



FRIENDS of *Great Salt Lake*

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Volume 6 Number 1

801/583-5593

Fall 1999



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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SPECIAL THANKS TO:

**The Ruth Eleanor Bamberger and
John Ernest Bamberger Memorial Foundation**
and

The Laird Norton Family Fund
for their generous support of our education programs.

Fall 1999 Calendar of Events

October 23-24, Sat. and Sun.	Stansbury Exploration Sesquicentennial Auto Tour
October 26, Tuesday	General Meeting 7:00 p.m.
November 4, Thursday	Board Meeting 7:00 p.m.
November 23, Tuesday	General Meeting 7:00 p.m. Great Salt Lake Planning Process Update
December 2, Thursday	Board Meeting 7:00 p.m.

Watch the local papers for announcements of speakers and topics at our General Meetings,
or call our hot-line at 801/583-5593, and press 1 for monthly activities.

NOTE: General Meetings are held at the Sugarhouse Garden Center, located in the northeast corner of Sugarhouse Park, 2100 South 1300 East in Salt Lake City. Board Meetings are held at the Salt Lake County Complex on State Street and 2100 South in Salt Lake City.

Cover: Great Salt Lake State Marina. Photo by Lynn de Freitas.



President's Message

A Plan With Possibilities

In September, I was asked to speak to the Weber County Chapter of the League of Women Voters. The League's members wanted to hear about the planning process for the Lake and how Friends participated in it. The working title for the talk was "A Plan With Possibilities."

The invitation provided a wonderful opportunity to ask Jim Carter, former planning team leader for the project and current advisory board member for Friends, to share the podium. Jim provided just the right touch of background information to build a framework of continuity to the current phase of the process as we know it today.

There were lots of good questions about brine shrimp, salinity and the railroad causeway, water quality issues, mineral extraction, lake levels and pumping, migratory birds and their habitats. It was no surprise that the League was up to speed on lake issues. We talked about the importance of the Scientific Review Committee's Report to the planning team and how their recommendations could be considered. We talked at length about managing sustainably for the long term and the unique characteristics of Great Salt Lake as a terminal basin. We even touched on comprehensive watershed-based restoration and protection for Great Salt Lake and our upcoming Issues Forum in February addressing that topic.

With that, we looked ahead to the next phase. The Great Salt Lake Planning Team has targeted early November for release of the final draft document. It will present the preferred management alternatives for the lake and each alternative will have a stated rationale to provide a basis for that alternative. The final draft will also include an economic review, an ecosystem section, a monitoring and implementation section along with a

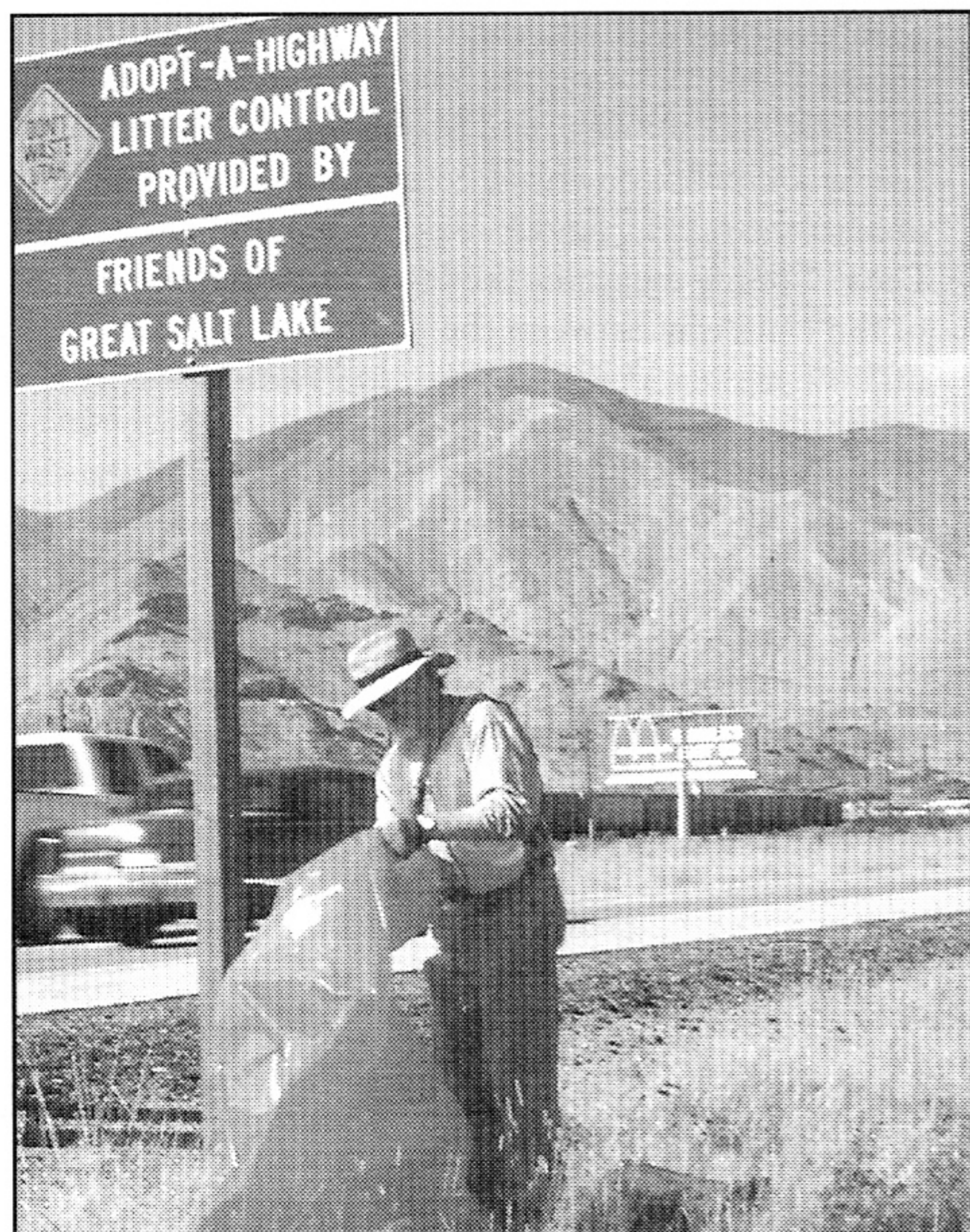
process and structure section. The report from the Scientific Review Committee and a more detailed breakdown of that initial report will also be available. Also included will be responses to all of the comments made by the public during the process. Finally!

