Department of Environmental Quality

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Air

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UTAH Report on the Environment

2006

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Utah's Report on the Environment

2006

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Message from the Director

I am pleased to present the Utah Department of Environmental Quality's first-ever **Utah Report on the Environment 2006**. This report provides opportunity for discussion on the condition of Utah's environment that could guide our environmental decisionmaking. In compiling this report, the **Department of Environmental Quality** (DEQ) takes a look at environmental conditions over the past few decades that contributed to where we are at today. These include both successes and challenges ahead.

Clean air, clean land and clean water are valuable resources essential to Utah's quality of life and economy. Our **mission** at DEQ is to safeguard public health and our quality of life by protecting and enhancing our environment. We do this by implementing state and federal environmental laws and by working with individuals, community groups, businesses and local, state and federal agencies.

By many measures, our environment is healthier today than it was in the 1970s. This is partly due to national environmental policy that has set the framework for stricter state laws to protect the **air**, **land** and **water**. It also is due to state officials working with local leaders who are committed to finding innovative ways to solve problems.

Although air pollution levels have declined in recent years, the ongoing challenge is to balance population and industrial growth with programs that ensure good air quality. The efforts of each of us – homeowners, vehicle users, industry and government – are essential. This cooperative, voluntary approach is exemplified through our **Choose Clean Air** campaign, where we provide residents with information about current air quality conditions and the actions they can take to curb air pollution.

DEQ employees work closely with city leaders, local residents and businesses to clean-up contamination that is often the result of unregulated practices that harmed the environment in decades past. Through the **Superfund**, **Brownfields** and **Utah's Voluntary Cleanup Programs**, thousands of acres of commercial and residential properties have been cleaned and put back into beneficial use.

As the second driest state in the nation, **water** is a precious resource. DEQ works to protect drinking water sources for Utah's 2.5 million residents and millions upon millions of visitors. We also oversee the quality of 14,250 miles of rivers and streams, and nearly 3,000 lakes and reservoirs that sustain a wide variety of wildlife, provide recreation and enjoyment, and support agricultural production.

Our ongoing **success** is due to dedicated employees who work in partnership with our various stakeholders. This report highlights some examples of our successes. DEQ intends to provide an update on an annual basis to illustrate our progress, successes and challenges. I hope you find this information valuable. I also invite you to learn more about DEQ and the issues we are following by visiting our Web site at www.deq.utah.gov.

Photo: Brandon Smart, DEQ

Dianne R. Nielson, Ph.D.
Executive Director
Department of Environmental Quality

Executive Summary

The **Utah Department of Environmental Quality** (DEQ) presents the **Utah Report on the Environment 2006**, a summary of the state's environment based on state and national standards and environmental goals. Although all facets of the environment are interrelated, for discussion purposes, the report has been divided into three main sections: **air**, **land** and **water**. In each section, the data have been compiled to paint a broad portrait of the environment today and challenges ahead. Most importantly, the examples show how communities have worked together to protect and enhance Utah's environment. Lastly, this report includes a discussion on **mercury**, which like many other contaminants, impacts air, land and water. Most importantly, we welcome your comments and feedback.

The report is available at: www.deq.utah.gov/envrpt. Please visit the comment page to provide feedback.

Cleaner Air

Utah's air has become significantly cleaner in the last 25 years. Stricter regulations for motor vehicles and industry, as well as other emission reduction programs, have reduced smog and improved visibility. In the early 1980s, the health standards for four of the six criteria pollutants identified by the U.S. **Environmental Protection Agency** (EPA) were violated in one or more Utah counties. As of Dec. 18, 2006, all Utah counties attain health standards in all EPA categories. Remarkably, the improvement comes after significant population growth. Tougher new EPA rules on fine particle pollution, however, will make it difficult for the Wasatch Front to meet the standards.

Cleaner Land

The amount of toxic chemical releases into the environment has steadily declined in recent years. This is the result of both regulatory and voluntary efforts. Prior to the 1970s, disposal of various wastes lacked regulatory oversight and guidance. Consequently, some wastes were discarded without regard for their impact to human health and the environment. That situation has improved with the establishment of solid and hazardous waste regulations designed to protect the environment and public health. Through voluntary clean up programs, thousands of acres of commercial and residential properties have been cleaned and put back into beneficial use.

Cleaner Water

Utah has made significant strides in water quality. Passage of the 1972 federal **Clean Water Act** and the implementation of wastewater discharge permits have reduced lake and stream pollution. Our drinking water systems have vastly improved their compliance with drinking water requirements. The **Safe Drinking Water Act** mandates that EPA, states and water systems protect consumers from unsafe drinking water. It has been more than two decades since a water borne disease outbreak has been reported in Utah.

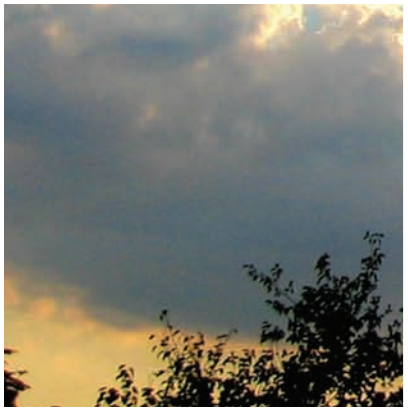
About this Report

This report is the work of everyone at DEQ who supplied important information and data to the **Leadership Development Committee**, a hand-picked group comprised of representatives from each of DEQ's six divisions. These employees examined the environmental data and drafted sections of this report. It was particularly important to the committee that the report be understandable to the general public. The members of the committee are:

- Jon Black, Division of Air Quality;
- Harry Campbell, Division of Water Quality;
- Jeff Emmons, Division of Solid and Hazardous Waste;
- John Hultquist, Division of Radiation Control;
- Kate Johnson, Division of Drinking Water; and
- Jason Wilde, Division of Environmental Response and Remediation

The Leadership Development Committee developed the report under the direction of Brad Johnson, director of the Division of Environmental Response and Remediation. The document was edited by Donna Kemp Spangler, the public information officer for DEQ. Leah Ann Lamb, director of the Office of Planning and Public Affairs and her staff assisted in the compilation of the data used in this report. The layout and design was done by Larry Clarkson of Clarkson Creative. The report is printed on recycled paper using soy-based inks. Any portion of this report may be reprinted, provided the Utah Department of Environmental Quality is given appropriate credit.

Air



Air: Cleaner

Introduction

Utah's mountain-and-valley topography, diverse economy, and a vastly growing population create some air quality challenges for the state. Despite these challenges, Utah's air is significantly cleaner than it was 25 years ago. Stricter regulations for motor vehicles and industry, as well as other emission reduction programs, have helped reduce smog and improved visibility. In the early 1980s, the health standards for four of the six criteria pollutants identified by the U.S. Environmental Protection Agency (EPA) were violated in one or more Utah counties. As of December 18, 2006, all Utah counties attained current federal air quality standards. Remarkably, the improvement comes after significant population growth, an achievement equaled by only a few other states.

Scientific evidence about the health effects of air pollutants have led to tighter standards for ozone and very fine particles known as $PM_{2.5}$. Cache Valley in northern Utah is on the verge of violating the current standard and new EPA rules will make it even tougher for all counties to meet standards. In September 2006, EPA lowered the allowable daily average of fine particles from 65 micrograms per cubic meter (ug/m^3) to 35 ug/m^3, and EPA's Science Advisory Committee is recommending that the health standard for ozone be tightened next year making it even more challenging for the Wasatch Front to meet the tougher new health standards in years ahead. For more information on the new standards visit: http://epa.gov/pm/naaqsrev2006.html

This chapter focuses on the quality of Utah's air and partnership efforts by DEQ to reduce regional haze. The data used in compiling this chapter can be found at: http://www.airquality.utah.gov/Public-Interest/annual-report/Index_2005.htm.

Photo: Steve Greenwood, UOT

The **Utah Air Conservation Act Utah Code 19-2-104** empowers the **Utah Air Quality Board** to enact rules pertaining to air quality issues and develop **State Implementation Plans** to attain and maintain **National Ambient Air Quality Standards**. The Division of Air Quality staff supports the Board in its policy-making role. The 11-member board is made up of diverse interests knowledgeable in air pollution matters and appointed by the governor with consent of the Senate. For more information about the Board and its members, visit www.airquality.utah.gov/Air-Quality-Board/index.htm

Choose Clean Air Success Story

DEQ has made strides to keep air pollution levels down through its "Choose Clean Air" campaign that encourages Utahns to voluntarily reduce vehicle use during winter inversions and summer smog that can make breathing difficult for the young and old and those suffering from asthma. For more information on the Choose Clean Air program, visit www.cleanair.utah.gov.

Air Quality Pollutants

In the 1970s, EPA identified six criteria air pollutants for which it established **National Ambient Air Quality Standards** (NAAQS) under the **Clean Air Act**: **carbon monoxide** (CO), **lead**, **nitrogen dioxide** (NO_2), ground-level **ozone**, **particulate matter**, and **sulfur dioxide** (SO_2). (See chart below). For more information, visit: www.epa.gov/air/criteria.html.

Two of the pollutants that were at issue 25 years ago are no longer a concern to Utah and most other states. Carbon monoxide comes almost entirely from vehicles, and the federally-required controls installed by manufacturers have eliminated the problem in newer vehicles. Almost all of the lead in the atmosphere in the 1970s was from leaded gasoline. When federal rules required lead to be eliminated, the lead emissions dropped to nearly zero.

Carbon Monoxide (CO); A clear, colorless, odorless gas.

Sources
Burning of gasoline, wood, natural gas, coal, oil, etc.

