Environmental Connection Newsletter

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Air Study Gives Insight of Dust from Great Salt Lake

As environmental scientists sift through data from a Division of Air Quality study of wind-blown dust particles from the exposed Great Salt Lake shoreline, officials already are contemplating how to initiate additional studies, if and when the lake level drops again.

"There is a lot of chemistry in the lake that we haven't quite got a handle on," said Dianne Nielson, executive director of the Utah Department of Environmental Quality (DEQ). "My objective in conducting this study was focused on fine particle size and what was in the sediment from all sources – both natural and manmade."

Others hoped the study would shed some light on mercury exposure, but results demonstrated no significant risks of airborne mercury from the dust. Even so, environmental officials are cautious about drawing any conclusive evidence about mercury risks.

"Even though the tests didn't find significant amounts of mercury or selenium in the dust particles doesn't mean they are not there," said Bruce Allen, an environmental scientist with the Air Monitoring Center who conducted the two-year study in 2004 and in 2005, noting the quartz fiber filters used to collect the samples don't completely capture gaseous mercury. "We just don't have the equipment to

be able to capture those mercury compounds," Allen added. "Our portable samplers are good for dust collection but not volatile metals."

"Mercury is really a difficult thing to monitor," added Nielson.

Even so, the study does provide some insight into the types of toxins that have been deposited in the lake that can be whipped up during windstorms. "Because of the terminal nature of the Great Salt Lake it serves as a sink basin for all kinds of activities," Allen said. "We did find significant levels of sulfur, chlorine, potassium, iron and strontium, which are more likely related to the types of rocks and sediment in the basin than any manmade activities."

Exposed Lake Bed Offered Opportunity for Study

Now that the lake levels have risen there is no need to continue to study, although officials don't rule out the possibility in the future. "What the study tells me is the next time we see the lake level go down we need to be prepared for a more rigorous sampling program," said Nielson. "We want to understand any impact on people's health of fine particulates that are picked up from the lake beds."

In 2004, the drought took its toll on the Great Salt Lake, leaving about 70,000 acres of exposed shoreline, the largest high-and-dry expanse since 1963. "After six consecutive years of drought the Great Salt Lake was at an all-time low, which amounted to about a 14-foot drop in lake levels," observed Bob Dalley, manager of the Air Monitoring Center. "We had a unique opportunity to do some air monitoring tests of windblown dust of lake sediment," added Rick Sprott, director of the Division of Air Quality. "We had a sense that the dry lake bed does contribute to PM 2.5, which is the fine particulate matter in the air that causes health problems for asthmatics, children and the elderly.

It all came about during negotiations on how to clean up the groundwater contaminated by a century of Kennecott and Utah Copper Company mining operations in Bingham Canyon. One proposal under consideration is to discharge the reverse osmosis contaminants which contain selenium into the Great Salt Lake. But before environmental officials agree to do that, Nielson directed that a study be undertaken to determine a selenium standard for the lake. In doing so, she also saw an opportunity to find out what substances have historically flowed into the lake. "It really was a dust problem," she said. "But I also was concerned about the chemistry and the risk. The lake is unusual because of the trace elements and metals."

Dalley devised an air monitoring plan that included placing small portable Airmetric samplers at three selected sites around the Great Salt Lake. Allen collected 24-hour air samples, specifically monitoring for total suspended particulate matter and a smaller fraction that are 10 microns or smaller, otherwise known as PM10. Later, he sent the samples that contained the highest concentrations for chemical analysis to a lab in Tigard, Oregon. "The study's primary objective was to assess the metal content of the wind-blown dust off the Great Salt Lake and its secondary objective was to evaluate the respirable and fugitive dust exposures stemming from the lake's shoreline," said Allen.

How the Sampling was Done

Allen chose three locations to set up his portable battery-powered air samplers: one about one mile north of Saltair, another on the north end of the causeway near the park entrance to Antelope Island and the other at the Farmington Bay Bird Refuge. "We picked the locations that were accessible," Allen said.

