is a great common cause between people who are working to protect the best interests of lakes and wetlands and the communities around them. That is why the Living Lakes Network now has within it a growing family of regional and national sub-networks where some of the same magic can be shared.

It is clear that Great Salt Lake and FRIENDS of Great Salt Lake are a natural partner for Mono Lake, sharing some of the unique and wonderful challenges only saline lakes can. But the power of the Network goes beyond the basics of the ecosystems to the issues at hand. Unplanned development, increased recreation pressures, water quality degradation, effective ecosystem protection, effective habitat restoration, and proactive education programs are just a few of the many places where people working on lakes protection can intersect. Do any of these sound familiar to Friends of Great Salt Lake? Surely they do. The body of knowledge gathered by these lake protectors is vast, and can be an important resource if there's a network in place to facilitate sharing this knowledge. The ability to pick up the phone and call another organization working on similar issues can be as valuable as money.

Just recently in Estonia, half a dozen lakes in Eastern Europe celebrated three years of networking together. They are now trying to find finance that would allow them to develop the project across the region. Other regional networks are starting in East Africa and Ibero-America. Connections are also being made

within countries. Seven Italian lakes have been united for nearly a year, having gotten together to develop policies and activities that would permit sports and leisure activities to exist in harmony with good lake management. The two year old Living Lakes Network in China is poised to become a potent voice in developing the country's response to the great challenges of balancing the environment against great economic growth. Canada is developing a national network at this time as well.

This May, in conjunction with the International Society for Salt Lakes Research conference at Great Salt Lake, there will be a gathering hosted by the Living Lakes Network to test the waters, so to speak, with an idea to initiate a Living Lakes United States Network.

Still wondering how a network focused on drinking water and a conference focused on salt water can come together for a successful discussion? Like the Living Lakes Network, it's time to think big--when you're thinking at the watershed level, we guarantee there will be good connections made. Please join us for a lively discussion at the International Society for Salt Lakes Research conference, or contact Arya Degenhardt, Communications Director at the Mono Lake Committee at (760) 647-6595 or [arya@mono-lake.org](mailto:arya@mono-lake.org).

For more information on the Living Lakes network visit [www.globalnature.org](http://www.globalnature.org).

Arya Degenhardt,  
Communications Director, Mono Lake Committee

Roger de Freitas,  
member of Living Lakes Network

# DISCOVERING OUR LAKE

## Great Salt Lake and Mono Lake: Gateways to the Great Basin



*Welcome to Mono Lake by Roger de Freitas*

Great Salt Lake brackets the Great Basin on the east, a salty sentinel that welcomes flocks of California Gulls each breeding season; 450 miles away, Mono Lake completes the bracket at the western edge. These two sister lakes are bookends for a landscape where the earth wrinkles in ranges and basins, and where lakes have no outlet except the sky.

Mono Lake's briny composition has been evolving for close to one million years. Fresh snowmelt racing down the Sierra Nevada carries trace amounts of salts and minerals to the basin's floor, where they collect and slowly increase in concentration as the fierce desert sun sucks fresh water from the lake's surface. Like most terminal lakes, Mono Lake's level has fluctuated dramatically with changes in climate, but in the last century, those fluctuations became manmade.

In the year 1941, the Los Angeles Department of Water & Power completed an aqueduct system that intercepted fresh water from four of Mono Lake's five tributary streams. Diversion dams placed on creeks channeled

water south in a 350-mile journey to the growing city, leaving little or no water to flow into the lake.

After 40 years of diversions, Mono Lake had dropped 45 vertical feet and lost half its volume, causing its salinity to double. Like Great Salt Lake, this western counterpart's unique chemistry supports endemic species of brine shrimp and alkali flies, which in turn attract millions of migratory birds to the basin. As Mono Lake's level dropped, this abundant chain of life was seriously threatened.

Today, after years of litigation, public education, and the hard work of habitat restoration, Mono Lake has risen ten feet from its parched low, and is guaranteed ten more feet of water by the California State Water Resources Control Board. The streams flow once again, bringing back forests of cottonwood and willow populated by hundreds of songbirds. Brine shrimp and alkali flies multiply in trillions during the summer months, and California Gulls continue to return by the thousands to nest and take advantage of the feast.