Health Effects
Reduces the ability of blood to transport oxygen to body cells and tissues; cells and tissues need oxygen to work. Carbon monoxide may be particularly hazardous to people who have heart or circulatory (blood vessel) problems and people who have damaged lungs or breathing passages.

Environmental Effects
Global climate change.

Lead

Sources
Lead paint (houses, cars), smelters (metal refineries); manufacture of lead storage batteries; note: burning leaded gasoline was the primary source of lead pollution in the US until unleaded gasoline was mandated by the federal government.

Health Effects
Lead damages nervous systems, including brains, and causes digestive system damage. Children are at special risk. Some lead-containing chemicals cause cancer in animals.

Environmental Effects
Lead can harm wildlife.

Nitrogen Dioxide (one component of NO_x); A smog-forming chemical.

Sources
Burning of gasoline, natural gas, coal, oil, etc. Cars are an important source of NO_2.

Health Effects
Nitrogen dioxide can cause lung damage, illnesses of breathing passages and lungs (respiratory system).

Environmental Effects
Nitrogen dioxide is an ingredient of acid rain (acid aerosols), which can damage trees, lakes, flora and fauna. Acid aerosols can also reduce visibility.

Ozone (ground-level ozone is the principal component of smog).

Sources
Chemical reaction of pollutants; VOCs and NO_x.

Health Effects
Ozone can cause breathing problems, reduced lung function, asthma, irritated eyes, stuffy noses, and reduced resistance to colds and other infections. It may also speed up aging of lung tissue.

Environmental Effects
Ozone can damage plants and trees; smog can cause reduced visibility.

Particulate Matter (PM_{10}, PM_{25}); dust, smoke, soot.

Sources
Burning of wood, coal, diesel and other fuels; industrial plants; agriculture (plowing, burning fields); unpaved roads, mining, construction activities. Particles are formed from the reaction of VOCs, NO_x, SO_x and other pollutants in the air.

Health Effects
Particulate matter can cause nose and throat irritation, lung damage, bronchitis, and early death.

Environmental Effects
Particulates are the main source of haze that reduces visibility.

Sulfur Dioxide

Sources
Burning of coal and oil (including diesel and gasoline); industrial processes.

Health Effects
Sulfur dioxide can cause breathing problems and may cause permanent damage to lungs.

Environmental Effects
SO_2 is an ingredient in acid rain (acid aerosols), which can damage trees, lakes, flora and fauna. Acid aerosols can also reduce visibility.

VOCs (volatile organic compounds); smog-formers

Sources
The principle source of VOCs is nature (such as pine forests), since VOCs are released from most living organisms. VOCs are also released from burning fuel (gasoline, oil, wood, coal, natural gas, etc.), solvents, paints glues and other products used at work or at home. Cars are an important source of VOCs. VOCs include chemicals such as benzene, toluene, methylene chloride and methyl chloroform.

Health Effects
In addition to ozone (smog) effects, many VOCs can cause serious health problems such as cancer.

Environmental Effects
In addition to ozone (smog) effects, some VOCs such as formaldehyde and ethylene may harm plants.

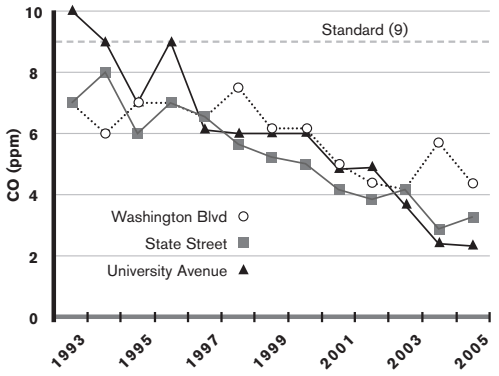
Carbon Monoxide CO

CO is produced primarily by motor vehicles, wood burning stoves and fireplaces. In the 1980s and 90s, the Division of Air Quality monitoring of Ogden, Provo and Salt Lake City revealed many violations of the federal standard. Improvements in automobile technology have helped all three cities attain the standard.

But more significantly, there has not been any recorded violation of the CO standard at any of the air monitoring stations in Utah since 1993. This is significant given that Utah's population is among the fastest growing in the United States. Utah is the fourth fastest-growing state in the nation, with a population of 2.5 million, increasing 3.2 percent from the previous year. For more information on Utah's demographics: www.governor.utah.gov/dea/EconomicSummary.pdf.

The figure to the right shows a 13-year trend in CO emissions. The steady decline is primarily due to improvements in vehicle emissions technology.

CO Second Highest 8-hr Concentration



Lead Pb

In the past, leaded gasoline was a source of lead pollution, which when inhaled can cause damage to the nervous system. However, the leaded fuels were phased out under a federal ban, by the end of 1995, and gasoline is no longer a significant source of air-borne lead pollution. Unleaded gasoline was introduced in the 1970s. For more information visit: www.epa.gov/air/urbanair/lead/effrt.html.

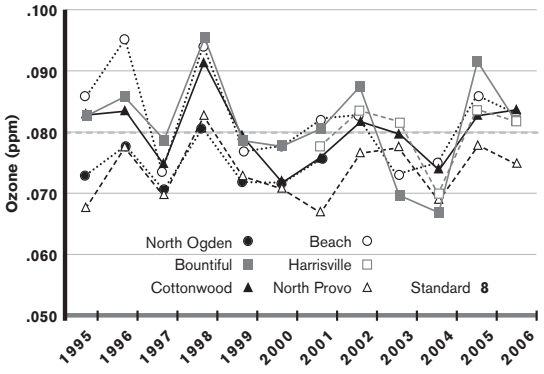
The major remaining sources of lead pollution in Utah are the extraction and processing of metallic ores, particles from deteriorating lead-based paint, and improper removal of lead-based paint. The current three-month standard for lead is an average concentration not to exceed 1.5 micrograms per cubic meter of air. Utah has not exceeded that health standard since the late 1970s.

Nitrogen Dioxide NO_2

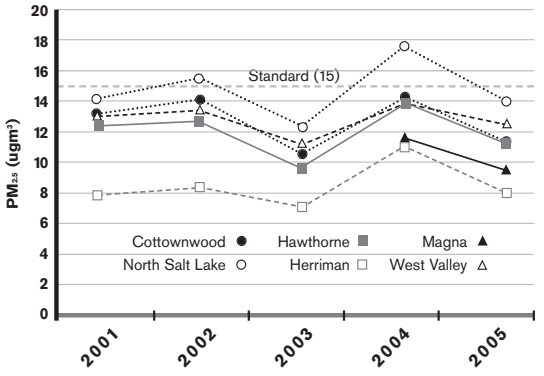
During high temperature combustion, the nitrogen in the air reacts with oxygen to produce various nitrogen oxides (NO_x), a reddish-brown gas. One type, nitrogen dioxide (NO_2), is considered a criteria pollutant under EPA standards.

The DAQ monitors the concentrations of NO_2 at various locations, but has never found a circumstance where the state violated EPA's annual standard of 0.053 parts per million (ppm). However, these oxides of nitrogen tend to react with other air contaminants to form other criteria pollutants. In the summer, photochemical reactions with volatile organic compounds (VOCs) lead to ground-level ozone. In both winter and summer, NO_x reacts with ammonia to form fine particulate matter ($PM_{2.5}$).

Ozone Fourth Highest 8-hr Concentration



$PM_{2.5}$ Annual Mean Concentrations (ugm^3)



Ozone O_3

Ozone is formed when volatile organic compounds (VOCs) and nitrogen oxides (NO_x) mix with sunlight and heat. Ozone is principally a summer time problem when temperatures are high and daylight hours are long, but it may have implications to wintertime particulate problems as well.

The Clean Air Act defines a non-attainment area as an area that is violating the national ambient air quality standard or contributing to a violation of the standard in a nearby area. The 8-hour ozone standard is based on averaging air quality measurements over eight hour blocks of time. EPA uses the average of the annual fourth highest 8-hour daily maximum concentrations from each of the last three years of air quality monitoring data to determine a violation of the ozone standard. To comply with the ozone standard, the average must be below 0.08 parts per million.

In the early 1980s, Salt Lake and Davis counties were in violation of the old one-hour ozone standard. By the early 1990s, Utah was in compliance with the one-hour EPA standards. But in 1997, a new 8-hour standard was promulgated and the one-hour standard revoked. Salt Lake and Davis counties are able to meet those standards, although they do so only by the slimmest of margins. EPA is under a court order to finalize the standard by March 2007. If the standards are tightened, many areas of Utah will have a difficult time meeting the new rules.

The figure at top left shows the recent trend in Ozone.

Particulate Matter PM

Particulate matter refers to the tiny particles found in the atmosphere that range in size from less than one tenth of a micron (about one-tenth the size of a human hair) up to 50 microns. Particles 10 microns in size and smaller – otherwise known as PM_{10} – can lodge deep in the lungs and are not expelled which can cause respiratory problems. Fine particulate matter known as $PM_{2.5}$ – those particles less than or equal to 2.5 micrometers – is a more serious health problem. In 1997, EPA adopted new standards for $PM_{2.5}$, setting the standard at 15 g/m^3 (micrograms per cubic meter) on an annual basis and 65 g/m^3 for a 24 hour average. EPA has lowered the limit on the 24-hour average to 35 g/m^3.

Several areas along the Wasatch Front did not meet the PM_{10} standard when it was first promulgated, but all of Utah has met the standard since 1994. The new standards will prove to be much more difficult to meet. DEQ monitors the air for the criteria pollutants hourly at air monitoring stations around the state. More information on the air monitoring station locations can be found at www.airmonitoring.utah.gov/utahmap.htm.

