

2009 Salt Lake Countywide Watershed Symposium

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August 26 & 27, 2009



Salt Lake County Watershed Planning & Restoration Program
2001 South State Street, Ste. N3100, Salt Lake City UT 84190 • (801) 468-3656 • waterresources.slco.org

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Keynote Address

Turning Whine Into Water: The Miracle of Cooperative Engagement

Alan Matheson

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Mayors Panel Discussion

Moderated by former BLM Director Patrick Shea, the Mayors Panel is a discussion between chief executives regarding water quality, recreation, and the desire to highlight the waterways in Salt Lake County. It represents the first county-wide brainstorming event in an effort to restore our rivers and streams both physically and in the minds of the people.

Mayor Peter Corroon

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Mayor Claudia Anderson

Bluffdale City
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Mayor Kelvyn H. Cullimore, Jr.

City of Cottonwood Heights
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Mayor Dave Newton

City of West Jordan
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Mayor Ralph Becker

Salt Lake City
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Mayor Tom Dolan

Sandy City
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Mayor Dan Snarr

Murray City
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Panel Moderator:

Patrick A. Shea

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Field Trips

Jordan River Kayak Trip

Adriaan Boogard
(801) 243-2647

Bob Thompson
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Float the Jordan River with expert guide Adriaan Boogard to observe riparian ecosystems and prior restoration efforts, as well as evaluate the current status of the river's ecosystems.

Jordan Valley Conservation Garden Park Tour

Clifton Smith
Jordan Valley Water Conservancy District
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The Conservation Garden Park showcases beautiful, waterwise landscapes ideal for northern Utah. Get landscaping and plant ideas by viewing each garden landscape, more at www.conservationgardenpark.org

Midvale Slag Superfund Site Restoration & Constructed Wetlands Tour

Erna Waterman, RPM
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EPA is working with UDEQ, Midvale City, Salt Lake County, community members, and others to improve 6,800 feet of the Jordan River riparian corridor adjacent to the Midvale Slag Superfund Site. The project is aimed at minimizing soil cover erosion that could release mine waste from the site into the river. In 1998, the site became the pilot program for EPA Region 8's Superfund Redevelopment Initiative. Work began in fall 2008 and today the Midvale Slag Superfund Site is being successfully redeveloped into a large-scale, mixed-use development.

More information at www.epa.gov/region8/superfund/ut/midvale/

Abstracts (listed alphabetically by title)

Analyzing an Urban Riparian Corridor

Florence Reynolds

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Melissa Stamp

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Salt Lake City's urban creeks and their associated riparian corridors are unique and important resources. In 2008, Salt Lake City passed a Riparian Corridor Overlay Zone (RCO) ordinance to establish restrictions and provisions for land uses occurring within 100 feet of above-ground city stream corridors. To inform the planning, permitting, and administrative processes associated with the ordinance, baseline assessment studies of Red Butte, Emigration, City, and Parleys Creeks were initiated in 2008. This talk will present an overview of the RCO ordinance, a description of stream and vegetation assessment methods, and a summary of study results for Emigration Creek and Red Butte Creek. Recommendations for riparian corridor improvement projects will also be presented.

Blueprint Jordan River: What's Happening Now?

Gabe Epperson

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Envision Utah and local partners recently completed a two year public planning process to explore the future of the Jordan River corridor. The Blueprint report concluded that a coordinated effort amongst the 15 municipalities that border the Jordan River and various community groups is necessary to plan for new development, preservation, capital projects and maintenance along the river corridor. Envision Utah and Salt Lake County formed a working group to address implementation of this public vision. The implementation committee is made up of a combination of elected officials and other representatives from each municipality, as well as other stakeholders representing community groups, non-profits and state agencies. This interim committee is currently working to determine the structure, responsibilities and funding of a future "Jordan River Planning Entity" to ensure the future viability of the parkway. The committee has been meeting monthly during 2009. The primary tasks and discussion has been around:

- Structure of a future board to govern a "commission" or "authority" to oversee the development and preservation of the Jordan River corridor (0.5 mile on either side of the river);
- Responsibilities of this planning entity (which may include: open space acquisition, development reviews, capital project prioritization and maintenance oversight);
- Appropriate funding sources for operations, capital projects, maintenance, open space acquisition and other needs;
- Political strategy and steps to authorize and create such an entity.

The presentation will give more background on the details of these meetings and a future prognosis of the viability of these efforts.

Bugs in the Toolbox: Biological Controls and their Use in Salt Lake County's Noxious Weed Program

Sage Fitch

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In the last several years, invasive species have gained recognition as one of the single greatest threats to the biodiversity and integrity of natural ecosystems. Noxious weeds in the west have been spreading more quickly than available funding and resources for adequate weed management can address. The Salt Lake County Weed Program and its partners are working to find sustainable solutions to this ever-increasing threat, while in the midst of funding and budgets cuts. One of the tools gaining in popularity by land managers and the general public is the use of biological controls. These are natural enemies of noxious weeds that are able to spread throughout weed infestations and may help to slow or prevent the spread of their host weed into new areas. Biological controls are often embraced by land managers who do not want to use herbicides; they also provides teachers with a real world biological system for study in the classroom. This past year, Salt Lake County has had the opportunity to facilitate several workshops focused on biological controls and how to get them more widely established in Utah. As we move forward, what biological controls will the weed program be focusing on? How safe are they? What sort of positive or negative impacts can we expect? In addition, what new weeds will we see invading our county? And what can we do about them?

Getting Your Message Heard: How to Educate the Public

André Walker Bravo

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Do you have information you would like to get out to the public? Have you made flyers, held workshops, set up websites, sent mailings, and more? Which of these was the most effective? How do you know which message to send out? This session will focus on how to develop effective outreach and education techniques to reach out to the public. We will cover the basics; from performing a general needs assessment to designing a program/outreach strategy. The session will highlight the success of the Stream Side Science Youth Education Program (run by USU Water Quality Extension) as well as the outreach techniques used by the Utah Society for Environmental Education.