Whatever that November date is, we will have a 45 day commenting period on the final draft. We have invited the planning team to come to our November 23 general meeting to discuss the draft and answer questions. If all goes according to plan, the final planning document for the lake will be in place by late January.

If wishes were fishes (or if wishes were brine shrimp), the final document could provide a wonderful foundation for an iterative process whereby, we could continue to refine and consider the possibilities of a long term sustainable management plan for our Great Salt Lake. Who knows?

On behalf of our Great Salt Lake and its myriad occupants.

Lynn de Freitas



Ivan Weber lends a hand during the Friends' final highway clean-up near Saltair on July 17, 1999. Photo by Lynn de Freitas.



Measuring the Level of Great Salt Lake

By Don R. Mabey, geophysicist and
Genevieve Atwood, Chief Education Officer, Earth Science Education.

In historic time the elevation of the surface of Great Salt Lake has varied by about 20 feet from a high in the 1860s and 1870s to a low in 1963 and another high in 1986 and 1987. Measuring the elevation of the lake has been a difficult and sometimes controversial task.

The first measurement of the elevation of the surface of Great Salt Lake was by John C. Fremont in September 1843. Fremont wrote: "From a discussion of the barometrical observations made during our stay on the shores of the lake, we have adopted 4200 feet for its elevation above the gulf of Mexico" (Jackson and Spence, 1970). The procedure used by Fremont provides only an approximate elevation. On a subsequent expedition Fremont provided a more useful measure of the lake level. He rode his horse across the bar to Antelope Island and noted that the water nowhere reached above the saddle girths. We now know that the elevation of this bar is about 4200 above sea level so we conclude the elevation of the lake surface at the time of Fremont's ride was about 4202 feet.

When G. K. Gilbert of the Powell Survey and later the U. S. Geological Survey (USGS) studied Great Salt Lake and its predecessor Lake Bonneville, he observed that the first "definite determination" of the lake level fluctuations began in 1875 when John R. Park of the University of Utah erected "a granite block cut in the form of an obelisk and engraved on one side with a scale of feet and inches" (Gilbert, 1890). Over the next six years the lake level declined several feet leaving this gage and two subsequent gages high and dry. A fourth gage established at Garfield Landing in 1881 provided observations for 20 years. Gilbert placed a block of granite well above the lake near Black Rock in 1877, and determined the elevation of the early gages and later the Garfield Landing gage relative to this block.

To determine how the level of Great Salt Lake had fluctuated between 1847 when the Mormon settlers arrived and 1875 when the first gage was established, Gilbert interviewed people who had moved livestock to and from Antelope and Stansbury Islands. Using their recollections of the water depth over the bars connecting the islands to the mainland he developed a hydrograph of the lake for this period. Gilbert wrote "The Antelope Island

bar thus affords a tolerably complete record from 1845 to 1865, but fails to give any later details. It happens, however, that the hiatus is filled at another locality. Stansbury Island is joined to the mainland by a similar bar, which was entirely above water at the time of Capt. Stansbury's survey, and so continued for many years" (Gilbert, 1890). The U. S. Geological Survey uses this "traditional" data developed by Gilbert for the pre-1875 period on the hydrograph they currently distribute. However, a hydrograph published by the USGS in 1914 differs significantly for the early period (Henshaw and others, 1914). After a sea level reference was surveyed into Utah, the earlier measured lake level fluctuations were referenced to a sea level datum.

Today the USGS operates three gages on Great Salt Lake. The gage at the boat harbor at the Saltair Beach State Park and the one at Promontory Point monitor the level of the main body of the lake south of the railroad causeway (Gilbert Bay). The gage at Little Harbor (Saline) monitors the lake level north of the causeway (Gunnison Bay). The data from these gages are transmitted by a satellite downlink to the USGS and made available to the public. About once each month surveyors for Davis County measures the level of the lake on each side of the causeway between the north end of Antelope Island and the mainland (Gilbert Bay and Farmington Bay).

Establishing and maintaining gages on the lake has proven to be difficult, and benchmarks on the unstable lakebed used as reference elevations have proven unreliable. The USGS reports: "Discrepancies in the lake elevations led to revisions of the base datum and the water-level record from April 15, 1984, to September 30, 1995. There is currently a consistent discrepancy of approximately 0.7 foot between the elevations recorded at the Saltair (Boat Harbor) gage and the Promontory Point gage, both of which are on the south part of the lake" (USGS Web Site, 1999). The Davis County measurements at the Antelope Island causeway are referenced to a benchmark east of the lake, and Davis County's measurements of the elevation of the main body of the lake agree with the Boat Harbor gage. The Saline and Promontory Point gages are both tied to the same reference benchmarks, and they both may be in error. (The error, which currently appears to be a little less than 0.6 feet, makes