The figure at bottom left shows the recent trend in $PM_{2.5}$.

Sulfur Dioxide SO_2

SO_2 is emitted primarily from burning fossil fuels, mainly coal and oil from power plants and refineries. In the 1970s, the Magna air quality monitor routinely measured violations of the 24-hour standard due to emissions from Kennecott Utah Copper. In the mid-1990s, Kennecott Utah Copper, Geneva Steel and other industries in the state made dramatic reductions in SO_2 emissions. Since 1994, the state has been meeting the federal health standard.

The figure to the right shows a 30-year trend of the monitored concentrations of SO_2.

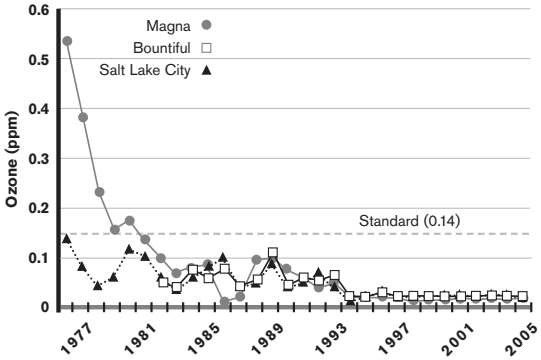
Indoor Air

Radon Gas

Radon is an odorless gas and the second leading cause of lung cancer behind smoking. The Utah Division of Radiation Control (DRC) Indoor Radon Program, funded by the State Indoor Radon Grant from the EPA, attempts to reduce the indoor radon concentrations in homes throughout the state to concentrations less than EPA's 4.0 picocuries per liter. DRC does this through public outreach, conducting surveys and providing individualized assistance to homeowners and public agencies on all aspects of the indoor radon hazard problem.

About 900 radon tests are conducted each year in Utah, resulting in about 150 mitigation systems installed in households in 2005. For more information, visit: www.epa.gov/iaq/radon/index.html and www.radon.utah.gov.

Sulfur Dioxide Second Highest 24-hr Values



Hawthorne Success Story

In 2004, DEQ teamed up with the Utah Department of Health and the University of Utah to study the air quality and its effects on children's respiratory health. Data collected during the winter of a two-year study showed children were breathing air of three times better quality inside the school than outdoors during winter inversion days. The "Hawthorne Health Project" evaluated air quality data of the 60 students who participated in pulmonary tests to show how air quality affects respiratory health.

Regional Haze

Utah is home to numerous national parks visited by millions of people. Haze can obscure the ability to see clearly over long distances (visibility) and is recognized as a serious problem throughout the nation, and more commonly in the Eastern United States. Haze is caused when light encounters tiny pollution particles and gases in the air. Forest fires and windblown dust as well as some industrial sources and vehicle emissions contribute to haze.

When the Clear Air Act was reauthorized by Congress in 1990, it included provisions to improve visibility in national parks and wilderness areas, and to establish a commission to determine the causes of poor visibility at the Grand Canyon. The Commission determined that many kinds of sources contributed to the poor visibility and it recommended strategies for improvement. For more information, visit www.wrapair.org/309/index.html. Those strategies were included in EPA's 1999 regulations as an option that Western states could use in developing visibility plans required of all states.

Utah is one of five states that submitted plans in 2003 under this option. Key elements of the plan include using a regional cap on SO_2 emissions and a backstop market trading program to be triggered if emissions exceed the emissions cap. Other components identify reduced emissions from prescribed fires and a requirement to track emissions and visibility conditions every five years through 2018. For more information: www.wrapair.org.

The Milestone Reports for 2003 and 2004 that were prepared by the five states show that actual SO_2 emissions are approximately 25 percent below the emission cap for each year. Western states and Indian tribes that make up the Western Regional Air Partnership continue to work together to make added improvements. A plan update is due in 2007.

Energy Policy

When Gov. Jon Huntsman, Jr. took office in 2005, the state's energy office was reorganized. He appointed Dr. Laura Nelson as the state's energy advisor. DEQ works in partnership with Dr. Nelson to implement energy programs, including alternative energy, conservation and efficiency. For instance, the task of administering the Clean Fuels Fund – established in the early 1990s to offer loans and grants to corporations and government entities making the switch to cleaner fuels and technologies – was moved to DEQ. Prior to reorganization under DEQ, $925,000 in loans have helped pay for about 81 clean fuel vehicles and two clean fuel refueling stations. Another $180,000 has been awarded in grants to 40 different entities to purchase 69 clean vehicles.

PowerForward Success Story

On May 30, 2006, Gov. Jon Huntsman, Jr. signed an executive order directing state employees to heed PowerForward email alerts to conserve electricity during the summer. The PowerForward campaign, managed by DEQ's Air Quality Division, is an important part of the governor's statewide goal of a 20 percent increase in energy efficiency by 2015. PowerForward asks consumers to voluntarily reduce electric use between the peak times between noon and 8 p.m. when Utahns should put the brakes on turning up their air conditioners. This program started in 2001 as a simple alert system and has progressed significantly to a broader program aimed at promoting an ethic of electricity conservation in Utah. In a given year there has been a savings of up to 100 megawatts of power, which equates to enough power for 70,000 homes in 2005. For more information, visit: www.powerforward.utah.gov.

Photo: Brandon Smart, DEQ

Utah Gov. Huntsman signs PowerForward executive order with Dianne Nielson and Rich Walje, President of Rocky Mountain Power, by his side.

Land

Cleaner Land

Utah Land Facts[1]

Topography
2,000 to 13,528 feet above sea level

State, Other Government & Private
15.7 million acres

Federal Land
34.8 million acres

Department of Defense
1.8 million acres

Wilderness Study Areas
3.2 million acres

Tribal Lands 2.1 million acres

Introduction

Utah is a land of high mountain ranges, slickrock formations and red rock canyons – all reflecting the diverse topography of the **Rocky Mountains**, **Colorado Plateau** and **Great Basin**. Protecting the environmental quality of the land is integral to ensuring Utah's air is clean and its water pure. To this end, the **Utah Department of Environmental Quality** (DEQ) focuses on the prevention, management, control and cleanup of toxic chemicals. With the advent of federal and state laws, waste management today is much better than previous practices. This chapter highlights some of the ways DEQ meets its state and federal responsibilities to protect human health and the environment.

Toxic Chemicals

The amount of toxic chemicals released into the environment has steadily declined in recent years, in part because of industry's voluntary efforts. Under the **Emergency Planning and Community Right-to-Know Act** of 1986, and the **Pollution Prevention Act** of 1990, facilities must report their releases of more than 650 toxic chemicals and chemical compounds to the U.S. Environmental Protection Agency (EPA) and to state officials. It is important to note that the majority of the releases are in fact permitted by DEQ and allowable under federal law. This data is available to the public through the **Toxics Release Inventory** (TRI). In 2004, the latest annual TRI available, the total toxic releases in Utah were about 167.8 million pounds of chemicals – a decline of one-third of the amounts released in 2003. Visit www.epa.gov/tri for more information on the TRI program in Utah, and for links to the federal TRI program.

The Utah Solid & Hazardous Waste Control Board has dual oversight within the Department of Environmental Quality. It not only oversees federal and state environmental laws relating to solid and hazardous wastes managed by the Division of Solid and Hazardous Waste but also the underground storage tank program and Brownfields reclamation projects managed by the Division of Environmental Response and Remediation. To learn more visit: www.hazardouswaste.utah.gov/Board/SHWCBMembers.htm.

Photo: Mel Lewis, UOT

Toxic Chemical Releases

2004

Air Releases: 9.8 millions lbs.
Land Releases: 154 million lbs.
Water Releases: 56,412 million lbs.

2003

Air Releases: 9.1 millions lbs.
Land Releases: 230.8 million lbs.
Water Releases: 57,978 million lbs.

Hazardous Waste Commercial Facilities

2005 - Hazardous Waste Managed

Clean Harbors
Aragonite Facility: 100,307 tons
Grassy Mt. Facility: 297,405 tons

EnergySolutions:
14,955 tons of mixed waste

Waste Management

Prior to the 1970s, disposal of various wastes lacked environmental oversight and guidance. Consequently, some wastes were discarded without regard for the impact to human health and the environment. That situation has improved with the establishment of solid and hazardous waste regulations and cleanup programs designed to protect the environment and public health. The known contaminated sites remaining in Utah include industrial facilities, mining and military operations, manufacturing activities, small businesses, and others. Contaminants range from heavy metals, chemicals, solvents and acids to petroleum products and other wastes. Once a contaminated site is identified it is assessed for the potential threat to human health or environment. Based on that assessment, a clean up strategy is developed.

Essentially, there are three types of waste – non-hazardous solid waste, hazardous waste and radioactive waste – that are regulated with consistency across the nation. In Utah, municipal waste is the largest component of non-hazardous waste generated. The municipal waste is sent to one of 34 landfills permitted to accept the waste. Hazardous Waste is regulated under the Utah Solid and Hazardous Waste Act. It is waste that is highly ignitable, corrosive, reactive or toxic and, if mismanaged, can pose a substantial threat to human health or the environment and therefore must be properly managed and disposed of at one of Utah's permitted 14 hazardous waste facilities or other permitted hazardous waste facilities outside of Utah. Of the 14 facilities which manage regulated quantities of hazardous waste, three are commercial facilities which manage, treat, store, or dispose of hazardous waste generated by other businesses. These three commercial facilities managed 99 percent of the total 418,533 tons of hazardous waste generated in Utah in 2005, as shown in the table to the left.[2]

Municipal Solid Waste

The 1990s was a decade of change for solid waste management in Utah. New regulations now require landfills, with some regulatory exceptions, to be constructed with plastic liners and clay barriers to prevent contaminants from leaching into the groundwater. In 2005, 83 percent of the 2.3 million tons of municipal solid waste was disposed of in lined landfills. Landfill gas collection systems have been installed to reduce emissions to the atmosphere and to use the collected methane gas as an alternative fuel.