How Sediment Impacts Water Storage

Todd Stonely, P.E.

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Reservoirs have traditionally been designed under the assumption that they have a finite “life,” frequently as short as 100 years, and will eventually fill with sediment. Little thought has been given to

replacing reservoirs when they fill up or begin to be impacted by sediment. Often there has been a tacit assumption that somebody else, members of a future generation, will find a solution when today's reservoirs become seriously impacted by sediment. The average age of Utah's reservoirs is 63 years. Many have already been impacted by sediment and others most certainly will. Are we the generation that will finally address the reservoir sedimentation challenge? Or, will we continue to pass the problem on to future generations? This presentation examines the impacts of sedimentation on Utah's reservoirs and estimates current and future storage losses. It also discusses several sediment management strategies that can be implemented at reservoirs to ensure their future usefulness. Several Utah case studies are presented as well as the basic economics and potential environmental and other impacts of sediment management.

Jordan River TMDL Study

Hilary N. Arens

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This presentation will provide an update on the current status of the TMDL (Total Maximum Daily Load) water quality study for the Jordan River. Topics to be covered include: the findings and recommendations from the Linkage Symposium held in April 2009; the status of activities and the participants involved in addressing the recommendations from the Linkage Symposium; and where we are with the completion of the TMDL and the next upcoming steps.

New Jordan River Projects

Emy Storheim

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This presentation will provide an overview of projects and efforts along the Jordan River in Salt Lake City including large-scale recreation projects to small-scale restoration sites. Salt Lake City is working to enhance the Jordan River Corridor for the benefit of the community while working to sustain the natural environment that provides ecosystem services.

New Ozonation Technique for Wastewater Treatment and Beneficial Use

Dr. Andy Hong, Ph.D., P.E.

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Water management is important to society; adequate supply of water is critical to sustainable economic activities. Ever increasing water demand from population growth and energy developments

necessitates sound management practice. For example, water containing hydrocarbons is produced as a consequence of oil or gas production, reaching 3 billion tons annually in the U.S. alone and increasing as oil wells approach their end. Development of unconventional sources of oil, such as extraction of bitumen from oil sands and in situ extraction of kerogen from oil shale, result in large quantities of water with hydrocarbons. Dispersed and dissolved oils in these waters pose treatment and disposal challenges, often preventing beneficial uses. In many regions, sustainable energy supply and new development will critically depend on availability and sound management of water. Additionally, past industrial activities have resulted in contaminated environmental media including groundwater, surface water, sediment and soil. Contaminants of great concern include PCBs, PAHs, MTBE, hydrocarbons, and heavy metals.

We have developed a new ozonation technique for the rehabilitation of sediment and water, with a focus on treatment and reuse of contaminated waters and on remediation of soil and sediment. Unlike ordinary ozonation practice, the new technique incorporates rapid, successive cycles of compression and decompression during ozonation. Small bubbles are created that provide reactive zones at the gas-liquid interface, resulting in heightened chemical conversions. The technique has been applied for different contaminated media with positive outcomes. This presentation will review treatment results for sediment and water with different contaminants. The method contributes to water treatment and recycle and reuse of wastewaters.

Restoring Bird Habitat Along the Jordan River

Bruce Heath

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For over 10 years, Great Salt Lake Audubon (GSLA) has led a consortium of organizations—including Tree Utah, U.S. Fish and Wildlife, the Utah Reclamation Mitigation Conservation Commission, and IHI Environmental—in a wildlife habitat restoration project along the Jordan River. Located along the east side of the river and both sides of 106th South, about 120 acres of what had once been grazing and farmland is now protected and being restored to a natural environment of cottonwoods and other native vegetation. With the rerouting of Willow Creek and the creation of ponds, a habitat supporting nesting and migrating birds along the internationally important Jordan River corridor is now nearing completion. GSLA will present and lead a discussion of the accomplishments to date of this important project, the transition of the project to a perpetually protected area benefiting both wildlife and the public, and the implications of lessons learned for similar projects.

Salt Lake & Sandy Aquifer Storage and Recovery Project

Michael L. Wilson

Metropolitan Water District of Salt Lake & Sandy
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The Metropolitan Water District of Salt Lake & Sandy (District) has drafted a plan to implement an

Aquifer Storage and Recovery (ASR) system. The District has considered ASR as a way to improve water conservation and conjunctive management of its water rights and resources. The District's primary objective in pursuing an ASR system is to develop a "strategic water reserve" or "water bank" that can be accessed during droughts to meet future demand requirements for the District or its member cities. An ASR feasibility assessment previously conducted by the District concluded that ASR was technically feasible and cost effective, and recommended pilot recharge testing to verify conceptual designs. The study area was selected based on the proximity to existing District infrastructure and available water supplies, which make development of an ASR system in this area more cost effective. Pilot testing of three infiltration methods for aquifer recharge was conducted in Fall 2007 at the District's LCWTP site using an infiltration basin, a Vadose Recharge Well (VRW), and Infiltration Distribution Lines (IDL) or seepage trenches.

The plan is developed to conceptually layout an aquifer recharge system capable of recharging approximately 8,790 ac-ft of water over a 70-day period—May 1 to July 10—each year. This is the identified amount of water rights available in Little Cottonwood Creek (LCC) each spring that could be made available for ASR purposes. Raw (untreated) water from LCC will be recharged via infiltration methods, primarily VRWs. Although conventional surface water treatments will not be used, filtering the water to reduce suspended solids and turbidity is included. Recharge using treated water from the Little Cottonwood Water Treatment Plant (LCWTP) and direct injection into the principal aquifer using deep injection wells was not considered for this plan. The recharged water will be recovered using a new production well at the LCWTP site and existing production wells in the Sandy and Cottonwood Heights areas.