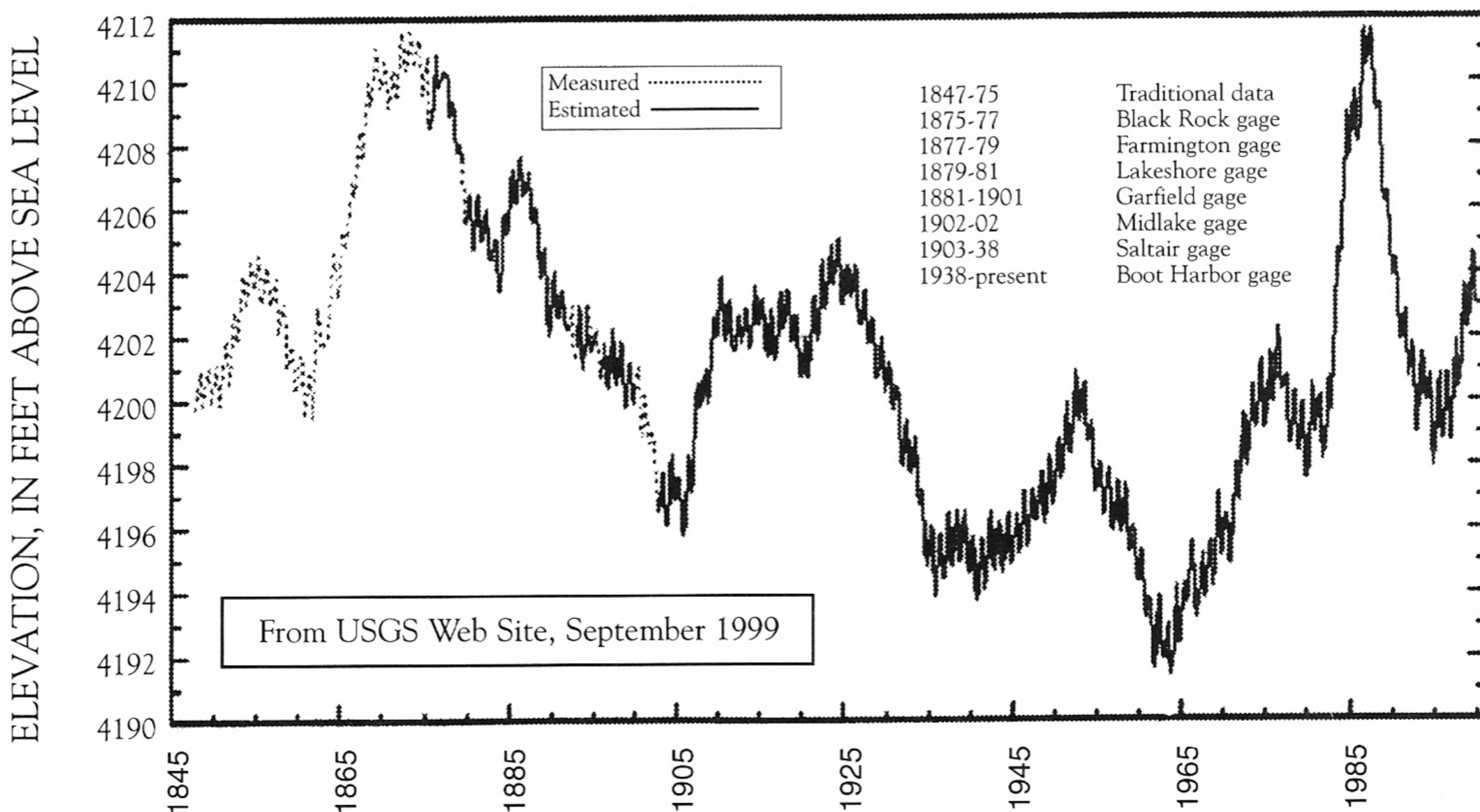
the reported Promontory Point level lower than the Boat Harbor level.) The difference in elevation of the lake on the two sides of the railroad causeway is a critical consideration in developing strategies for the managing Great Salt Lake. The difference between the levels measured at the Promontory Point and Saline gages appears to be a better measure of this difference than the more often reported difference between the Boat Harbor and Saline gages.

The measurements of the elevation of the surface the main body of Great Salt Lake and of Gunnison and Farmington Bays are important in recording the seasonal and longer-term fluctuations of these three bodies of the lake. The USGS gages also record short-term fluctuations related to winds blowing over the lake. For example on November 24, 1998, the Boat Harbor gage recorded a 1.5 foot change in the lake level over a six hour period while

the Promontory Point gage recorded an out-of-phase change of about 0.8 feet. This was wind setup and set-down produced by strong wind associated with a cold front moving over the lake. The gages then recorded an oscillation (seiche) of the lake surface with a period of six hours that continued for two days. Such measurements are important to understanding the dynamics of the lake.

REFERENCES

- Gilbert, G.K., 1890, Lake Bonneville U.S. Geological Survey Mono-graph I, 438 p.
 Henshaw, F.F., 1914, Surface water supply of the United States 1912, Part X, The Great Basin: U.S. Geological Survey Water Supply Paper 330, 275 p.
 Jackson, Donald, and Spence, M.L., 1970, The expeditions of John Charles Fremont, Volume I, travels from 1838 to 1833: University of Illinois Press, 854 p.



Fluctuations of south part of Great Salt Lake, 1847 to present.



Serving Up a SLICE of Great Salt Lake for Utah's Education Pie

Bruce Thompson, FOGSL Education Director

Thanks to the confidence and generosity expressed through your donations and additional grant support, Friends of Great Salt Lake is becoming a leader in community and school-based education. In addition to our entertaining and informative program, The Lake Affect, our Project SLICE is now well underway.

Background of the SLICE Project

How might we appropriately care for something if we do not know about it?
How can we as citizens make informed decisions, without first being informed? We cannot.