In the past, most local governments operated a landfill. However, the recent trend is to close smaller landfills and create larger regional ones. As example, there were approximately 170 municipal landfills 30 years ago[3] as compared to 34 landfills today.[4]

Despite the growing population, the amount of municipal waste has remained relatively constant, which demonstrates the impact of the amount of waste being recovered (recycled or composted). In 2002, Utah

generated approximately 2.48 million tons of municipal waste,[5] primarily from homes and workplaces – an increase of about 7 percent over a seven-year period.

Hazardous Waste

In 2005, 74 Utah facilities generated 78,233 tons of hazardous waste, excluding hazardous wastewater managed on site. Nine facilities generated 69,472 tons, or 89 percent of the total reported quantity. Incineration, thermal treatment, pollution control equipment, painting operations, process equipment maintenance and outdated products were the primary sources of hazardous waste. Preliminary estimates from EPA indicate that nationally, Utah ranked 35th in the amount of hazardous waste generated in 2005, the most recent available data.

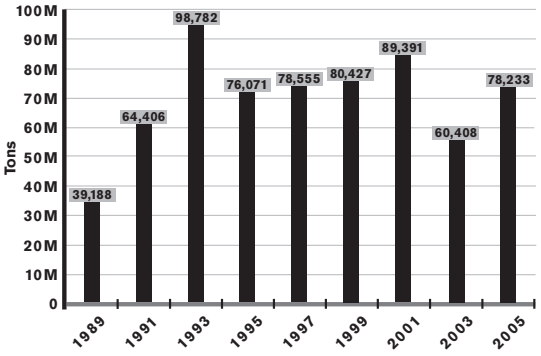
DEQ ensures the disposal of hazardous waste is done in a manner to protect the environment and the public health and safety. It does so through a combination of oversight activities that include review of permit applications, and making modifications to the permit to ensure performance and design standards are met, as well as operational procedures, groundwater monitoring, gas monitoring, record-keeping, financial assurance, closure and post-closure care. DEQ makes routine and unannounced inspections. Prior to construction activities, construction plans, quality assurance, and quality control plans are reviewed. During construction, inspections are conducted to ensure the plans are followed.

Andrew Avenue Success Story

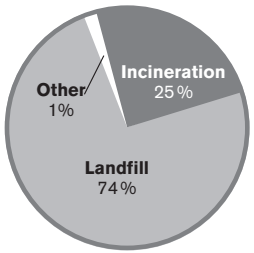
The Engelhard Corporation operated a petroleum catalyst manufacturing and regeneration facility on nearly 400 acres of land at 3050 West Andrew Avenue, in Salt Lake City, from 1988 until 1999. The plant also operated under various names and owners between 1950 and 1988. Past operations at the site have resulted in soil and groundwater contamination on the majority of the site. In 2002, Engelhard sold the property to The Ninigret Group (Ninigret), a land developer. As part of the sale, Ninigret assumed responsibility for closing three hazardous waste storage pads at the site. In addition, Ninigret also assumed the major responsibility for conducting investigations and the remediation of site contamination.

Since 2002, Ninigret has worked very closely with the Division of Solid and Hazardous Waste (DSHW) to conduct investigation and remediation of select portions of the property, starting on the west side and moving east. When the cleanup activities were completed to the satisfaction of DSHW, Ninigret sold the property for development. Several new businesses are currently operating on the remediated portions of the property. This cooperative effort has allowed formerly contaminated land to be returned to a useful and productive condition. Based on the current state of the site investigation and remediation, it is expected that corrective action will be completed at the former Engelhard property in the next two to three years.

Utah Hazardous Waste Generation



2005 Utah Hazardous Waste Management Methods



The **Radiation Control Board** represents a diverse group of interests that oversee radiation issues in the state of Utah. The Board considers issues that affect **uranium mills**, commercial **radioactive waste disposal**, **medical X-ray users** and those who use radioactive materials from commercial, research and industrial purposes. For more information about the Board and its members visit: www.radiationcontrol.utah.gov/drc_brd.htm

Radioactive Wastes

Radioactive Waste in Utah is regulated by the Division of Radiation Control, as part of an agreement with the U.S. Nuclear Regulatory Commission (NRC) that gives the state the authority to license, regulate and inspect users of certain types of radioactive materials. There are approximately 240 licensees within the state of Utah authorized to use radioactive materials. They include medical, industrial, well logging, moisture density gauges, flow meters and academic research.

Hazardous Waste

In 2005, Utah imported 77,012 tons of hazardous waste, which accounts for 19 percent of the total commercially managed hazardous waste at Utah facilities. Approximately 41 percent of the imported hazardous waste was generated in California. Nationally, Utah ranked 16th in the amount of imported hazardous waste and 38th in the amount of exported hazardous waste in 2005.[6]

Federal Facility

The Deseret Chemical Depot, located in Tooele County, is scheduled to close in 2011 after it finishes its mission of destroying 45 percent of the nation's chemical weapons stockpile. As of June 2005, all stockpiled GB and VX nerve agents had been safely destroyed through incineration. Currently, the facility is destroying mustard agent.

Oversight of Medical Uses of Radiation

Medical x-rays account for the majority of the average citizen's exposure to man-made radiation. Most scientists believe there is a health risk from low levels of exposure to x-rays, but the risk is generally considered to be small when compared with the benefits.

X-ray exposure is minimized and image quality is improved when X-ray systems and operators perform properly. Therefore, the Radiation Control Rules require regular registration and inspection of X-ray units. Operators of X-ray equipment designed for human use must also meet the licensing requirements required by the State's Division of Occupational and Professional Licensing.

About 2000 facilities are currently registered with the Division. Approximately 6200 tubes or machines are being used in health care, research, and industrial applications throughout Utah. Dental and medical uses account for the majority of the machines, although there are a significant number of other uses. For more information on X-Ray Exposure visit www.radiationcontrol.utah.gov/drc_xray.htm.

Low-Level Radioactive Waste Disposal

By virtue of Utah's long-standing membership in the Northwest Compact, low-level radioactive waste generated in Utah must be disposed of at the host site operated by U.S. Ecology on the Hanford Reservation in eastern Washington. Envirocare of Utah, now owned and operated by EnergySolutions, opened a site in Utah in 1988 to receive naturally occurring radioactive material (NORM waste). Eventually, Envirocare expanded to take mixed waste, Class A low-level waste, and uranium mill tailings. The company worked out an agreement with the Northwest Compact that allows EnergySolutions to receive low-level waste from most of the country excluding the members of the Northwest Compact. Compacts must affirm that the low–level waste is acceptable for disposal at the facility.

On the national front, one site, Duratek in Barnwell, S.C. is ramping down disposal volumes until 2008 when the site will only be open to members of the Atlantic Compact. Duratek receives all classes of low level radioactive waste. The U.S. Ecology facility serving the Northwest Compact (Alaska, Hawaii, Oregon, Washington, Montana, Wyoming, Utah, Idaho) also receives all classes (A,B,C) of low level radioactive waste and partners with the Rocky Mountain Compact (Colorado, New Mexico, Nevada) in receiving limited amounts of low level radioactive waste. A new facility, Waste Control Specialist in Texas is in the process of licensing a low-level radioactive waste facility to take care of low-level waste from Texas and Vermont. Whether this facility will be willing to accept wastes from other states is speculation at this point. Discussions are on-going nationwide to ensure that the 36 states that will be excluded from Barnwell will have a disposal option after July 1, 2008.

Volumes of waste disposal at EnergySolutions have increased substantially from 13 million cubic feet in 2001 to 24.7 million cubic feet in 2005. This volume represents Class A low-level radioactive waste, uranium mill tailings, mixed waste, and NORM waste.[7]

The Utah Legislature in 2002 passed a law that required out-of-state waste generators and processors to seek a Utah permit to transport radioactive waste to Utah. There are 168 "active" permits that resulted in over 17,000 individual shipments in 2005.

Uranium Mills

Currently, there are facilities licensed to manage uranium mill tailings. EnergySolutions receives and disposes of uranium waste at its low-level radioactive waste facility in Clive, located in Utah's West Desert; International Uranium Corporation operates a mill in Blanding, Utah, where it extracts the uranium from ores and alternate feed materials; Plateau Resources in Ticaboo, has not been issued a license but hopes to resume operations; and Rio Algom in Lisbon Valley, southeast of Moab, is in the process of reclamation activities. It must complete a site closure plan that provides a detailed description of the

Low-Level Radioactive Waste

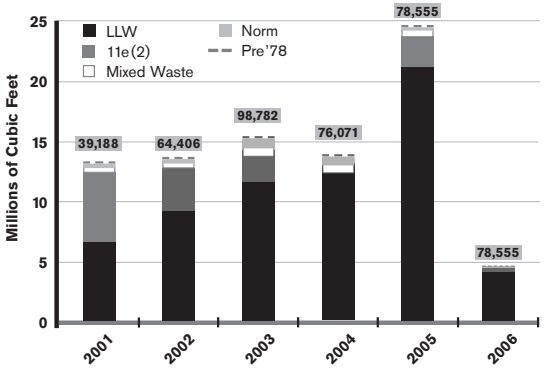
LLW is low-level radioactive waste, which mostly includes soils lightly contaminated with radioactivity.