There were some bumps along the way trying to find the right sites. “In 2004, we used a site near the Central Davis Sewer District that was about three miles from the Great Salt Lake. Initially, we took 4-wheelers out and got stuck in the mud trying to find a suitable sampling site. So we ended up moving the sampling sites to a more accessible point near the treatment plant. In 2005, that site was moved to Farmington Bay Bird Refuge,” Allen said. “And, were I to do it again, I would move the Antelope Island site about one mile to the west where winds frequently stirred up immense clouds of dust from the exposed shoreline.”

Allen secured the portable samplers on telephone poles or tripods about 10 feet above the ground to avoid tampering. “I would set up the samplers a day in advance where the winds were predicted to exceed 20 miles per hour and no rain was in the forecast,” he said.

Portable samplers were calibrated at the outset of each year’s study and flow audits were performed at the end of each season. A margin of error of plus or minus 3 percent in flow rates was measured. For each study period, filters with the highest mass loadings were sent to Chester LabNet in Oregon for x-ray fluorescence elemental analysis.

In 2005, two samples from the Saltair location contained readings higher than the National Ambient Air Quality Standard (NAAQS) for PM10 set at 155 micrograms per cubic meter of air sampled (155 ug/m3). Lab results for mercury and selenium levels were compared to the reported laboratory “uncertainty term,” which represents measurement noise. Allen concluded there were no significant levels of the metals found in the air samples, because in order to be determined “significant” the results had to be at least twice the uncertainty term and none of them were.

“Respirable dust concentrations occasionally exceeded current NAAQS during high-wind conditions,” Allen said. “Those were found at the Saltair location, which was the site nearest the exposed lakebed. Much lower levels of particulate were measured at the other sites, which were at least a mile to three miles away from the lakebed.”

Internet Training Opportunities

Employees have an opportunity to take advantage of Internet-based training opportunities in May and June, sponsored by the Interstate Technology and Regulatory Council (ITRC). The Utah Department of Environmental Quality is an active partner with ITRC, a state-led coalition of regulators, industry experts, academicians, citizen stakeholders, and federal partners working together to increase regulatory acceptance of state-of-the-art environmental technologies. DEQ is actively working in ITRC committees to develop training and regulatory guidance documents.

Training

ITRC technical teams develop and deliver free, live, interactive, Internet-based training on emerging environmental technologies. ITRC also partners with industry and other organizations to develop inexpensive classroom courses offered across the country.

Internet-based training planned for May and June include:

- May 11th – What’s New with In Situ Chemical Oxidation?
- May 18th – Site Investigation and Remediation for Munitions Response Projects
- June 13th - Design, Construction and Monitoring of Bioreactor Landfills

- June 15th - Permeable Reactive Barriers: Lessons Learned and New Directions

Guidance Documents

ITRC's 60-plus documents include technology overviews, technical/regulatory guidance, and case studies. The guidance documents – often incorporating decision trees – set out uniform requirements for technology demonstrations or approvals. Some of the most recent guidance document topics include: direct push well technology, permeable reactive barriers, remediation process optimization, and management of outdoor small arms firing ranges.

Please e-mail Neil Taylor (the State ITRC Point-Of-Contact) if you would like to be included in the monthly training notification list or receive a list of available ITRC technical guidance documents or new documents as they become available.

Krauth Receives Prestigious Water Quality Service Award

Paul Krauth, the outreach coordinator for the Division of Water Quality (DWQ), is this year's recipient of the Water Environment Association of Utah's prestigious Grant K. Borg Extraordinary Service Award. This award recognizes Krauth, a 17-year veteran of DWQ, for his long-term commitment and achievement in the area of water quality improvement.

"Paul is most deserving of this award," said Walt Baker, director of DWQ. "He has helped numerous cities tackle tough technical problems with their wastewater facilities and saved them thousands of dollars in the process."

Krauth, a native Utahn, came to DWQ in June 1989. For two and one-half years he worked in the UPDES permits program, writing discharge permits and working on pretreatment, bio-solids and storm water issues. In September 1992, he began working as the Outreach Coordinator for the Division, providing technical and operational assistance to all of Utah's municipal wastewater facilities. He is a graduate of the University of Utah with bachelor degrees in civil and mechanical engineering.

The award is named after Grant K. Borg, professor emeritus of the University of Utah, who had a distinguished career in environmental engineering and in helping develop the seminal water quality rules, laws and policies that largely remain intact today.