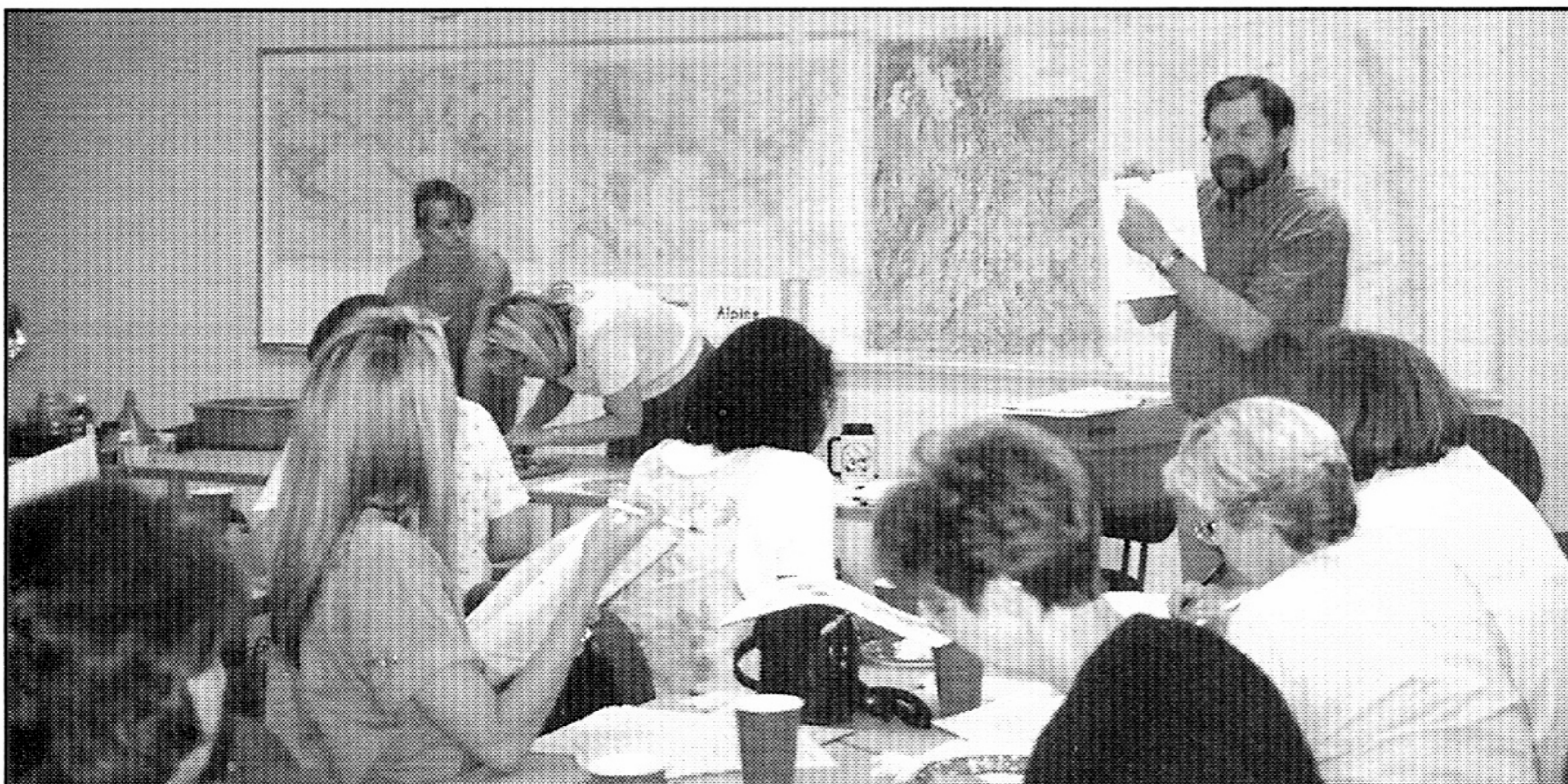
Directed by the portion of its mission to preserve and protect the Great Salt Lake Ecosystem through education, Friends of Great Salt Lake has undertaken a significant three year project named Project SLICE, a Salt Lake Institute for Conservation Education. Its aim is to serve regional educators and students in our public schools through the development of curriculum, resources, field trips and workshops focused upon Great Salt Lake. A primary outcome for this process will be to assist teachers with matching the wealth of scientific, cultural and economic attributes of Great Salt Lake to their own instructional needs.

The project will initially concentrate on the fourth grade, a grade level afforded a spectrum of exceptional opportunities for Great Salt Lake education by the Utah Core Standards for Science. Following two years of program development, including pilot testing and field testing, a refined education package will be made available to fourth grade teachers and their students throughout the state of Utah.

Elements of the SLICE curriculum package will be made available to other groups and grade levels as appropriate, and future opportunities for program expansion may be sought in order to meet specific needs identified for additional school-aged or adult audiences.

The SLICE education package will offer these products and services:

- A Teacher Training Institute offering educator workshops and support
- A Curriculum Guide to Great Salt Lake classroom studies
- Field Guide to on-site learning and discovery
- A Video of The Lake Affect to enhance understanding and appreciation of Great Salt Lake
- A Speakers Bureau providing in-class and on-site expertise about Great Salt Lake
- A Resource List of appropriate materials and services
- A Network of providers offering Great Salt Lake education



Bruce Thompson
instructing at the July 28-29
Teacher Training Institute



Project SLICE Progress Report

Ongoing work and contact with various entities throughout our region has resulted in a data base of 457 individuals and organizations, including 147 educators. These relationships have provided the foundation from which we have constructed a detailed plan for materials design and development, classroom pilot testing, curriculum review and refinement, and support materials and services.

The Project SLICE Curriculum Guide to Great Salt Lake

Our Great Salt Lake curriculum has been articulated in fifteen units of study [refer to page 8]. Topic selection and sequence was informed by three references: State Core Curriculum requirements designated by the Utah Department of Education for fourth grade learners, "Guidelines For Learning (K-12)" from the National Project for Excellence in Environmental Education, and a careful evaluation of those study areas readily accommodated by physical, biological and cultural elements of Great Salt Lake itself.

The Teacher Training Institute

Twenty educators attended our first Teacher Training Institute, held July 28 and 29 at Westminster College and Antelope Island State Park. During the first day of the workshop, teachers were introduced to various elements of Project SLICE and specific activities contained in units 1 and 2. The second day offered a field emphasis, with activities on the shores of Great Salt Lake and a presentation of "The Lake Affect" at the Antelope Island Visitor Center classroom. Credit was made available to teachers through a cooperative agreement with the Utah Museum of Natural History and the University of Utah. Future two-day Teacher Training Institutes are planned for the summers of 2000 and 2001, in order that more teachers can be introduced to the value and benefits of Project SLICE materials and the infusion of Great Salt Lake into classroom and field studies.

The Great Salt Lake Education Committee

Our Education Committee remains under development and will consist of board members, the Director of Education, and committed individuals from the education sector. Its purpose will be to: 1) Review and guide education programs and Director of Education activity, 2) Assist the Director of Education with various support tasks, and 3) Report and make recommendations to the full Board of Directors.