Streamflow, Climate Change and Forecasting

Kevin Werner

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The Colorado Basin River Forecast Center (CBRFC) generates and provides routine forecasts and analysis for streamflow, floods, and water supply. Forecasts are generated from a hydrologic model and forecaster expertise with meteorological data and forecasts. These forecasts are routinely used by people interested in various aspects of water management from flood managers to water managers planning ahead based on the annual runoff. In Utah and surrounding states with semi arid climates, one of the major forecasts interests is in seasonal water supply forecasts. This talk will describe forecast methodologies that the CBRFC uses to generate streamflow forecasts.

Climate change is projected to alter the hydrology of many western U.S. basins. The most significant changes in the U.S. are projected for the Colorado and Great basins. Changes to basin hydrology are important to understand for many applications. The CBRFC is involved in several studies examining how climate change is expected to impact streamflow. Preliminary results from two of these studies will be presented. One focuses on streamflow changes in the Colorado River Basin. The other study explores how climate change will affect our ability to predict streamflow in the future.

Sustainable Water Solutions: Stormwater, Best Management Practices, Rainwater Harvesting and More!

Dr. Steven Burian
burian@civil.utah.edu

Urban Water Engineering & Sustainability Group
Civil and Environmental Engineering
University of Utah
122 Central Campus Drive, Salt Lake City UT 84112

Dr. Christine Pomeroy
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Urban water management has become a critical issue at the forefront of sustainability. Municipalities and engineers are seeking solutions to improve the performance and sustainability of existing urban water infrastructure systems, plan and design sustainable water infrastructure solutions for newly urbanizing areas, and increase the overall efficiency of urban water systems. This workshop will provide a brief overview of sustainability and place it in the context of urban water infrastructure as viewed at the national level by the Environmental Protection Agency, American Society of Civil Engineers, and other organizations. We will then expand with an overview of emerging green infrastructure components including pervious concrete, rainwater harvesting, green roofs, and bioretention. We will highlight the key characteristics of these green infrastructure components relevant for implementation in Utah, describe design methods, review tools available for estimating their costs, and discuss challenges inhibiting their application in Utah. Case studies from across the country will be reviewed to highlight key points and design examples and procedures will be presented. Workshop participants can expect to increase their knowledge of sustainable urban water systems, learn design techniques, and be able to apply cost estimating methods.

The Inspector's Approach to SWPPP and Site Inspection Using the New State Inspection Form

Trace Robinson, P.E.
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Under the direction of the Utah Storm Water Advisory Committee and the Department of Environmental Quality, a Stormwater Pollution Prevention Plan (SWPPP) training and registration program has been developed for site inspectors. This program will train the inspectors regarding the requirements of the Utah Pollutant Discharge Elimination System (UPDES) permit and unify the inspection and reporting process for Municipal Separate Storm Sewer Systems (MS4). One of the Sections of the training and registration program deals with the State Inspection Form and how an inspector should approach a construction site and perform their inspections. This presentation will provide a brief overview of the training program, introduce the new State inspection Form and outline the obligations of the inspector as he/she approaches a construction site.

Water Law 101

Wendy Bowden Crowther

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This presentation will address the basics of Utah water law. The presentation will focus on the prior appropriation doctrine, which governs the administration of water rights throughout the western United States, and the specifics of Utah water law. Topics to be covered will address the appropriation of new water rights, the conveyance of existing water rights, and the process for changing the use of existing water rights. The presentation will also address the role of the Utah State Engineer and the role of the court in addressing water rights.

What Role Does the Salt Lake Valley Health Department Play in Water Quality?

Randy Williams

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Drinking water is a necessity. Protecting our drinking water has been an issue for many years and several government and private entities have tried to address it. The Salt Lake Valley Health Department has several programs that contribute to protecting our drinking water. Salt Lake County is required to enact an ordinance by 2010 for source water protection. This will continue to be a “hot” topic especially as global warming continues and new chemicals are discovered in our drinking water.

Where to Get Grant Money

Carl Adams

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Mike Reichert

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Shelly Andrews

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Utah Department of Environmental Quality

Division of Water Quality

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Clean water is not free. Since enactment of the Federal Clean Water Act in 1972, billions of dollars have been invested in treating and protecting water quality. The original focus was on cleaning up point sources of pollution such as from municipal sewer systems and industrial facilities. As these sources have since been largely controlled to the extent feasible more attention is being given to the other half of the water quality equation, non-point sources. Non-point sources are very generally defined as everything else that pollutes the water and is typically not regulated by a discharge permit. Nonpoint sources are usually addressed through the voluntary implementation of best management practices, a collection of structural designs and management practices specifically designed for various land uses to reduce or eliminate pollution. As this effort is voluntary and serves the public good, funding is made available as an incentive to help defray the cost of the project to the sponsor. This presentation will outline a few sources of available funding for non-point source pollution control, the Division’s priorities in disbursing these funds, and the process for obtaining funding.

Working Collaboratively to Solve Environmental Problems

Michele Straube

Salt Lake City—Salt Lake Solutions Initiative
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After outlining basic principles of collaboration and consensus building, this presentation will use one or two Utah case studies to demonstrate the principles in action. There will be opportunity for Q/A and group discussion about issues of concern to the session participants.

Bios

CARL ADAMS has worked for the State of Utah's Division of Water Quality for the last 9 years. Carl currently manages the TMDL/Watershed Planning Section that is responsible for protecting and improving the water quality of our streams and lakes throughout the State. In spite of the many challenges associated with this effort, the citizens of Utah have consistently demonstrated their ability to work collaboratively with partner agencies on finding solutions that no single individual or agency could realize on their own.