Statewide Energy Conservation Campaign Begins in June

The hot weather just around the corner has most people thinking of summer barbecues, a dip in the pool and even a round of golf. But the Huntsman Administration, along with utility experts and Department of Environmental Quality officials, are encouraging Utahns to start thinking of summer – a period of peak electrical usage – as a critical time for energy conservation.

On May 30, Gov. Jon Huntsman, Jr. will hold a press conference that kicks off PowerForward, the statewide energy conservation program that encourages consumers to implement simple, voluntary measures to conserve electricity during those dog days of summer when

temperatures rise, air conditioners work overtime and utilities can be strained to meet the demand for electricity. Higher power production costs can also mean higher rates for all consumers.

PowerForward is a system of alerts, issued separately for the Wasatch Front and for Utah's Dixie region, through which color-coded messages are sent to the media and are available at DEQ's Web site www.PowerForward.utah.gov. Each level signals various degrees of conservation measures that are recommended to consumers. PowerForward alerts are based on weather predictions, high demand for electricity, regional power supplies, and market power prices. Following conservation recommendations during PowerForward alerts is especially important to avoid overloading circuits or forcing utilities to purchase extra, costly power on the wholesale market – actions that translate to higher energy rates in the future.

On "green" PowerForward days, normal, common-sense conservation is urged, such as turning off the lights and electrical appliances when not in use. "Yellow" days signal a need for extra conservation during the hours of noon to 8 p.m., as higher temperatures boost demand. By doing such simple things such as raising air conditioning thermostats to 78 degrees Fahrenheit or higher, customers can help keep utility rates low.

"Red" days are those when it is critical for customers to avoid using electricity as much as possible because power generation and transmission resources are severely strained. Consequently, conservation is crucial to maintaining the reliable flow of electricity.

"This has been a widely successful program that in years past has shaved as much as 80 megawatts from the peak demand," said Rick Sprott, director of the Utah Division of Air Quality (DAQ), which now oversees the program in consultation with the Governor's Office, Utah Power, and other utility partners across the state.

St. George residents rely on PowerForward alerts to help them make conservation choices that can keep them cool during the hot summers.

"Energy conservation is critical in the Dixie area, where the summers are particularly hot, contributing to the increased electrical demand," said Rene Fleming, conservation coordinator for the City of St. George.

Energy conservation is something Utahns should be mindful of throughout the entire year, it is especially important during the summer months when demand is highest and electricity is most expensive to purchase.

"Although Utah's electricity is among the most reliable and least expensive in the nation, the increasing demand for electricity during the summer peak season can put a strain on the entire system," said Margaret Oler, spokeswoman for Utah Power. "The demand for electricity during the peak summer hours is growing at twice the rate of growth in the state."

Utah's political leaders have increasingly called for energy efficiency as a matter of public policy. Most recently, the 2006 Legislature's General Session passed a bipartisan energy policy that directs the Governor's energy advisor to promote "educational programs, including programs supporting conservation and energy efficiency measures" and to "help promote the Division of Facilities Construction and Management's measures to improve energy efficiency in state buildings."

PowerForward was first introduced in 2001. Last year it was moved under the direction of DEQ's Division of Air Quality, which has made it part of an overall effort and partnership to promote smart energy choices, said Glade Sowards, energy program coordinator for DAQ.

"We are simply asking consumers to be aware of those times during the day when energy conservation efforts will have the biggest impact. If everyone helps out even just a little, the benefits can be significant on the electrical system as a whole," said Sowards.

The following are five simple things consumers can do to conserve energy this summer:

- Set air conditioning thermostat for 78 degrees Fahrenheit or higher. Use fans instead of air conditioning when possible.
- Turn off non-essential lights and appliances when not in use.
- Avoid running large appliances such as washers, dryers and electric ovens during peak energy demand hours.
- Open windows during the evening or early morning hours to take advantage of the natural cooling effect of lower outside temperatures. Close blinds or drapes during the heat of the day to maintain cooler air inside the home.
- Consider switching from central air conditioners to evaporative coolers, which use about one-quarter of the electricity.

State Environmental Data to Aid National Children's Study

Data already collected by Department of Environmental Quality scientists could provide the foundation for the Utah component of a landmark National Children's Study that will track the impacts of genetics and environmental influences on more than 100,000 children across the United States from before birth until age 21.