The Teacher Advisory Panel

Our Teacher Advisory Panel consists of a group of educators involved in pilot testing and later field testing the curriculum. Their role will be to provide expert feedback and guidance during various phases of program development and refinement.

The Pilot Test Phase

Pilot Testing will be conducted by five or six teacher volunteers who will implement draft versions of curriculum units in their fourth grade classrooms as the materials become available. These teachers will provide essential feedback to guide revision for future Field Test versions of the curriculum.

The Field Test Phase

Field Testing of the revised Pilot Test units will be conducted in 2000 and 2001, both by original Pilot Test Teachers, and an expanded pool of up to 20 teachers in school districts throughout the region. During this time we will also seek support and endorsement from district leaders and the State Department of Education. Feedback from Field Test Teachers will guide the final development of the SLICE Curriculum to be released for statewide distribution and use in fall of 2001.

Summary of Tasks Completed

- Education Committee formed
- "Essential Underpinnings for Great Salt Lake Education" document completed
- Curriculum Framework created, incorporating Utah Core Standards
- Scope & Sequence completed for a 15-unit curriculum
- Correlations charted between Great Salt Lake study areas and the State Core
- 4th Grade Pilot Test Teachers identified
- Teacher Advisory Panel formed
- Pilot Test versions of units 1 and 2 completed
- First Annual Teacher Training Institute conducted (July 1999)



Summary of Tasks Scheduled or in Progress

- ◆ Pilot Testing has begun in five 4th grade classrooms
- ◆ Develop of units 3 through 15 (See Outline)
- ◆ Pilot units 3 through 15 (See Outline)
- ◆ Development of Speakers Bureau (Winter 2000)
This comprehensive listing of businesses, organizations and individuals will assist our teachers in contacting qualified persons who have consented to visit with students to represent various facets of Great Salt Lake research, management, recreation, industry, and government.
- ◆ Creation of The Lake Affect classroom video (Spring 2000)
- ◆ Develop and fund Field Trip Services (Summer 2000)
- ◆ Second Teacher Training Institute (Summer 2000)
- ◆ Expanded Field Testing of all units (Fall 2000)

Project SLICE Great Salt Lake Curriculum Plan 4th Grade Scope and Sequence

The following outline defines the current scope and sequence for the Pilot Test Version of the Great Salt Lake Curriculum. The Pilot Test version completion dates are in parentheses.

Planned Units of Study

1. Overview and Orientation to Great Salt Lake (Summer 1999)
2. Properties of Water (Summer 1999)
3. The Great Salt Lake Watershed, Past & Present (Fall 1999)
4. Wetlands of Great Salt Lake (Fall 1999)
5. Plant & Animal Life in the Greater Great Salt Lake Area (Winter 2000)
6. Plant and Animal Habitats in the Great Salt Lake Region (Winter 2000)
7. Plant and Animal Adaptations (Winter 2000)
8. Interrelationships (Spring 2000)
9. Cycles and Soils of the Great Salt Lake Ecosystem (Spring 2000)
10. Regional Climate and Weather (Summer 2000)
11. Human History at Great Salt Lake (Fall 2000)
12. Great Salt Lake and Us (Fall 2000)
13. Our Future with Great Salt Lake (Winter 2001)
14. Field Trips To Great Salt Lake (Summer 2000)
15. Special Activities to Demonstrate or Summarize Learning (Winter 2001)

What You Can Do

- ◆ **Help Us Procure Bookings for The Lake Affect**
We continue to seek contacts with business and government groups in order to arrange presentations of our Lake Affect program.
- ◆ **Review SLICE Materials** If you would like to review any of the materials described herein, please contact Education Director Bruce Thompson. Some larger documents may necessitate a small charge to offset costs of postage and photocopying. For teachers and others interested in receiving each of the complete curriculum units as they become available, we also offer a one-year subscription service for \$25.
- ◆ **Field Test SLICE Materials** We are beginning to seek fourth grade teachers who might be interested in field testing our Great Salt Lake curriculum in 2000-2001. All written materials and activity masters are provided at no charge.

- ◆ **Suggest Additions to Our Speakers Bureau** If you know of a business or organization that might provide a speaker for classroom visits who could give a presentation, provide a demonstration, discuss current issues or model a Great Salt Lake-related career, please drop us a line.

- ◆ **Help Us Fund Field Trip Transportation for Our Young People.** To be introduced to Great Salt Lake first-hand is to begin to know it and care about it in the most meaningful way. For this reason, we wish to encourage and support our teachers in arranging field trips to lake sites.

Our goal is to ultimately provide funding for fifty classrooms to visit our lake each year, which we anticipate to cost \$10,000 per year for transportation and staffing. Can you suggest a private or corporate sponsor who might be willing to help fund this effort? If so, please let us know.



Round Three of *The Lake Affect* Begins

By Bruce Thompson, FOGSL Education Director

Our third series of presentations of *The Lake Affect: Living Together Along the Shores of Something Great* has begun, with 9 of 50 bookings already completed. Between fall of 1997 and spring 1999, this live-narrated, slide-based program has been given to 104 groups, representing 4,594 citizens of all ages. Now, interested groups in the Great Salt Lake region are again being given the opportunity to experience "The Lake Affect," celebrating the biological, economic, and recreational attributes of our Great Salt Lake.

Our presentation creates a tone that emphasizes the wealth of interrelationships, interdependencies, and diversity among humans and all life, and between these living things and their Great Salt Lake environment.

Slides are preceded by an engaging introductory orientation and followed by a question and answer session. Recommended duration is 50–90 minutes. Service is customized based on group age, interest and background. Fifty presentations will be offered between now and May, 2000, on a first-come, first-served basis. There is no charge for this service, but an honorarium of \$25–100 is encouraged to help fund future presentations.

If you know of an educational, recreational, business or political group interested in booking this popular program, I invite you to call or e-mail at your earliest convenience. Voice: 801/467-3240 or e-mail: ecotracs@aol.com

Thank You to our new and renewed members for Fall 1999. You are greatly appreciated.