CLAUDIA ANDERSON currently serves as the Mayor of Bluffdale City Utah, elected in 2004. Her elected government service also includes serving on the Bluffdale City Council from 1999 to 2004, and as a Commissioner of Bluffdale City Planning and Zoning from 1996 to 1999. Her volunteer government service includes serving on the Utah Governors' Council for the Deaf and Blind, serving as Secretary/Trustee of the International Parent Board for 4 years, and serving on the Parent's Council of the A.G. Bell Association for 15 years. Ms. Anderson has successfully formed parent, school, community and business partnerships and alliances for the support of education and benefit of children. In 1978 she founded Audio Enhancement, a woman-owned, worldwide company providing services and research-based products that improve teacher instruction and student academic achievement. She also founded "The Child Shall Speak Foundation", which was created to teach deaf children to talk. It is recognized as one of the first private school/clinic organizations that successfully introduced reverse mainstreaming into the preschool setting. Ms. Anderson is the inventor and patent holder of the first infrared wireless microphone that has resulted in the best instructional technology and interactive delivery systems (i.e. internet, camera, video, and audio) for classroom teachers. She created a partnership with Panasonic in 2004 that delivers the newest and best audio technology possible to the nation's classrooms. She was the 2004 Utah Business Woman of the Year. Claudia Anderson was educated at the University of Utah, Brigham Young University, and Utah State University. She is the single mother of four children, two of which are profoundly deaf.

SHELLY ANDREWS has worked for the State of Utah Department of Environmental Quality for over 20 years. Currently, Shelly coordinates the "Green" American Recovery and Reinvestment Act and the Nonpoint Source Financial Assistance programs and is responsible for the environmental assessment of point source and nonpoint source project impacts to waters of the State. Working together with individuals, industries, local, state and federal agencies to improve water quality continues to be rewarding as we make progress in achieving our common goal.

HILARY ARENS is the Jordan Basin TMDL Coordinator for the Utah Division of Water Quality. She believes that by working closely with the watershed stakeholders the Jordan River, the TMDL will be on track for completion by the spring of 2011. Hilary moved to Utah from Alaska, where she helped complete the first watershed plan for the State. She has a Masters in Watershed Science from Colorado State University where she conducted her research on the planning qualities that have led to the successful implementation of watershed plans and projects.

RALPH BECKER was sworn in as Mayor of Salt Lake City in January, 2008. Prior to being elected Mayor, he was a member of the Utah House of Representatives, from 1996 to 2007. During that time, Mr. Becker served in leadership for seven years, including five years as the House Democratic Leader. Mayor Becker is a professional planner (FAICP) and lawyer. He founded the consulting firm Bear West in Salt Lake City in 1985, specializing in community planning, environmental assessment, public lands, land use, consensus building, and public involvement. Mr. Becker received a Bachelor of Arts in American Civilization from the University of Pennsylvania in 1973 and received his J.D. and Masters Degree in Geography and Planning from the University of Utah in 1977 and 1982. Mayor Becker is an adjunct professor at the University of Utah. He has taught environmental planning, policy and law, public lands, and environmental assessment in the College of Architecture and Planning. Mr. Becker is on the board of the Policy Consensus Initiative, an organization promoting collaborative decision making in state government. Away from work, Mayor Becker is an avid skier and kayaker and enjoys Utah's great outdoors with his two sons and 14 year-old granddaughter. In addition, Ralph Becker worked to increase government transparency and ethical standards by providing audio and video access to legislative debates, proposing banning gifts from lobbyists to legislators, prohibiting the personal use of campaign funds, and ending closed legislative meetings. He also worked to establish stricter standards on billboards and stop legislation, which eased takings regulations.

ADRIAAN BOOGAARD is a lifetime Jordan River enthusiast and expert river guide. His knowledge about the river and its ecosystem has been greatly appreciated at the Salt Lake Countywide Watershed Symposium; this will be his second year guiding the Symposium kayak trip.

ANDREÉ WALKER BRAVO is the Associate Director for the Utah Society for Environmental Education. She has a Bachelors Degree in Environmental Studies with an emphasis in Environmental Education and a Masters Degree in Watershed Science with an emphasis in Outreach Programming Evaluation and Assessment. Andreé has been in the EE field for over eight years previously working for Utah State University Water Quality Extension.

STEVEN BURIAN is an Associate Professor in the Urban Water Engineering & Sustainability Group in the Civil and Environmental Engineering at the University of Utah. Dr. Burian has taught courses in sustainable urban water engineering, stormwater management and design, water management, hydrology, hydraulics, sustainable design, and flood modeling since August 2003. He earned a B.S. in Civil Engineering from the University of Notre Dame in 1993 and a M.S.E. in Environmental Engineering in 1995 and a Ph.D. in Civil Engineering in 1999 from The University of Alabama. Dr. Burian's research team contributes to the engineering of sustainable and secure urban systems and integrated water-energy infrastructure. Focus research areas include sustainable development and urban water infrastructure design, integrated urban water management, modeling and simulation of urban water systems and extreme floods, and regional water-energy interdependencies and sustainable solutions. Reporting on these various topics, Dr. Burian has authored or co-authored more than 30 peer-reviewed publications, more than 50 conference papers and project reports, and delivered several software packages and databases. He is active in numerous professional societies including the American Society of Civil Engineers (ASCE), American Water Resources Association (AWRA), Water Environment Federation (WEF), American Geophysical Union (AGU), and American Society of Engineering Educators (ASEE). He is a registered professional engineer in Utah.