"We don't want to re-invent the wheel," said Jim Quackenboss of the U.S. Environmental Protection Agency's National Exposure Research Laboratory, who is one of the principal investigators in the National Children's Study. "We want to complement what has been done and build on that. We hope to use the DEQ information to fill in those gaps. The strength of the study will come from collecting the information that has already been recorded."

There's no certainty the study will continue. President Bush did not include the $70 million requested to keep the study going in his budget, even though $50 million has already been spent on the study. But advocates are optimistic Congress will restore funding for the study that has been in the works since 2000, when Congress authorized the National Institute of Child Health and Human Development and a consortium of federal agencies to conduct the research.

Dianne Nielson, executive director of DEQ, sponsored a resolution that was approved by the Environment Council of States, urging the funding be included in the FY07 budget, saying the study could provide answers to health problems affecting many children today. To view the resolution, go to: http://www.childrenshealth.utah.gov/childrens_study.htm.

"We are pleased this work is proceeding with the budget that exists," said Nielson. "Funding to continue the work is essential. If we are to improve the quality of a child's environment we need more information."

The importance of the study is emphasized in the resolution: “The outcome of these efforts will provide the most complete data to date on the effects of early life exposures to multiple environmental factors, and will be key to understanding the toxicity of a number of environmental agents, life stages of susceptibility, and genetic factors that contribute to susceptibility. The National Children’s Study will be one of the richest information resources available for answering questions related to children’s health and development, and it will form the basis of child health guidance, interventions and policy for generations to come.”

In September 2005, the University of Utah was awarded a $16 million contract as one of the six initial Vanguard Centers. Dr. Ed Clark, chairman of the University of Utah’s School of Medicine Department of Pediatrics and medical director of Primary Children’s Hospital, is serving as the principal investigator of the University of Utah study, where the enrollment of 1,250 women in Utah is expected to begin next year. “We are in a very amorphous stage,” Clark said. “But our community is better linked than some of the other vanguard sites. It’s possible a year from now we could have some very preliminary results.”

Utah’s advantage has partly to do with the existence of the wealth of information state agencies have collected over the decades. For instance, the Division of Drinking Water has tested public water systems for such contaminants as arsenic. The Division of Air Quality has measured ozone and particulate matter from the various monitoring stations around the state. The Division of Environmental Response and Remediation has extensive data on file from cleanup projects like the one in Eureka where high levels of lead have been found in the soils.

DEQ and other state agencies are committed to offer assistance by providing the information to researchers and continuing to collect the data that could help answer questions, such as the concentrations and impacts pesticides have in the environment.

“We are committed to working with state agencies to collect this data and we are committed to sharing the results as well,” said Clark.

Today’s Children at Risk

“We are facing an epidemic of childhood diseases like obesity, diabetes, asthma and autism,” noted Clark. “Kids now in school are going to be less healthy than their parents. This will have a dramatic effect in our country.”

Physicians have suspected there are links between these diseases and environmental and genetic factors, but they don’t have the data to back it up. “It is unclear to us what happens to humans after long periods of low-dose exposures to chemicals, pesticides and herbicides,” said Clark. “We are very interested in why there is a 10-to-12 fold increase in asthma. Is it genetics and early exposures? We know that children who were born and raised on a ranch or have dogs and cats are less likely to have asthma. Is it because exposures early in life are less likely to become problematic later in life?”

Researchers also will be studying the participants’ physical environments to determine whether there are any links between environment and health. “How do housing quality and neighborhood community conditions affect a child’s health and development? What about household mold exposure? How does school environment trigger asthma symptoms?” questions Clark. The study doesn’t stop there. Researchers will also analyze the psychosocial environment. “For instance, chronic exposure to urban violence could exacerbate asthma if it causes high levels of stress. And what factors are associated with an increased risk of schizophrenia?” Clark adds.

Environmental Monitoring

The study is designed to follow the participants from before birth until they reach age 21. It will track environmental factors including food, water and air and the chemicals they contain to see if, or how, such factors affect the children's health.