William Adams
Catherine Balka
Susan & Bill Bergener
Iginia Boccalandro
Geoffrey and Diane Bodell
Bob & Georgene Bond
Fritz Breeze
Lozina Brooks
Yaeko Bryner
John & Lucy Ann Bywater
Mr. & Mrs. Edward Campbell
Lynn Carroll
Jim Carter
R. Camille Chart
Kent Covey
Bert & Sylvia Cundick
Dinah Davidson
Ann & Gale Dick
Bryan Dorsey
Nina Dougherty
Richard Dougherty

Geralyn Dreyfous
Gary & Paula Evershed
Ann Floor
Christian Fannesbeck
Naomi C. Franklin
Phyllis Geldzahler
Donald Griffin
Eileen & David Harvey
Elaine Hill
Edith Hoffman
Elaine Ipson
Barbara Jenson
Dee Jette
Ann Kelsey & Lester Aoki
Dave Kuehn
Linda Lange
Mark Low
Spencer Martin
Linnette & Lynn McCreary
Ann O'Connell
Wes & Marge Odell

Amy Odell
Maunsel & Ann Pearce
Pete & Ann Peterson
Christine Probasco
William Redeker
Laurie Rich
Kandy Richards
Helen & Doug Rollins
Linda & Chris Rowlette
June Ryburn
Connie Sedlar
Marleen Skabelund
Gibbs Smith
Jennifer & Randy Speers
Richard Sweet
Patrick Tresco & Yael Calhoun
Mike & Amy Valdez
Paul Van Dam
Jean Francois Van Huele
Karen & Wally Wright



Great Salt Lake Planning Process Update: Scientific Review Committee Results

In May 1999 the State of Utah Department of Natural Resources (DNR) selected this Scientific Review Committee to "verify and validate the scientific information presented in the Great Salt Lake Comprehensive Management Plan: Planning Document of May 1, 1999." DNR requested that the reviewers focus on an evaluation of the scientific underpinnings presented in the "Statement of Current Conditions and Trends" section of the planning document and resist looking at the entire body of information available about the lake and its environs. The scientific review process was to offer an unbiased assessment of the technical information base utilized by DNR to make decisions and tradeoffs concerning Great Salt Lake (GSL). Furthermore, the scientific review process was to evaluate the DNR use of available technical information, identify information that was limited or missing, forewarn the DNR of potential criticisms of its information base, and enhance the credibility of the DNR planning process. DNR asked the Scientific Review Committee to ignore political and economic issues of GSL and focus only on the science.

The following letter presents the executive summary of the Committee's findings. For more information on the Scientific Review Committee, its deliberations, and its members, please contact: James Springer, DNR Administration, 801/538-5324

August 31, 1999

Kathleen Clarke
Executive Director
Department of Natural Resources
1594 West North Temple, Suite 3710
Salt Lake City, Utah 84114

Dear Ms Clarke,

We appreciate the opportunity to have participated with the Department of Natural Resources (DNR) in a review of the scientific underpinnings of "Great Salt Lake, Comprehensive Management Plan -- Planning Document." The DNR has on its staff some of the authorities on Great Salt Lake (GSL) and it was a pleasure for us to work with them. We have informally shared our thoughts directly with the Planning Team. Following are six perspectives that we believe will assist you in providing leadership to the development of the draft Planning Document.

1- Knowledge pays off. The information collected on the water balance, salt balance, and lake fluctuations of GSL provides a narrow but adequate underpinning for much of the discussion in the Planning Document. Without the decades of monitoring of lake levels and salinity of GSL the scientific foundation would be woefully inadequate for defending management decisions. Much is known about the lake, but there is a great deal we do not know. The elevation of the lake surface has been monitored for over a century. The State has a relatively good information base for the salt balance of the lake based on monitoring of lake salinity since construction of

the causeway. There are, however, almost no comprehensive, integrated information bases for GSL ecosystems. The present relative ignorance, due to lack of data, about the ecosystems of the lake makes it very difficult to make management decisions designed to protect the ecosystems based on scientific reasoning. The DNR should support and expand monitoring programs and research to better understand natural and human-caused changes of the lake. All currently available data on the GSL should be accessible in electronic form.

2- The lake is a system of interlocking subsystems. The lake is several water bodies and differs as much east-west as north-south. The lake's physical, chemical, biological, ecological, economic, and social systems are dynamic and interact to influence the behavior of each other in complex ways. The Planning Document approaches GSL issues based on constituencies. Resources of the lake that have constituencies are well considered in the report while resources that do not have constituencies are not. The lake should be thought of as a complicated set of subsystems rather than as a collection of individual components. Managing the lake as a system recognizes that each management decision impacts the total system. The scientific database to support this kind of systems management should emphasize interactions among the components in addition to the components themselves.

3- Recognize and to the extent possible welcome lake level fluctuations. The idea that the State of Utah can control the lake within a range of a few feet is unrealistic. The Planning Document gives the impression that the State of Utah can control the lake rather than living

with its fluctuations. Hydrologically, it is not possible to control lake level changes, nor should stakeholders expect the State to possess or develop a capability to do so. The State should accept occasional flooding and work with other state and federal agencies and local governments to respect and plan for fluctuations in the lake level. Given the time scale on which human activities operate, predictions of the range of lake level fluctuations have some use in the short-term (1-3-year period). Longer-term predictions, however, are not reliable enough for planning purposes. The state should assume the lake will rise to the historic high levels (4212 ft a.s.l.) during the lifetime of most facilities and that the lake can rise even higher (4217 ft. a.s.l.) in today's climate regime. Given that lake level fluctuations will occur, any policy that does not acknowledge probable flooding levels is not on strong scientific footing.

4- The salt balance of the lake is well understood in its broadest terms. The railroad causeway created the dramatic dynamics that determine the salt balance between Gunnison (north part) and Gilbert (south part) Bays. In the past few years of rising lake level, Gunnison Bay has gained salt at the expense of Gilbert Bay. This is a transitory and expected phenomenon. However, when the lake is at high levels and declining, there is a net movement of salt from Gunnison Bay into Gilbert Bay. Thus, on the time scale of decades, the difference in salinity between Gunnison and Gilbert Bays is relatively constant.