PETER CORROON was elected Salt Lake County Mayor in 2004, and since then has worked to foster open, honest and ethical government. At a time when Salt Lake County is seeing rapid growth, he emphasizes "planning, not politics" to manage this growth. His fiscally conservative policies will make county government both more efficient and more environmentally sound. Mayor Corroon believes that government should be accessible to all citizens. He regularly holds open-door meetings for the public and has made promoting diversity a priority. A champion of small business, his Up Grade initiative and economic development efforts are improving lives throughout the county. In addition to being mayor of Salt Lake County, Mayor Corroon also serves as a board member for the National Association of Counties, The United Way, Envision Utah, Utah Technology Council, Economic Development Corporation of Utah, and Salt Lake Area Chamber of Commerce, which recently awarded him "Public Official of the Year." He holds a B.S. in Civil Engineering from Carnegie Mellon University, Pittsburgh; M.S. in Real Estate Finance and Investment, New York University; and a J. D. from Golden Gate University. Mayor Corroon and his wife, Amy, have three children. His twin brother Christopher also lives in Salt Lake.

WENDY BOWDEN CROWTHER is a shareholder at the firm of Clyde Snow & Sessions, P.C. Her practice is focused on Water Law but she also works extensively in the areas of Natural Resources Law, Environmental Law, and Eminent Domain (Condemnation). Ms. Crowther represents municipalities, water districts, irrigation companies, and individual water right holders. Ms. Crowther regularly appears before the Division of Water Rights (Utah State Engineer) as well as the state and federal courts. She has experience representing clients in matters dealing with Reclamation Law, the Clean Water Act, and the Clean Air Act. Ms. Crowther is a member of the Utah State Bar Energy, Natural Resources & Environmental Law Section. She currently serves as the Section Treasurer. Prior to becoming Section Treasurer, Ms. Crowther served as Chair of the Water Law Committee. Ms. Crowther is the Chair of the American Bar Association Section of Environmental, Energy and Resources' Water Law Committee and she was Co-Chair of the 2008 ABA Water Law Conference.

KELVYN H. CULLIMORE JR. was elected the first Mayor of Cottonwood Heights in November 2004. From 2002-2004, Mayor Cullimore worked as a member of the committee to incorporate Cottonwood Heights as the 16th city in Salt Lake County. The outcome of the vote was 85% in favor of incorporation and 15% against. Mayor Cullimore's term of office expires on January 1, 2010. In addition to his mayoral duties starting up a new city of approximately 36,000 residents, Mayor Cullimore is a member of the board of the Unified Fire Authority serving as the chairman of its finance committee. Mayor Cullimore also currently serves in the following capacities: Member of the Council of Governments for Salt Lake County, Treasurer of Conference of Mayors for Salt Lake County, Alternate member of Transcom, member of the Sheriff's Law Enforcement Administrative Control Board, and member of the interlocal committee to form a new Eastside School District. Previously Mayor Cullimore served as a board member of the organizing committee for the Unified Police District

and as a member of the ZAP tax advisory board for Salt Lake County. Upon incorporation, Cottonwood Heights chose the Council-Manager form of government. In that form of government the Mayor is not a full time position. Professionally, Mayor Cullimore presently serves as Chairman, President & CEO of Dynatronics Corporation, a publicly traded medical device manufacturer with headquarters in Cottonwood Heights. Mayor Cullimore has served as a Director and Officer of Dynatronics since it was founded by his father in 1979. Since 1992, Mayor Cullimore has been a member of the Board and chairman of the audit committee of ITEC Attractions, an entertainment company operating in Branson, Missouri. In 2003 he joined the board of directors of the Medical Device Manufacturers Association headquartered in Washington, D.C. and currently serves on its executive committee. Mayor Cullimore also serves as a member of the Life Sciences Advisory Board for the Utah Technology Council. Mayor Cullimore has volunteered in numerous capacities. For the past five years he has been a board member of the Jordan Education Foundation, an organization that raises money to supplement education in the Jordan School District, the largest district in Utah. Mayor Cullimore has served in many positions for the Boy Scouts of America, including Scoutmaster, and in 2002 received the District Award of Merit for his service. From 1976 to 1978 he served as a missionary for the LDS Church in the province of Quebec. He graduated cum laude from Brigham Young University in 1980 with a degree in Financial and Estate Planning. Mayor Cullimore and his wife, Laurie Lyn Cullimore, are the parents of five children and one granddaughter and has lived in Cottonwood Heights since 1980.

TOM DOLAN was born in Washington, D.C. He graduated from the University of Utah in 1967. Mayor Dolan and his family lived in Colorado and Maryland and have been residents of Sandy since 1979. Mayor Dolan was elected Mayor of Sandy City in 1994 and is currently serving his fourth term. He currently serves on numerous committees and boards. These appointments include the Utah League of Cities and Towns (Past President), EDCU Executive Committee (Vice Chair), Utah Sports Commission, Wasatch Front Regional Council, Salt Lake County Council of Governments (Past President), Salt Lake Valley Conference of Mayors (Past Chair), Healthy Sandy Executive Committee, and the Envision Utah Steering Committee (Vice Chair). Mayor Dolan received the Utah APA 2002 Citizen Planner Award, the 1999 Healthier Communities Institute Award, and was named Sandy Area Chamber of Commerce Man of the Year in 1997.