Under the direction of Dr. Rod Larson of the Rocky Mountain Center for Occupational and Environmental Health, about 35 different agents will be measured. These agents include various metals, organics, pesticides, bacteria and mold. Samples will be obtained in the residences of participating women prior to conception, during pregnancy, and after the birth of the child. Additional environmental monitoring will be conducted in the home, workplace and day care center.

"We are using the bare minimum of what we have to do to form the framework of the study," Larson said. In efforts to get to the "true" exposure, some participants will be wearing monitoring devices to track their exposures to various environments. Researchers will also use a combination of questionnaires, diaries and even food samples to analyze what the participants are eating. And researchers will be monitoring the indoor and outdoor pollution to determine what impact that has on the participant health.

Findings will be made public in various stages of development, Larson said. "We will look at both the adverse and beneficial aspects."

Researchers are hoping for widespread participation that will recruit Utah women of childbearing age from a variety of backgrounds and ethnicities. "There's something fundamentally bold and groundbreaking about this study," said Clark. "We could never pay these families enough. What we can hope to do is reward them in some small way for volunteering."

State Loans Help Communities with Wastewater Needs

In the mid-1990s, the 4,000 folks living in West Haven, Weber County, had an overflowing problem: Many septic tanks were full and spilling into open drain ditches, creating foul odors and a major health problem.

Today, the city boasts a new wastewater collection system connecting area homes and businesses to the Hooper wastewater treatment plant. The nearly $12 million project was funded by a zero-interest loan from the State Revolving Fund Loan Program, administered by the Water Quality Board.

"Without this type of loan, without the help of the Water Quality Board, we wouldn't have been able to build the system," said Steve Anderson, West Haven city engineer. West Haven residents now pay $30 to $40 a month in sewer bills, a fraction of what it would have been without the loan program.

But success stories like West Haven may be harder to come by in the future if the U.S. Environmental Protection Agency dramatically cuts its water project grants to the states. Because Utah takes its share of the EPA grant pool and adds it to the revolving loan fund, less federal funding could mean fewer Utah projects will be funded.

"The loan program has been very successful, providing $350 million in loans to help fund more than 200 projects since 1988," said Walt Baker, director of the Utah Division of Water Quality. "This year's funding is at an all-time low, and EPA is proposing to cut federal funding even further."

EPA contributes $4.72 million to the revolving loan fund in the current budget year. The proposed 2007 budget calls for $3.66 million. The revolving loan fund has anywhere from $18 million to $23 million a year, coming from loan repayments, sales tax revenue and EPA funds. The number of critical projects is typically greater than the amount of money available, and any reduction in EPA money will mean some projects will be delayed.

And delays mean the growing backlog becomes a growing problem. Water Quality officials are accustomed to shrinking federal participation. In the mid-1980s, EPA contributed more than $20 million a year to Utah projects for Central Valley Water Reclamation Facility, Provo City and Spanish Fork City.

Those aging facilities will soon be in need of upgrades, Baker said. And that comes at the same time that many small Utah communities need to switch from septic tanks to treatment facilities.

In Fairview, Sanpete County, $4.1 million of funding assistance in 2004 helped the town build a $10 million collection and treatment system.

“Without these Water Quality Board loans, cities like Fairview wouldn’t be able to afford it,” said John Iverson of Sunrise Engineering, project manager for the Fairview city project. The city charges $38 a month for sewer service. Without the loan, it would have been well over $100 a month.”

The only silver lining is that the higher loans of years past are now being paid back, creating a bigger pool of loan repayment funds available to be loaned out again. “The loans help communities embrace new technologies that improve public health and improve the environment,” Baker said. “We make a difference.”

Utahns Kick Up Heels to Choose Clean Air in Sandy 5k Run

The Department of Environmental Quality’s Choose Clean Air campaign kicked off April 29 with 85 participants kicking up their heels during a second annual 5k run/walk at Hidden Valley Park in Sandy to draw attention to ozone and what Utahns can do to breathe easier during the dog days of summer ahead.

“I walk every weekend, and I support the cause,” said Michele Straube, among the walkers and runners of all ages who participated in the event co-sponsored by Sandy City Parks and Recreation and the Utah Asthma Task Force. “Clean air is vital for our quality of life.”