Analyses of lake chemistry by DNR and IMC Kalium, as well as results from a numerical model developed by the U.S. Geological Survey, have been used as tools to understand these dynamic changes in the salt load of the lake. All parties agree that approximately 12% of the total salt load of the lake was lost to the West Desert as a result of pumping from 1987 to 1989. IMC Kalium and the DNR-USGS model differ in their interpretation of the effect of the breach in the causeway and the role of changing causeway permeability. The former concern can probably be resolved using existing data while the latter will require geotechnical information that has not yet been assembled. We have provided details of these issues in our discussion points with the Planning Team.

5- The health of the GSL ecosystems should be of paramount importance. DNR is wise to be concerned about the health of all of the GSL ecosystems. A "healthy" ecosystem can be defined as an ecosystem that is within natural variability; whereas, an "unhealthy" ecosystem is one that has been impacted to such an extent by human activity that it is no longer within natural variability.

Some ecosystems, probably including the ecosystems of GSL, are naturally variable and may depend on this variation to redistribute nutrients and support diverse communities. A tough question facing DNR is whether the ecosystems of GSL are "healthy". In order to answer this, we need know the natural variability of the GSL ecosystems, and to answer that we need long-term data (several 10s-100s of years). For certain important variables, for example nutrients, we have virtually no data from which to determine natural variability or trends. Understanding the impacts of changes in nutrients and salinity on GSL biota are essential for determining the functioning of GSL ecosystems. Based on the data available to us, we know that at sometime in the past GSL has probably been as saline as Gunnison Bay and as fresh as Gilbert Bay are today. Construction of the railroad causeway created a very different set of GSL systems than those that existed prior to 1959. Also, the WDPP significantly reduced the salt load in the main body of GSL. Were the WDPP re-instituted and more salts deposited from the lake to the West Desert Pond, the salt problems might be exacerbated to such an extent that the lake would reach a crisis state. The DNR should expand monitoring presently underway to include all key components of the GSL ecosystem and to be spatially and temporally comprehensive. Such a monitoring program should identify trends that indicate when the lake is on a dangerous trajectory and act as an early warning system of "unhealthy" lake conditions.

6- Respect the lake and appreciate its diverse resources and ever changing boundaries. We suggest that the GSL is a phenomenal asset to the State of Utah. Its mineral resources have been appreciated for almost 150 years. The brine shrimp are now appreciated because they are economically valuable. To only a very limited extent is the lake appreciated for tourism, for culture, for earth systems history, and for education. We fear that the present constituencies drive the DNR approach to management and that these policies may eventually diminish the net social value of the lake to the citizens of the State of Utah.

Thank you for this opportunity to share our perspectives with you.

Respectfully,
GSL Science Review Committee

Genevieve Atwood
John A. Kadlec
Paul W. Jewell

Mac McKee
Katrina A. Moser



Board Elections for 2000

Officer and Board member elections will be held during the next General Meeting, Tuesday, October 26, 1999. Several Board members are completing their terms this year and will move on to other activities. To those serving so willingly for the protection and restoration of the Great Salt Lake ecosystem, we extend our sincere thank you. The following Board members will not be seeking re-election: Ann Dick, Margie Nakowski, Mark Doman, Rick Ford, and Robin Hooton.

Officer positions are elected for a one-year term. The following candidates have been nominated for these positions.

President—Lynn de Freitas
Vice-President—Spencer Martin
Treasurer—Cara McCarthy
Secretary—Michele Davis

Board positions are elected for a two-year term. The following candidates have been nominated for these positions.

Heidi Hoven
Jon Callender

Completing their terms for another year include Kathlyn Collins, Don Mabey, Lindsey Oswald, and Ivan Weber.

If all current candidates are elected, three other Board positions remain open. These other Board positions not filled at the time of the annual October elections can be appointed anytime by the Board throughout the year. If you have an interest in applying for a Board position, please contact Lynn de Freitas or any of the Board members.

Profiles of Candidates Who Are New to the Friends of Great Salt Lake Board

Heidi Hoven is a botanist and wetlands ecologist and is currently working for SWCA, Inc. Environmental Consultants in Salt Lake City. Her doctoral work focused on the use of aquatic, marine plants as biomonitors of sources of heavy metal pollution in estuarine systems. Her background in physiological ecology of halophytic (salt-loving) plants and their environs would offer knowledge and foresight in planning and educational efforts by Friends of Great Salt Lake. She is committed to the conservation and preservation of existing wetlands of the Great Salt Lake and is actively involved in the restoration of the Jordan River delta and its associated wetlands. She is interested in becoming an active member of the Board as a way to further contribute to the protection of the rare resources of the Great Salt Lake ecosystem.

Jon Callender is the Manager of Strategic Resources at Kennecott Utah Copper Corp. Magna, Utah. Trained as an earth scientist and manager, Jon uses his technical and managerial experience to solve environmental and

sustainable resource problems. He received his Ph.D from Harvard University in Structure and Tectonics, A.M. from Harvard in Geology and a Bachelor of Science from California Institute of Technology with a major in Geology. He has a broad range of experience in academic, consulting and business environments. He remains deeply involved in education, public service, and interaction with diverse interest groups, and is an effective fundraiser.

Cara McCarthy holds a Bachelors degree in geology and a Masters in hydrology and currently works for the National Weather Service in the Colorado (and Great Basin) River Forecast Center where she runs a suite of mathematical models that predict river flows throughout the region. Cara's participation in Friends' sponsored activities in the past several years has raised her awareness and concern over issues affecting Great Salt Lake. As candidate for Treasurer, Cara hopes to raise the consciousness of others and help ensure the preservation of the Lake's ecosystem in our ever-developing world.



Visit the Bay

By Justin Dolling

I'm often asked the question when is the best time to visit Farmington Bay WMA. Inevitably I pause for a moment as my mind clicks through images of years past. I start to explore the seasons searching for the best snapshot in time. I begin with winter.