GABE EPPERSON began working for Envision Utah in 2003, starting as an Assistant Planner working on efforts in Salt Lake County (Sandy City 9400 South TRAX Site Plan) and Box Elder County (Brigham City and Perry City General Plans). In 2004, he began the development of the Envision Utah Economic Development Toolbox, which was completed in 2005. The Economic Development Toolbox is a 150+ page document with straightforward guidelines for local governments to prepare for economic growth, attracting higher-paying businesses and high-skilled workers. Beginning in 2005, Mr. Epperson, began serving as the Project Lead for the Wasatch Choices 2040 project: a 4-County land use and transportation visioning process that was used by two Metropolitan Planning Organizations (Wasatch Front Regional Council and Mountainland Association of Governments) as the official land use scenario for their Long Range Transportation Plans. Through the Wasatch Choices process, he served as the lead GIS specialist in mapping the public input and creating the Vision map. He also co-authored the Wasatch Choices 2040 Final Report. In 2006, Gabe worked on the Downtown Rising joint visioning effort undertaken by the Salt Lake Chamber of Commerce and Salt Lake City. Through Downtown Rising, he facilitated several technical teams that developed transportation and economic development strategies for Downtown Salt Lake City. In the last two years, Gabe has been the Project Manager for two major regional planning efforts along the Wasatch Front relating to watershed management and planning, including the Blueprint Jordan River, and the Wasatch Canyons Tomorrow projects. He was promoted to Planning Director in July 2008. In 2003, Gabe completed his B.A. in Environmental Studies/Human Ecology from Middlebury College, VT. In 2007, he finished his Thesis on "Measuring the Land Use Impacts on Regional Transportation along the Wasatch Front," and received a Master's Degree in Public Administration from the University of Utah.

SAGE FITCH is a Noxious Weed Specialist for the Salt Lake County Weed Program and Chairwoman of the Bonneville Cooperative Weed Management Program (BCWMA). Sage is responsible for grant writing and project coordination, weed awareness and education, coordination of the BCWMA, weed mapping, and program development. Before moving to Utah in 2004, Sage worked for the King County Noxious Weed Program in Seattle, Washington. She holds Bachelors degree from Utah State University in Horticultural Science.

BRUCE HEATH is the Executive Director of Great Salt Lake Audubon, one of the oldest conservation organizations in Utah. He is a life-long birder and has an MS degree in Economics from the University of Utah. He has had a lengthy career in variety of positions in Utah state government and has been a contractor in Mauretania, West Africa.

ANDY HONG is a Professor of Civil and Environmental Engineering at the University of Utah. He received a BS in Chemistry and MS and PhD in Environmental Engineering Science from the California Institute of Technology. Dr. Hong has been doing research and teaching in Environmental Engineering. His research focus has been on treatment processes for the water and soil media, particularly for organic and metal contaminants. The processes include ozonation, AOP, and chelation. More recently he has been developing processes of energy interest such as conversion of petroleum byproducts into fuel compounds as well as in extraction of bitumen from oil sands. Dr. Hong has conducted different environmental research projects and contributed over 150 research papers, book chapters, and conference presentations.

TERRY KENNEY received a B.S. degree in environmental science from the University of Iowa in 1996. He received his M.S. degree in 2004 from the University of Utah. Terry is a hydrologist with the U.S. Geological Survey Utah Water Science Center and is currently the Surface Water Specialist. He has conducted a variety of 1- and 2-dimensional hydraulic modeling and monitoring studies on the Colorado, Green, Fremont, and Jordan Rivers in Utah. Terry in 2007 updated the regional flood frequency regression equations for Utah and recently finished a statistical assessment of dissolved solids in the Upper Colorado River Basin.

RAY LIMB has worked in the Community & Economic Development Department for the past four years as the Development Site Coordinator for the Midvale EPA Superfund Sites. He oversees the material management on the sites to insure that the remediated remedy of the sites is environmentally protected, which includes the Riparian area of the Jordan River. Ray has a Bachelors' degree from USU and a Masters' degree in Administration from BYU. He has worked in the public sector for 29 years, 23 of those years in municipal government. 16 of the 23 years he served as a City Administrator. He has served in various capacities, including: Director of Community Education, Town Councilman, City Treasurer, member of Board of Directors of URMA Municipal Insurance Company, Sanpete County Community and Economic Development Committee member and chair, Sanpete County Mayors/Managers Association member, Gunnison Business Association member, Zoning Administrator of Pleasant Grove City, Pleasant Grove Businessman Alliance Association member, Utah Ordinance Compliance Association member, and Utah City Managers Association member and secretary. Ray is HAZWOPER certified, CERT trained, past certified in water, sewer and building inspection. He has written and administered water, sewer, and economic grants, and is a staff member of Jordan River Stakeholders and Midvale Technical Advisory Committee (TAG) for the Midvale Superfund Sites.

ALAN MATHESON, JR. became the Executive Director of the nonprofit Coalition for Utah's Future and Envision Utah in 2004. In that role, he oversees implementation of a publicly developed quality growth strategy designed to keep Utah beautiful, prosperous and neighborly for future generations. He previously served as a member of the Envision Utah Steering Committee. Under Matheson's direction, Envision Utah has developed and managed several local and multi-county visioning processes. The focus of these processes is broad public involvement, advanced technical analysis, and practical implementation strategies. Matheson is a frequent speaker at national conferences and has consulted with several regions around the country seeking to address the challenges of growth. Matheson holds a B.A. in International Relations from Stanford University and a J.D. from the UCLA School of Law, where he was an editor of the UCLA Law Review. Following graduation, he served as a law clerk for a federal judge on the Ninth Circuit Court of Appeals. Matheson practiced law in Phoenix as an associate at Brown & Bain, P.C.; as Senior Attorney and Environmental Policy Advisor for Arizona Public Service Co., Arizona's largest electric utility; and as a partner at Ryley, Carlock & Applewhite, where he focused on water law. In 2001, Matheson became the founding director of the Utah Water Project. Matheson is active in his community and among other things, serves on the Sandy City Planning Commission, the Wasatch Front Regional Council's Regional Growth Committee, and the Governor's Oil Shale and Tar Sands Advisory Panel.