There were no cash prizes for the winners, just an opportunity to share in the message that summer air pollution brings with it health hazards, like inflamed lungs and other respiratory problems. The DEQ campaign, patterned after the winter “Red-Light Green-Light” campaign, is designed to alert Utahns to deteriorating air quality and encourage them to take voluntary measures to reduce air pollution.

“Even the smallest steps like consolidating your errands in one simple trip do make a difference,” said Renette Anderson of DEQ’s Office of Planning and Public Affairs and organizer of the event.

The primary problem during summer months is ozone, an invisible gas formed when vehicle emissions combine with heat and sunlight. Not surprisingly, the campaign is geared toward encouraging more car pooling and greater use of mass transit, fewer trips to the store, and not running lawn mowers and other gas-powered equipment during the heat of the day.

“I carpooled the last two days and I am mindful of the problem,” said Marilee Royle, who brought her two teenage children to participate. “The exercise season is on and spring is a good time to get outdoors.”

About 85 people took part in the 2nd Annual Choose Clean Air 5k Walk/Run

Matt and John LaFrance, 22-year-old twin brothers from Salt Lake, attended the race to “support the cause” and “run a 5k,” Matt said. Matt ended up winning the event with a time of 19 minutes 46 seconds.

“We are very active during the summer time. We live near City Creek Canyon, and clean air keeps us outdoors,” John added.

Division of Air Quality (DAQ) staffers were on hand to lend their support as course guides and to distribute bagels, water and other goodies contributed by Wild Oats, Einstein Bagels, Costco and McDonalds.

“It is great to see everyone out here to support an important message like this,” said Cheryl Heying, branch manager of DAQ.

For information on air quality conditions, visit www.cleanair.utah.gov.

Water Quality Board Keeps Head above High Waters

The 11-member Water Quality Board is waist deep in waste issues.

This decade, rural communities will be faced with having to build expensive sewer plants to meet growing populations. Some financially strapped suburbs could seek on-site septic systems rather than community-wide sewer plants. Millions may be needed to remove pollutants from treated waste waters. Then there are the nagging issues of trying to figure out how much selenium can be discharged into the Great Salt Lake or how mercury is getting into our lakes and streams.

These and other challenging issues now confront the Water Quality Board, a diverse cross-section of citizens who oversee a $24 million per year Wastewater Project Assistance Program while making sure Utah's waterways remain pristine.

More to the point, the board does three things, said Leland Myers, manager of Central Davis County Sewer District who was appointed to the Board last month. "The Board acts as a mechanism for approving rules relative to water quality, including discharge permits. It acts as an approval process for loans issued under the Utah State Revolving Loan Program, which includes both federal money and state sales tax money (See related story). And, it acts as an appeals board for decisions made by the staff relative to enforcement of regulations."

To Myers, the biggest challenge will be tackling the so-called Total Maximum Daily Load, or TMDL analysis, for all impaired waters and streams identified throughout the state. That analysis will help determine the amount and effects of any pollutant including "nutrients" that has been identified as causing harmful effects to the flora or fauna of the waterway.

"This could have a huge impact from Santaquin to Tremonton. Residents may be faced with huge sewer bills as most of the wastewater facilities in this area do not have the capability of removing all nutrients being discharged into the rivers, streams or lakes. If, for instance, it is determined that phosphorous is the problem to all the rivers, lakes, or streams along the Wasatch Front, it could cost $500 million to fix the problem," said Myers. "As a member of the Water Quality Board, I hope we find ways to get sufficient funding to do these TMDL analyses completely and correctly, including the analytical studies necessary to support them."

Board Chairman Joe Piccolo, the mayor of Price now serving a second four-year term, adds a host of other issues to a long list of challenges. "Rural Utah is faced with growth and it will lean on the Water Quality Board to help pay for the infrastructure. I think that's equally important."

Piccolo and Myers won't have to tackle the problems on their own. They will have the help of an experienced staff and other members of the Board who come from a diverse background: Agriculture, Government, Environment, Wildlife and Recreation and Manufacturing.

Board members are committed to solving the problems as a matter of public service. They don't get paid for their participation. "It's in the true spirit of volunteerism," said Walt Baker, who as director of the Division of Water Quality serves as the Executive Secretary of the Board. "This is public service at its best."