Winter is a quiet time. The ice-covered marsh waits for spring to return. It is cold. Most birds have moved farther south to a warmer place. A couple of exceptions include the Bald Eagle and Great Blue Heron. Large concentrations of Bald Eagles gather to feed on exposed carp when we drain the ponds. A few Great Blue Herons spear small minnows trapped in the ice-free shallow flows. Adult Canada Geese are breaking away from the kids to prepare for the approaching spring. It is a season of rest.

The brightly colored Northern Pintails start the spring, arriving to feed in the melting ice edge. They gather in enormous concentrations. Pickleweed flats are the first to melt. These shallow sheet water habitats are ideal for Green-winged Teal and Northern Pintail. Green spikes of newly emerging alkali bulrush cover the landscape. On a graveled roadway a single Killdeer calls then flies away. Small concentrations of Yellowlegs are foraging at the marsh edge. American Avocets and Black-necked Stilts appear magically overnight. Black-bellied Plovers loaf on the sandy beach edge. It is a season of transition.

As temperatures rise summer begins. The brown stems from last years growth are covered in a sea of green.

Water in the playas is receding to expose a sun baked mud edge. As the mud dries it begins to crack. American Avocets are busy making small scrapes in the drying mud to support a clutch of eggs. Large organized flocks of American White Pelicans are fishing in the fresh water ponds to catch a meal then returning to Gunnison Island to feed their young. Franklin Gulls and White-faced Ibis nest in large colonies in the emergent vegetation. The sky blue eggs of the ibis contrast the brown speckled eggs of the gulls. Eared Grebes pull chunks of submersed plants to the surface to form semi anchored nest bowls. Their eggs rest only a few centimeters from the water surface. A Cinnamon Teal flushes from a salt grass mat. Her cream-colored eggs are tucked into a ball of down. It is a season of renewal.

Fall approaches as the mornings turn crisp but the days remain hot. Pickle weed takes on a color of red and orange. The dark green color of the marsh starts to fade away. American Avocets have molted, replacing the rusty brown head feathers with a color of slate white. Bonaparte's Gulls pick insects from the water surface. The large flocks of Wilson's Phalaropes have come and gone. Waterfowl return in enormous flights to forage on the marshes bounty. It is a season of harvest.

In a few short seconds, hundreds of scenes pass through my mind. Of all these images, it's hard to pick only one. The visitor patiently waits for an answer. My response is simple yet consistent. Each visit can be the best visit. The subtleties force people to return. With each visit comes a new experience and with each experience comes a new appreciation. It's best to visit often.



Egrets at Farmington Bay.
Photo by Libby Ellis.



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RECYCLE ALUMINUM CANS FOR FRIENDS (please note new drop-off location)

Please consider donating aluminum cans to Friends. Can donations will be accepted at 1170 East Warnock Ave (2490 South). All proceeds will go to the FOGSL general fund. Cans must be contained in plastic garbage bags. If you have cans to donate, but can't transport them, please call Lindsey and arrangements will be made for pick-up. If you don't recycle aluminum, please consider starting!! This will greatly benefit Friends. Volunteers are needed for accepting aluminum cans in your neighborhood and/or taking cans to the recycling center.

Questions, please call **Lindsey** at 801/485-7307.

SUBMITTING MATERIAL FOR PUBLICATION

1. **What to submit:** original articles (historical, geological, geographical, biographical, political, fiction, poetry, etc.) or art work (sketches, photographs, etc.) which pertain to Great Salt Lake.
2. **Submitting material:** Mail or deliver to 1117 E. 600 S., Salt Lake City, UT, 84102. Or e-mail to: ldefreitas@earthlink.net
3. **Please call 801/582-1496** to confirm receipt of e-mail or with any other questions, suggestions, comments, or ideas.
4. **Deadlines:** The deadlines for submittals are Sept. 16 (Fall), Dec. 16 (Winter), Mar. 16 (Spring), and June 16 (Summer).

Friends of Great Salt Lake wants to thank the following businesses for their generous support: **Xmission.com** for donation of services to support us on the World Wide Web and **Kinko's University Branch**, **Graphic Images**, and **Tooele Transcript Bulletin** for supporting our printing needs.



Announcing
The Third Great Salt Lake Issues Forum :
*Exploring Ideas and Steps Toward a Comprehensive Watershed-Based
Restoration and Protection Program for Great Salt Lake*

Friday and Saturday, February 25 and 26, 2000
at the Quality Inn Downtown, Salt Lake City

Join us for two days of inspiration, examples and catalysts on comprehensive watershed-based thinking. The Forum will highlight

- ◆ the problems and issues affecting Great Salt Lake and its watershed, with recognition of its international significance and unique setting in the Great Basin
- ◆ selected watershed programs within the state and around the country that provide nuts and bolts examples of collaborative watershed efforts, with a review of the accomplishments and principle lessons learned in those programs
- ◆ a discussion about ways to move from the **idea** of a Great Salt Lake watershed program to a **reality**.

Featuring

Charles F. Wilkinson (keynote speaker)
Moses Lasky Professor of Law, University of Colorado

Bob Adler
Professor, University of Utah College of Law

Ralph Becker
State Legislator and Principal of Bear West

Jim Corven
Manomet Center for Conservation Sciences, WHSRN

Art DuFault
State Forester/Director,
Utah Division of Forestry, Fire, and State Lands

Mike Hirshfield
VP Resource Protection, Chesapeake Bay Foundation

Steve Jensen
Jordan River Sub-Basin Council

David Krostling
BLM Salmon/Lemhi Resource Area, Idaho

Chris Montague
The Nature Conservancy of Utah

Joel Peterson
The Nature Conservancy of Utah
and others

Call for Posters

A poster session will be held Friday and Saturday displaying relevant information and/or approaches addressing comprehensive watershed thinking related to Great Salt Lake.

We are accepting:

- biological, hydrologic, geological, ecological, planning processes and economic studies related to GSL and its watershed
- planning processes in other watershed that provide information relevant to GSL planning
- federal, state, and local programs that support watershed planning efforts
- educational programs that encourage citizen/student-based monitoring programs.

For more information, contact
Lynn de Freitas, 801/583-5593, 801/582-1496
or ldefreitas@earthlink.net





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