DAVE NEWTON is a 35 year resident of West Jordan having built his home at the North end of the City in 1974. Trying to solve a local problem, he became involved with City Government in 1997, serving on the City council and then as Mayor beginning 2006. He and his wife Sandy have been married 35 years, with two children, Ben Newton and Stacy Schultz; both married and living in West Jordan. He has two grandchildren. Dave served a mission to New Zealand for the LDS Church and has served as a Scoutmaster for 8 years with the Boy Scouts of America. Attaining the rank of Major in the Army ROTC, he received an offer to join the Air Force and go to flight school, but opted to get married and finish school instead. Graduating from BYU in motion picture and television production, Dave and Sandy have just finished production of a major motion picture entitled "Beau Jest", a romantic comedy. The movie has been shown at film festivals and will be released on

DVD this November. They have visited Russia where they visited the city of Votkinsk, West Jordan's sister city. In his spare time, (what spare time?) he likes to read, play tennis and buy real estate.

CHRISTINE A. POMEROY is an Assistant Professor in the Urban Water Engineering & Sustainability Group in the Department of Civil and Environmental Engineering at the University of Utah, where she teaches courses in hydraulics, open channel flow, stormwater management and design, water distribution system analysis, and urban watershed management. She has more than 14 years of academic and consulting experience in stormwater management, watershed management, permitting and compliance, modeling, GIS applications in water resources, hydraulics and hydrology. Dr. Pomeroy earned a B.S. in Civil Engineering from Michigan State University in 1995, a M.S. in Civil Engineering in 2004, and a Ph.D. in Civil Engineering in 2007 from Colorado State University. She is active in numerous professional societies including the American Society of Civil Engineers (ASCE), American Water Resources Association (AWRA), and the Water Environment Federation (WEF). Dr. Pomeroy is currently co-chair of the Water Environment Federation task force to update the Manual of Practice No. 23 Design of Urban Runoff Controls. She is a registered professional engineer in Michigan.

MIKE REICHERT has worked as an Environmental Manager/Scientist in the Department of Environmental Quality, Division of Water Quality for 33 years. He has overseen programs related to water quality standards, assessment/evaluation of water quality conditions and the nonpoint source water pollution control/management program. He is currently serving as the State Nonpoint Source Coordinator managing the CWA Section 319 NPS Grant Program. Mike graduated from Brigham Young University in 1975 with a Master's Degree in aquatic biology with emphasis in fisheries and stream and lake ecology. He grew up on a woodlot in northeastern Iowa and northern California. He and his wife Linda have lived in Utah for 42 years and are the parents of eight children.

FLORENCE REYNOLDS, Water Quality and Treatment Administrator, has been with Salt Lake City Public Utilities, since 1987. Coming from Chicago, Florence spent several years with utilities in the East. Currently responsible for the water quality in the City, the Riparian Corridor Project falls under her purview.

TRACE ROBINSON, P.E. is the Public Works Director/City Engineer for Riverton City. He has a strong commitment to the Storm Water Program and has been involved with the development of many of the UPDES programs for Cities throughout the State including the registration of Storm Water Inspectors. Trace has a Masters Degree in Water Resources Engineering from Brigham Young University and currently serves on the Utah LTAP Board, Utah Storm Water Advisory Committee, and the Utah APWA Specification Committee.

PATRICK A. SHEA was an associate and a partner with the law firm VanCott, Bagley, Cornwall & McCarthy from 1976 to 1985. In 1979 Mr. Shea took a leave of absence and was the counsel to the United States Senate Foreign Relations Committee. Senator Frank Church and Senator Jacob Javits were the chair and ranking minority members of the committee. In 1985 Mr. Shea became the General Counsel and Corporate Secretary for Standard Communications, Inc. which was a privately held telecommunications company which owned 12 television stations, 12 radio stations, 6 cable systems and 8 newspapers. In 1992 Mr. Shea started Patrick A. Shea, P.C. and specialized in telecommunications, natural resources, and complex corporate transactions. Beginning in 1992 Mr. Shea helped organized the Huntsman Cancer Institute and worked on a network basis with Mr. Scott Parker, CEO of Intermountain Health Care. In 1996 President Clinton named Mr. Shea to the President's Commission on Aviation Safety and Security after the TWA 800 crash. In 1997 President Clinton named Mr. Shea as the National Director of the Bureau of Land Management in the Department of Interior. In 1999 Mr. Shea was named Deputy Assistant Secretary for Land and Minerals. In November of 2000 Mr. Shea returned to Salt Lake and became of Counsel with the Philadelphia law firm Ballard Spahr Andrews & Ingersoll. In June of 2004 Mr. Shea reopened Patrick A. Shea, P.C. Since then his time has been devoted to solving complex business problems that involve legal, political and economic questions. He represents the University of Utah's Department of Physics in implementing an international high-energy physics experiment. Mr. Shea is an Adjunct Professor of Agronomy at Kansas State University with a particular focus on native grasses. Mr. Shea is an advisor at Westminster College for faculty grants and student scholarships.

CLIFTON SMITH was raised in Northern Utah and attended Utah State University where he received his Bachelors Degree in Horticulture and a Masters Degree in Water-Efficient Landscaping. He has supervised landscape crews for various landscapes in the Salt Lake City area including the Conference Center at Temple Square and has been managing the Conservation Garden Park since 2005.

DANIEL C. SNARR was first elected in 1997 and is serving his third term as Mayor. As a full-time mayor in a Mayor / Council form of government, Murray City employs 396 full- and part-time employees and 487 seasonal employees. Mayor Snarr oversees a budget of \$83 million. Mayor Snarr attended the University of Utah and earned a Bachelor of Science in Organizational Communications. He also served a two-year mission in Scotland for the Church of Jesus Christ of Latter Day Saints. Mayor Snarr also served as a demolition expert in the Special Forces of the Utah National Guard Green Berets Unit. Prior to serving as Mayor, he was a co-owner of Snarr Brothers Landscaping, a business he started in his garage and built to be one of the largest property maintenance businesses in Utah. Maintaining his Murray roots and appreciation, Snarr Brothers is housed in a historic house, which the Mayor restored. Mayor Snarr is married to April Thompson Snarr. He has five children and three grandchildren.