Mixed Waste contains both radioactive and hazardous waste

NORM is naturally occurring radioactive material which can be a contaminant in a waste

Class A is waste that is higher in radioactivity than the low-activity radioactive waste.

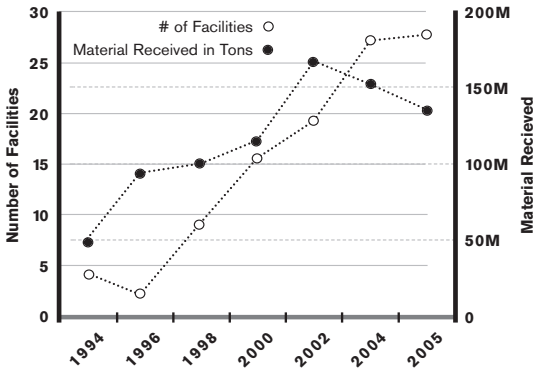
Radioactive Waste Disposal Volumes 2001-2005



Atlas Success Story

After a 10-year-long effort from DEQ, Grand County, and others, the U.S. Department of Energy is in the process of removing the 13.5 million tons of uranium mill tailings from the former Atlas mill site on the banks of the Colorado River near Moab to a more suitable location at Crescent Junction, 30 miles away. For more info visit www.moabtailings.org.

Growth of Composting in Utah



reclamation, decontamination and dismantlement of the mill facilities, final closure of the mill tailing disposal cells, and the plans for environmental monitoring after the site has been closed.

High-Level Nuclear Waste

On Sept. 7, 2006, Utah won a significant battle to keep nuclear waste out of the state when two Interior Department agencies rejected proposals by Private Fuel Storage (PFS) to temporarily store nuclear fuel rods on the Skull Valley Band of Goshute Indian reservation in Tooele County, 45 miles southwest of Salt Lake City. In two separate decisions, the U.S. Bureau of Land Management (BLM) refused to grant PFS the rights of way to build a rail spur to transport by rail 40,000 tons of nuclear spent fuel on land Congress declared as "wilderness." In a separate but equally important decision, the Bureau of Indian Affairs disapproved a lease to allow PFS to use Goshute tribal lands as a temporary storage facility. The decision brings renewed optimism to state leaders who have fought the PFS plan every step of the way since 1996 when Goshute tribal leader Leon Bear signed a lease agreement with PFS, a consortium of mostly Eastern nuclear utilities.

Pollution Prevention

Composting Facilities

Composting of yard waste, sewage sludge and food waste has been a major component of the solid waste management system for many areas. Several agricultural operations utilize composting to covert manure into a marketable commodity. Most compost facilities are operated by municipalities as part of their landfill and disposal operations.

Recycling Facilities

Much of the recycling in Utah is done by private industry. Public recycling programs consist of curbside collection and drop off centers. Several landfills operate drop off centers that accept ferrous and nonferrous metals, paper, corrugated cardboard, tires, used oil and carpet padding. Some collection of plastic and glass also takes place. Information on the amount of material recycled in Utah is not available from the private companies that handle the recycled material from public and private recycling activities.

E-Waste

There is a growing need for recycling electronic equipment such as old television sets and cell phones. The 2006 Utah Legislature determined that additional study was needed to evaluate the recycling options available to Utah residents. E-waste may be addressed during the upcoming 2007 Legislative session.

Used Oil Recycling

Prior to 1990s, there were minimal rules pertaining to the proper management and recycling of used oil. Furthermore, there were no established collection centers available to households, or a "Do-It-Yourself Program" to recycle used oil. As a result, significant quantities of used oil were improperly discarded in sewer drains, on land as a dust or weed suppressant, and in landfills, polluting the environment and endangering public health. In 1993, the Utah Legislature enacted the Used Oil Management Act, which required DEQ to develop a statewide Used Oil Recycling Program. The volume of used oil recycled from household participation has grown from 123,586 gallons in 1995 to 512,549 gallons in 2005. The total volume of business and household participation in used oil recycling in Utah rose from 3.7 million gallons in 1990 to about 11.5 million gallons in 2005.[8] More information on the program can be found at: www.UsedOil.utah.gov.

Waste Tire Program

Waste tire piles can be breeding grounds for disease-carrying mosquitoes. If set on fire, tire piles burn with intense heat, producing thick, black, hazardous smoke. These fires are difficult to extinguish and burn for days. In 1990, the Utah Waste Tire Recycling Act was enacted to help create a recycling market for waste tires generated in Utah and recycle accumulated tire piles. Currently, markets exist for the approximate 2.3 million waste tires generated annually in Utah. The amount of tires recycled has gone from 43 tons in 1991 to more than 35,000 tons (nearly 2.3 million waste tires) in 2005.[9]

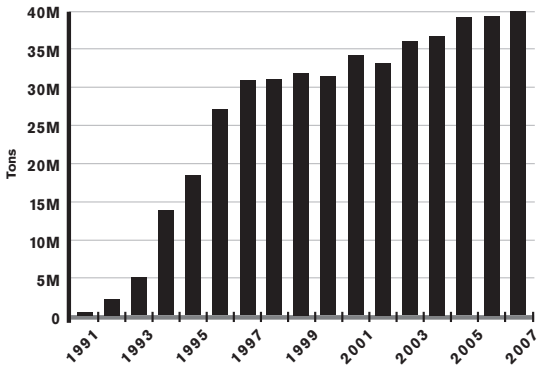
Lead Acid Battery Recycling Program

The 2006 Legislature reauthorized the Lead Acid Battery Act for another 10 years, a cost-free program to the taxpayer that recycles lead acid batteries commonly found in vehicles. The act has been in effect since 1992, and it requires all retail outlets that sell lead acid batteries to accept the old batteries from customers if they buy new ones. The batteries are then taken out of state for recycling, primarily to lead smelters that reclaim the lead. State law also prohibits the disposal of lead acid batteries in landfills. No data is available to determine the actual volume of used batteries collected and recycled. As evidence of the program's success, the Division of Solid and Hazardous Waste has not received any complaints regarding illegal disposal of lead acid batteries.

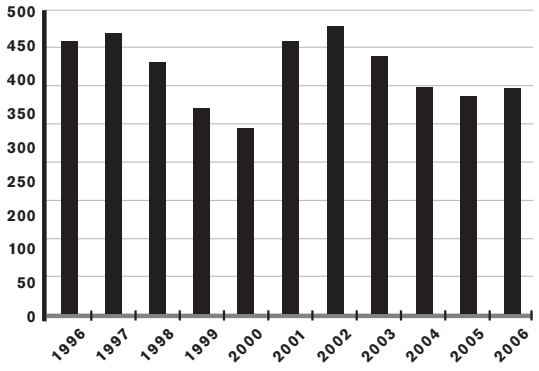
Clean Utah Success Story

Utah businesses have benefited from participation in Clean Utah – a voluntary initiative that rewards companies for reducing or preventing pollution. The program, designed by a stakeholder group in collaboration with DEQ and consultation with EPA, has seen a steady increase in participation since the program officially launched in September 2004. As of October 2006, there are 12 businesses participating in the program. For more information visit: www.deq.utah.gov/cleanutah.

Utah Waste Tires Recycled



Number of Incident of Notifications of Spills Received



Spill Reports

The Division of Environmental Response and Remediation (DERR) receives approximately 400 reports of chemical spills each year. The calls come from companies reporting accidental toxic spills, watchful citizens who spot contaminants being dumped in drainages or other unauthorized places, and residents calling the division to learn how to clean up household wastes, like broken mercury thermometers. DEQ provides guidance and support to ensure that these spills are properly remediated.

Reclamation Projects

Many of the contaminated sites that must be cleaned up today are the result of historic land use practices. The sites vary from small toxic spills and leaking tanks to large areas of contamination from legacy mining operations. The contaminated sites fall under different classifications depending on the regulated authority – RCRA Corrective Action, EPA Superfund or state voluntary cleanup programs.

The Division of Environmental Response and Remediation (DERR) is charged with protecting public health and Utah's environment by administering the superfund and state voluntary cleanup programs in order to cleanup chemically contaminated sites by ensuring that underground storage tanks are properly managed.

Cleanup Totals

Program	Area	Volume of Groundwater
Superfund	1,015 acres	40,850,000 gallons
Emergency Removals	2,824 acres	3,435,000,000 gallons
Federal Facilities	6,815 acres	1,046,500,000 gallons
Voluntary Cleanup Program	1,086 acres	0 gallons
Totals	11,740 acres	4,522,350,000 gallons

Superfund Cleanups

The most toxic waste sites are listed on the Superfund National Priorities List (NPL), established by Congress in 1980 and administered by EPA. As of 2005, there were 22 NPL sites in Utah. Cleanup work is complete at eight of these sites. For more information on the Superfund cleanups visit: www.superfund.utah.gov/.

Midvale Slag Success Story

In August 2006, community leaders in south-central Salt Lake Valley celebrated the completion of a Superfund site cleanup known as "Midvale Slag," a 446-acre site that is now on its way to become a mixed-use development along the scenic Jordan River. This, along with another redevelopment project on the former 270-acre Sharon Steel Superfund site marks a major transformation from decades ago when area smelters processed ore from local mines and left a legacy of contamination to what will become an attractive residential and retail community. Using a unique financial arrangement, the property owner of the former site of the U.S. Smelting, Refining & Mining Co. used Superfund special account funds set aside by three responsible parties in 1991 to pay for the cost of cleanup, which amounted to about $17 million on this portion. The cleanup was recently performed by the property owner's contractor under the oversight of EPA and DEQ. The neighboring former Sharon Steel mill was declared a Superfund site in 1990 and deleted from the NPL by EPA in 2004 following cleanup completion in 1998. Twenty percent of the Midvale city area has now been returned to reuse.