*California Gulls* courtesy of the Mono Lake Committee

Walking near Mono Lake, one draws skeptical looks from the gulls that bob just offshore snapping up unsuspecting shrimp. The birds cannot know that humans were responsible for their reproductive crisis in the early 1980s, when the lake dropped far enough to turn the gulls' primary breeding island into a peninsula subject to visits from hungry coyotes. Likewise, they do not know that humans eventually fixed that mistake, allowing enough water to flow into the lake to cover the land bridge and restore the gulls' safe haven.

But we humans can know these things. And it is truly one of the greatest discoveries to be made here: that even though humans severely damaged this desert oasis, we have also begun to make things right.

Mono Lake's shore holds other surprises, like a Snowy Plover nest hiding among the stones or a stray feather shed by a preening Red-tailed Hawk. Flocks of White-faced Ibis browse among reeds as Great Basin spadefoot toads hop hurriedly along. Limestone tufa towers signal fault lines

through which freshwater springs once bubbled up into the briny lake, and sometimes these towers wear bristly crowns of sticks—Osprey nests where hungry chicks await the call from parents bearing fish from nearby re-watered streams. Coyotes stalk jackrabbits through the brush, sending the delicious acrid smell of sage into the air. And everywhere, the calls of birds rise into a huge dish of sky, bound only by the Sierra crest and perhaps a pale waxing moon.

What will you find along the shores of Mono Lake? 🐦

Elin Ljung, Communications Coordinator

## HOW TO REACH US

FRIENDS of Great Salt Lake  
P.O. Box 2655  
Salt Lake City, UT 84110-2655  
801-583-5593  
email: [mail@fogsl.org](mailto:mail@fogsl.org)  
website: [www.fogsl.org](http://www.fogsl.org)

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**Matt Crawley:** Newsletter Layout  
[matt@celadonstudios.com](mailto:matt@celadonstudios.com)

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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](mailto:ldefreitas@earthlink.net) or call 801-583-5593.



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## GREAT SALT LAKE PEOPLE AND SISTER SALINE LAKES, TOO

**Shared much like the Nobel Peace Prize**, the 2008 Friend of the Lake Award will be given to two outstanding Great Salt Lake advocates – one a doctor, the other a lawyer. Congratulations to Dr. Maunsel Pearce, Chair of the Great Salt Lake Alliance and Joro Walker, attorney with Western Resource Advocates. Both have worked tirelessly to raise awareness about the importance of the Great Salt Lake Ecosystem and to defend its long term sustainability as a hemispherically important ecosystem. Established in 2002 by FRIENDS in recognition of the talent of an individual, business or organization performing outstanding work to benefit the Lake, we are grateful to Maunsel and Joro for their dedication.

**A warm welcome to Ted Wilson**, the new Executive Director of the Utah Rivers Council. As a former mayor of Salt Lake City, Ted brings a wealth of experience and understanding of politics, the environment, trends and issues in the Greater Great Salt Lake community.

**A delegation from the Mono Lake Committee** will be participating in the Joint Conference of the International Society of Salt Lake Research & FRIENDS of Great Salt Lake, May 11-16th. The Mono Lake Committee was the catalyst behind the formation of FRIENDS in 1994. Their determination and success in protecting the Mono Lake Ecosystem from being drained dry by a thirsty Los Angeles continues to inspire us in our work to preserve and protect the Great Salt Lake Ecosystem.

**Congratulations to Dr. Bonnie Baxter**, Associate Professor of Biology at Westminster College. Baxter's work on halophilic organisms aka "extremophiles", in Great Salt Lake's Gunnison Bay won her the Governor's Medal for Science & Technology. Bonnie's never ending enthusiasm for her work and the lake has inspired many of her students to follow in her footsteps. The lake is lucky to have Dr. Baxter in the neighborhood.

### Lake Fact:

How many gallons of water is equal to 1 acre foot of water?

Answer: 236,000 gallons, which is enough water for a family of 4 for 1 year.



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Airboats on Bear River Bay by Charles Uibel ©2008