MELISSA STAMP serves as a Watershed Scientist and Project Manager for BIO-WEST's Water Resources Section and has 14 years of professional experience in the water resources field. Her project experience with BIO-WEST includes stream channel assessment and restoration design, geomorphic mapping, water quality evaluation, erosion control design, hydrologic analysis, and storm water management. She is currently serving as Project Manager for the Salt Lake City riparian corridor study projects on Emigration, Red Butte, Parleys, and City Creeks. Prior to her time with BIO-WEST, Melissa worked on stream restoration projects as an environmental specialist for the state of Maryland and also completed internships with the National Park Service and National Wildlife Federation. She received a B.A. Degree in Geography from Dartmouth College in 1992 and an M.S. degree from Utah State University in Watershed Science (emphasis in fluvial geomorphology) in 2000.

TODD STONELY has worked for the Utah Division of Water Resources since 1998, first as an engineer in the River Basin Planning Section, then as its manager since 2002. Todd was the primary author of several major publications by the division, including the latest Utah State Water Plan, Utah's Water Resources—Planning for the Future (2001), Utah's M&I Water Conservation Plan (2003), and Weber River Basin—Planning for the Future (2009). Todd also oversaw the production of four detailed planning studies on water reuse, conjunctive management of surface and ground water, drought, and reservoir sedimentation. Todd also directed the division's effort to create a water conservation web page for the state of Utah: www.conservewater.utah.gov. Todd was born and raised in Utah. He grew up in the Millcreek area of the Salt Lake Valley and later attended Brigham Young University. After a year at BYU, he served a two-year LDS mission to Germany. Upon returning home, he continued his schooling at BYU where he earned a BS degree in Civil and Environmental Engineering in 1995. While at BYU, Todd met and married his sweetheart, Daisy. They live in Orem and are the proud parents of four children.

EMY STORHEIM is the program manager for Salt Lake City's Open Space Lands Program that strives to preserve natural areas, increase access to parks and enhance trail and open space connectivity. Prior to her work in Utah she was a project manager for the Mountains Recreation and Conservation Authority, a local government agency in Southern California where she focused on open space conservation, restoration and regional trail connections. She has a master's degree in Landscape Architecture from California State Polytechnic University Pomona and earned a bachelor's in Humanities with a concentration in ecology, culture and sustainability from New College of California. She has past work experience in organic farming, landscape design, permaculture, forestry, travel and construction. Her interests include sustainable land management, animal husbandry, earth-works art, and the preservation of natural, cultural and agricultural heritage.

MICHELE STRAUBE is a mediator and facilitator working with Salt Lake City Mayor Ralph Becker on his Salt Lake Solutions initiative. Salt Lake Solutions undertakes projects to model collaborative problem solving. Each Salt Lake Solutions project is designed to engage all sectors of the community in solving difficult public problems. Ms. Straube has an extensive background as an environmental lawyer, policy analyst, and designer of stakeholder engagement. She also teaches Conflict Management and Environmental Dispute Resolution as an adjunct at the University of Utah S.J. Quinney College of Law.

ERNA WATERMAN began her career with the Environmental Protection Agency nearly 20 years ago serving the bulk of her time as Project Manager at sites in Utah, Colorado and North Dakota. A year and half of her time at the EPA included work in the RCRA program in the weapons of mass destruction and incineration unit. A 2007 graduate of the Colorado Leadership Development Program, Erna earned a B.S. in Civil Engineering, University of Colorado, 1989, and a B.S. in Geology & Art from Adams State College, 1981. She has also taken graduate classes in Public Administration and Petroleum Geology. Married with two girls, 10 and 14, Erna makes time for an avocation in art, as time permits.

KEVIN WERNER is the Service Coordination Hydrologist for NOAA's Colorado Basin River Forecast Center. In this role, his work connects water predictions and science with people and organizations that benefit from forecasts and understanding of the Colorado and Great Basin rivers. The River Forecast Center has expertise in forecasting water from the very short flash flood time scale to the longer seasonal scale for water supply. All of these forecasts provide critical information to decision makers. In previous positions Kevin has worked to infuse new science and technology into river forecast operational procedures and methodologies. Kevin holds Master of Science and Bachelor of Science degrees from the University of Washington and is working on a Master of Public Administration degree from the University of Utah.

RANDY WILLIAMS analyzed drinking, surface, and sewage effluent water for microbiological contaminants for several years. He has completed hundreds of sanitary surveys on public drinking water systems, accompanied inspectors or completed inspections on hazardous material releases and septic tank, swimming pool, and restaurant inspections. He has participated in household hazardous waste collections and the writing of Health Department regulation and County ordinance concerning drinking water.

MICHAEL L. WILSON has been the General Manager of the Metropolitan Water District of Salt Lake & Sandy since August 15, 2005. The District provides wholesale water supplies to Salt Lake City, Sandy City, and others. Prior to being appointed as the General Manager, Mike was the Assistant General Manager at the District for three years. Before joining the District, Mike worked for Sandy City for 13 years where his primary responsibilities included the planning, design, construction, and operation of the City's drinking water, storm water, and irrigation systems. Mike currently serves as the President of the Provo River Water Users Association Board of Directors. In addition, he is a member of the American Water Works Association and the American Society of Civil Engineers. Mike is a graduate of Utah State University with a Bachelor of Science Degree in Civil Engineering. He is a licensed Professional Engineer in Utah and California.