Before

After

Brownfields

Other types of blighted lands include Brownfield lands on which hazardous substances, pollutants, or contaminants may ve or have been present. Cleaning up and redeveloping these lands improves the neighborhoods and the local economy. DERR has assisted communities in obtaining federal funding assistance to clean up Brownfields. DERR has completed nine Brownfields assessments and is currently assessing an additional 10 Brownfield sites. These assessments provide information to local governments about the environmental conditions of suspected Brownfields properties. This information can be used to guide decisions about revitalization and redevelopment of the properties. These sites may also be cleaned up through the Utah Voluntary Cleanup Program. In some cases, federal grants may also be available for cleanup.

DERR also offers local governments assistance with their applications for competitive Brownfields grants from EPA. Communities that have received EPA Brownfields grants include West Jordan, Salt Lake City, Murray, Provo and Ogden. Information about Brownfields can be found at: www.epa.gov/brownfields/, www.superfund.utah.gov/vcp.htm, www.undergroundtanks.utah.gov/ustfields.htm.

Portland Success Story

The 71-acre Portland Cement waste site at 1000 S. Redwood Road was placed on the EPA's Superfund National Priorities List in 1986 because the contaminants, including arsenic, lead, cadmium, were considered an environmental risk to nearby industrial and residential areas. Cleanup of the NPL site was completed in 1998.

Two other 15-acre sites where the company discarded its kiln material were "orphaned" in that they were not part of the NPL cleanup. In 2006, the state, through a $3.3 million contract with a Montana firm, completed the project by cleaning up the remaining two sites located near the Great Salt Lake, at 9300 West 600 North and 2500 West Center in North Salt Lake. DEQ used leftover money from the Superfund account, which was funded in part by a 1995 bankruptcy settlement agreement with the former company. Both properties are now seeded and restored for productive use.

Voluntary Cleanup Program

The Utah Legislature in 1997 passed a law that created the Voluntary Cleanup Program (VCP) that encourages property owners to voluntarily clean up environmentally impaired sites. This thereby avoids the stigma attached to the Superfund sites that could hamper economic redevelopment. By the end of 2005, DEQ had received 45 VCP applications and issued 16 "Certificates of Completion" or "No Further Action" letters to VCP applicants. Today there are 51 total VCP applications, and 18 have been completed.

Underground Storage Tank Program

Because more than 50 percent of Utahns rely on the groundwater as a major drinking water source, DERR is committed to protecting the public from Leaking Underground Petroleum Storage Tanks (LUSTs).

EPA developed regulations that require owners and operators of Underground Storage Tanks (USTs) to prevent, find and correct any leaks or spills. As a result of a federal mandate, Utah amended the Solid and Hazardous Waste Act in 1986, which established the UST Program, to require all owners and operators to register all tanks. By 1998, all operating facilities were required to be upgraded with corrosion protection, spill or overfill equipment, and they must regularly monitor their tanks for releases. Tanks that could not be upgraded were closed. As a result of these changes to the requirements, the number of regulated tanks has decreased from approximately 10,000 in 1991 to 4,000 in 2006.

Fact
Nearly 4,000 releases from underground storage tanks have been identified and cleaned up since the program began in 1988.

Meth Labs

In 2004, the Utah Legislature passed a law that requires local health departments to create a list of properties used for clandestine methamphetamine labs reported by law enforcement. Methamphetamine can be easily produced in makeshift labs in homes by using common household ingredients, including over the counter drugs and household chemicals that are cooked to produce the drug. Under the law, the Utah Department of Health is charged with developing standards for cleanup, and DEQ is charged with creating a Certified Clandestine Drug Lab Contractor Certification program. DEQ completed rules for a certification program in October 2005 and began offering certification testing that same month. As of July 19, 2006, 11 individuals have become certified cleanup contractors. Information about the Clandestine Drug Lab Cleanup program can be found at www.superfund.utah.gov/meth_cleanup.htm.

South Temple Success Story

Many former LUST sites have been cleaned up and redeveloped. On the west side of Salt Lake City, a site at North Temple and 600 West was slated for media housing for the 2002 Winter Olympics. However, the discovery of petroleum-based groundwater contamination put the project on hold. With an EPA grant of $14,000, DERR performed groundwater cleanup operations and the vacant property has been redeveloped into an attractive four-story apartment building, with commercial offices on the ground floor.

Before

After

1 Facts and Figures 2000 Bureau of Land Management, Utah. www.ut.blm.gov/FactsFigures/factsandfigures.htm

2 "Preliminary National Biennial RCRA Hazardous Waste Report: Based on 2005 Data." Report unavailable on the Internet.

3 Data is according to the "1972 Utah State Solid Waste Management Plan."

4 Data is based on a compilation of annual reports submitted by the permitted facilities to the Division of Solid and Hazardous Waste (DSHW).

5 Data is based on a compilation of annual reports submitted by the permitted facilities to DSHW. For more information visit: www.hazardouswaste.utah.gov/SWBranch/SWSection/Adobe/SolidWaste/2006_Landfill_List.pdf.

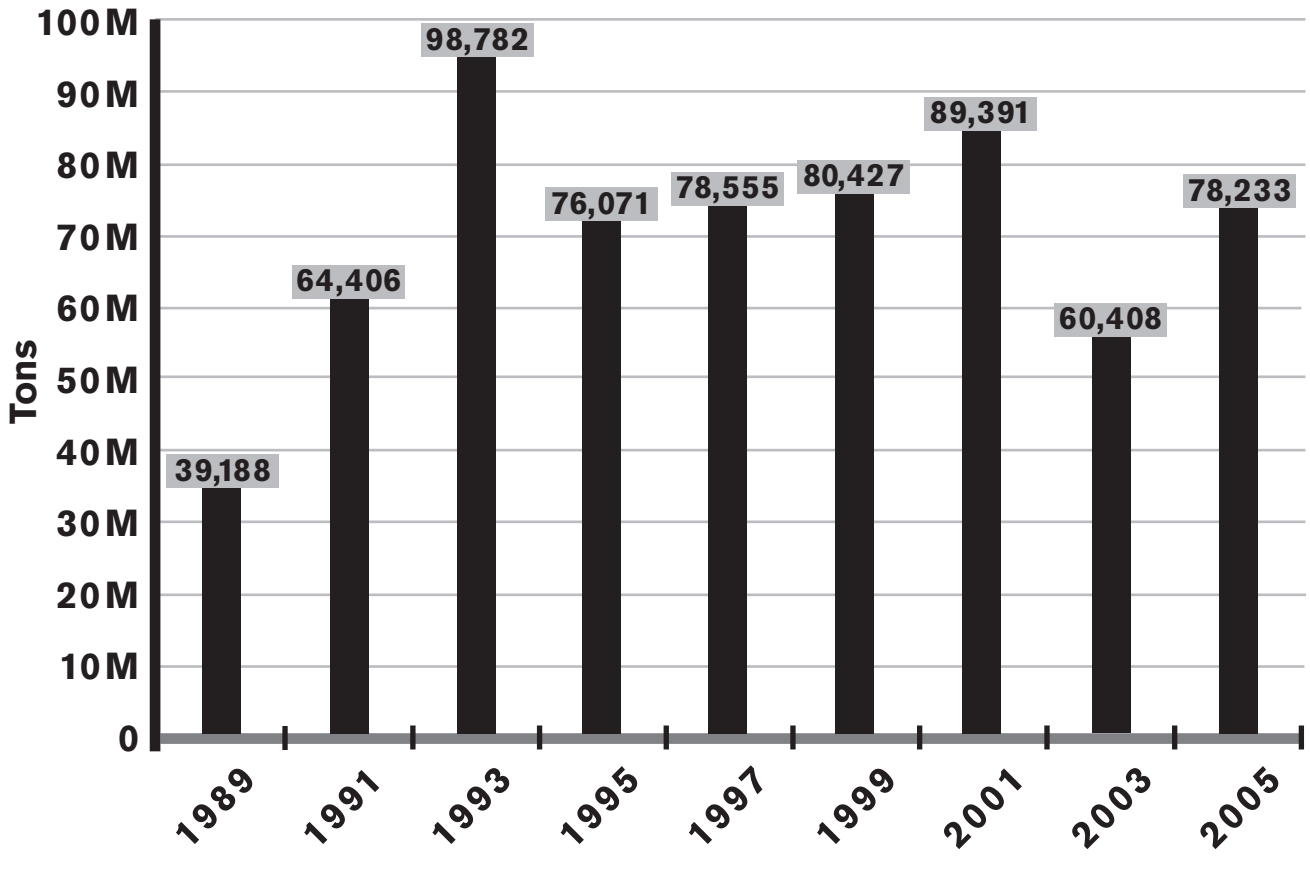
6 "Preliminary National Biennial RCRA Hazardous Waste Report: Based on 2005 Data."

7 Data is based on a compilation of quarterly reports submitted by EnergySolutions between 2001 and 2005.

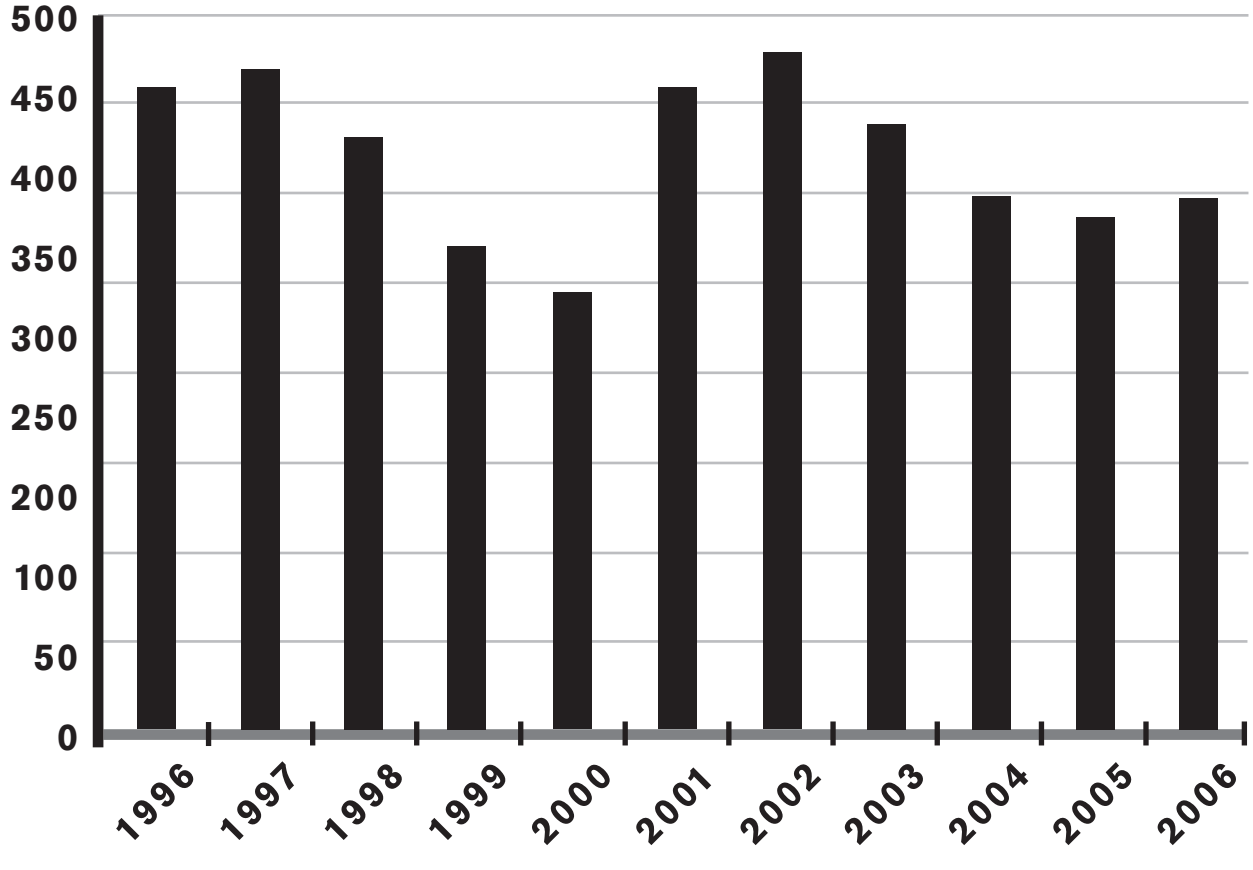
8 The information is based on required annual reports by permitted used oil facilities in Utah. The reports were submitted to the Division of Oil, Gas and Mining until 1993. After which, the used oil recycling program was moved to DEQ and annual reports are required to be submitted by March 1 for the prior calendar year.

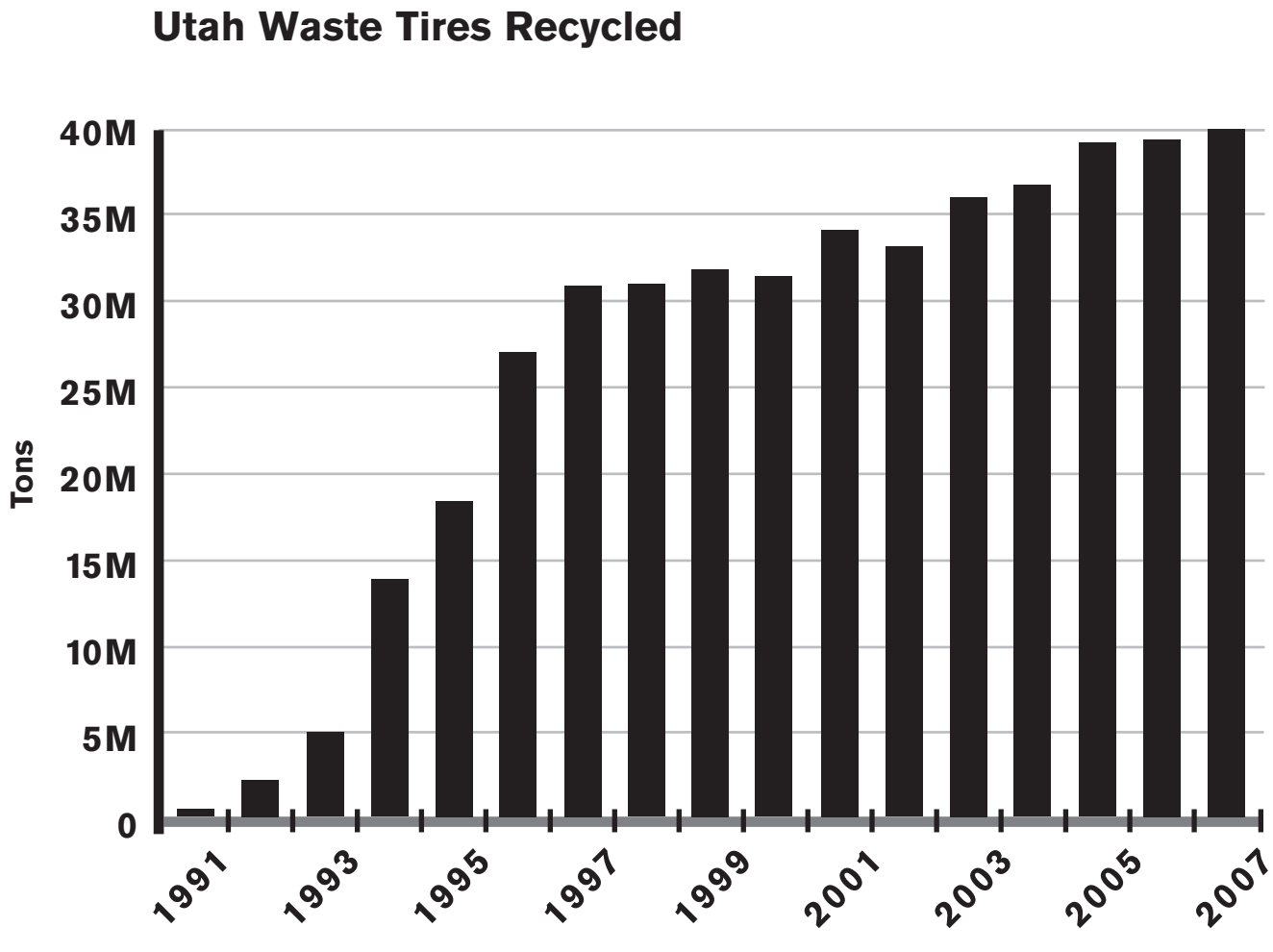
9 Data is based on the "Waste Tire Fund Report" by the Utah Division of Finance, Department of Administrative Services.

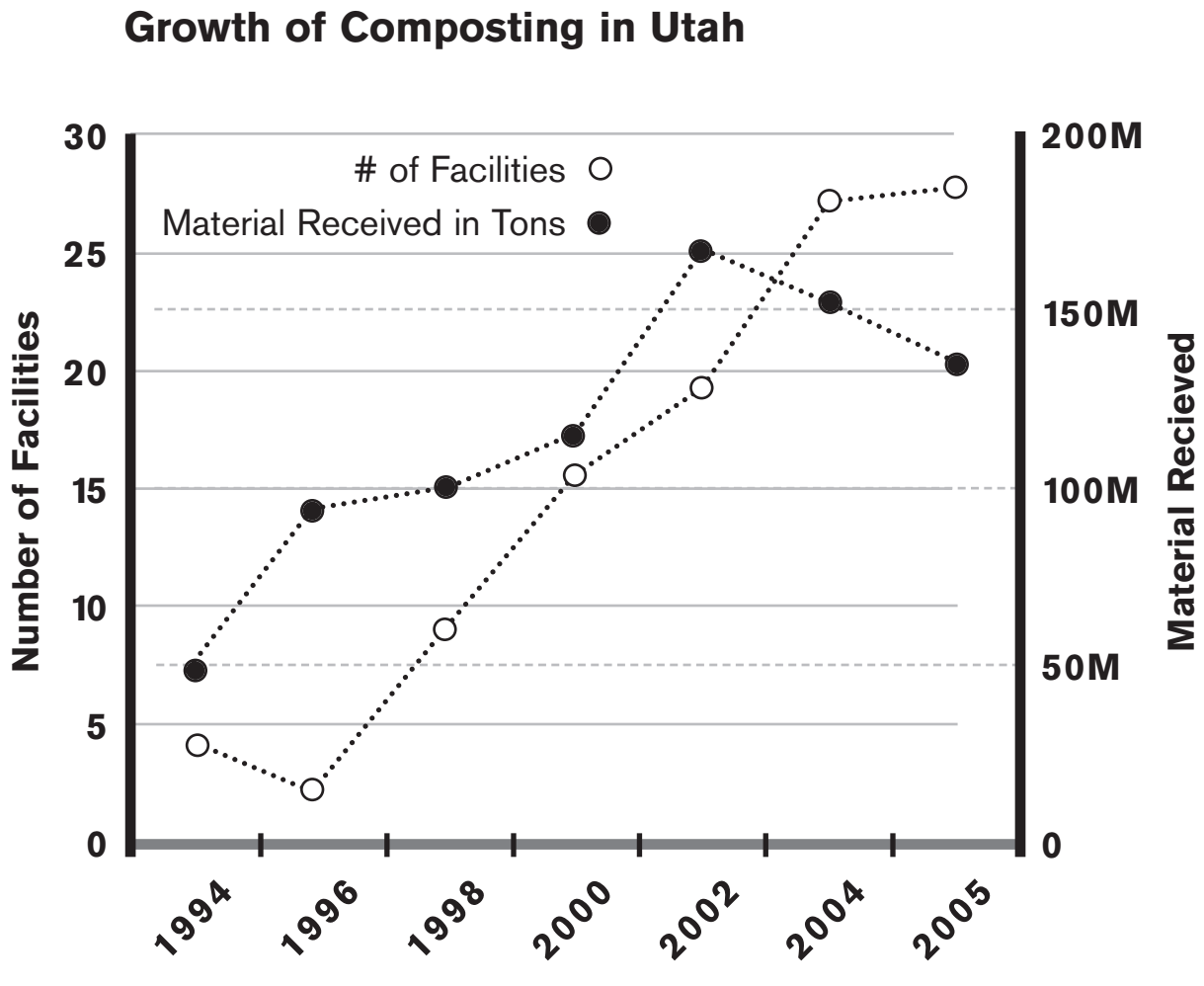
Utah Hazardous Waste Generation



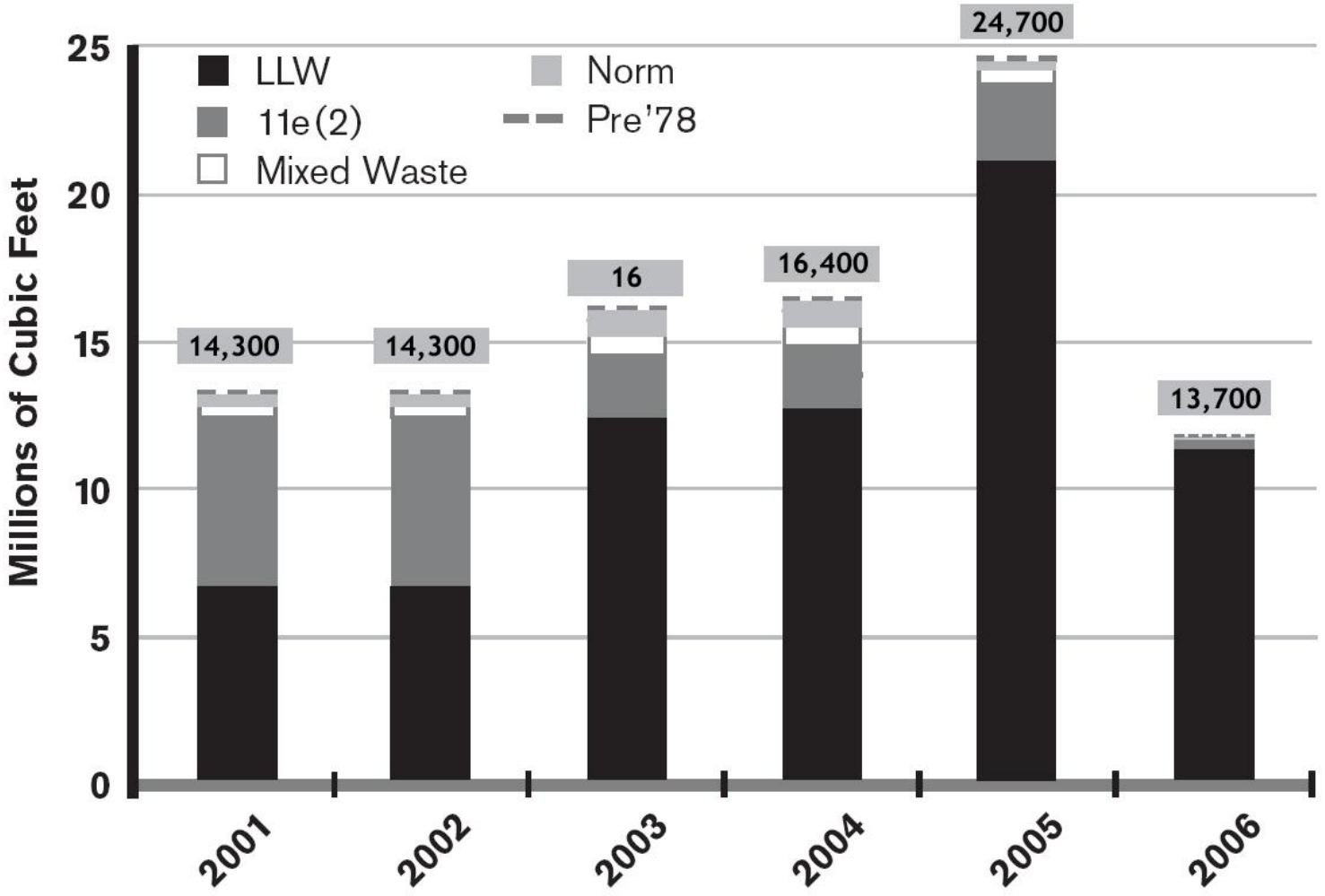
Number of Incident Notifications of Spills Received



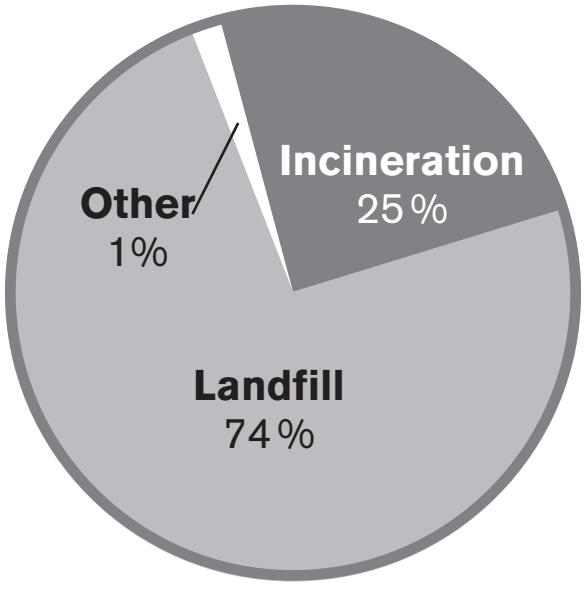

Utah Waste Tires Recycled
Tons
40M
35M
30M
25M
20M
15M
10M
5M
0
1991
1993
1995
1997
1999
2001
2003
2005
2007


Growth of Composting in Utah
# of Facilities
Material Received in Tons
Number of Facilities
Material Recieved
30
25
20
15
10
5
0
200M
150M
100M
50M
0
1994
1996
1998
2000
2002
2004
2005

Radioactive Waste Disposal Volumes 2001-2005



2005 Utah Hazardous Waste Management Methods



Water

Cleaner Water

Introduction

Water is a precious resource in Utah, the second driest state in the nation. Some 2.5 million residents and thousands of visitors depend on surface and groundwater for drinking. Utah's 14,250 miles of rivers and streams, and nearly 3,000 lakes and reservoirs, sustain a wide variety of wildlife, provide recreation and enjoyment, and support agriculture production.

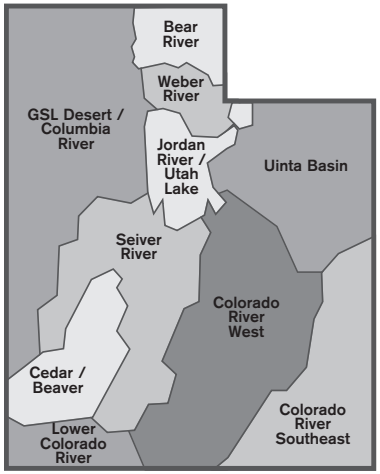
Utah has made significant strides in protecting water resources since passage of the 1972 federal Clean Water Act and the implementation of wastewater discharge permits that have reduced lake and stream pollution. Challenges remain, however, including pollution in runoff, changes to water flow, airborne pollutants settling into water, and addressing aging wastewater and drinking water infrastructure.

This chapter highlights the condition of Utah's waters and watersheds and the quality of the drinking water.

The Water Quality Board guides the development of water quality policy and regulations in the state. The Division of Water Quality administers the laws and rules and is responsible for wastewater loans. The board is made up of various interests groups across the state, as defined by statute in the Utah Code, Section 19-5-103. Like the other Boards, members are appointed by the governor, with the consent of the Senate. For more information on the Board and its members visit: www.waterquality.utah.gov/WQBoard/wqb_members.htm

Photo: Tom Till, UOT

Utah Watershed Management Areas



Water and Watersheds

A watershed is a geographic area in which all the water drains into a common waterway such as a river, lake or stream. Watersheds are susceptible to pollution in two ways that are commonly classified as point or non-point sources. An example of a point source is a wastewater treatment plant that discharges treated water directly into a stream, whereas non-point source pollution generally refers to runoff from the land, as a result of impacts from agriculture, storm water or air pollution settling in water. The Division of Water Quality (DWQ) uses a five-year rotating monitoring process to assess the water quality of rivers and streams within the state. The states have been divided into 10 watershed management units and these have been aggregated into five monitoring regions that are designed to cover the state every five years.

Condition of Utah's Waters

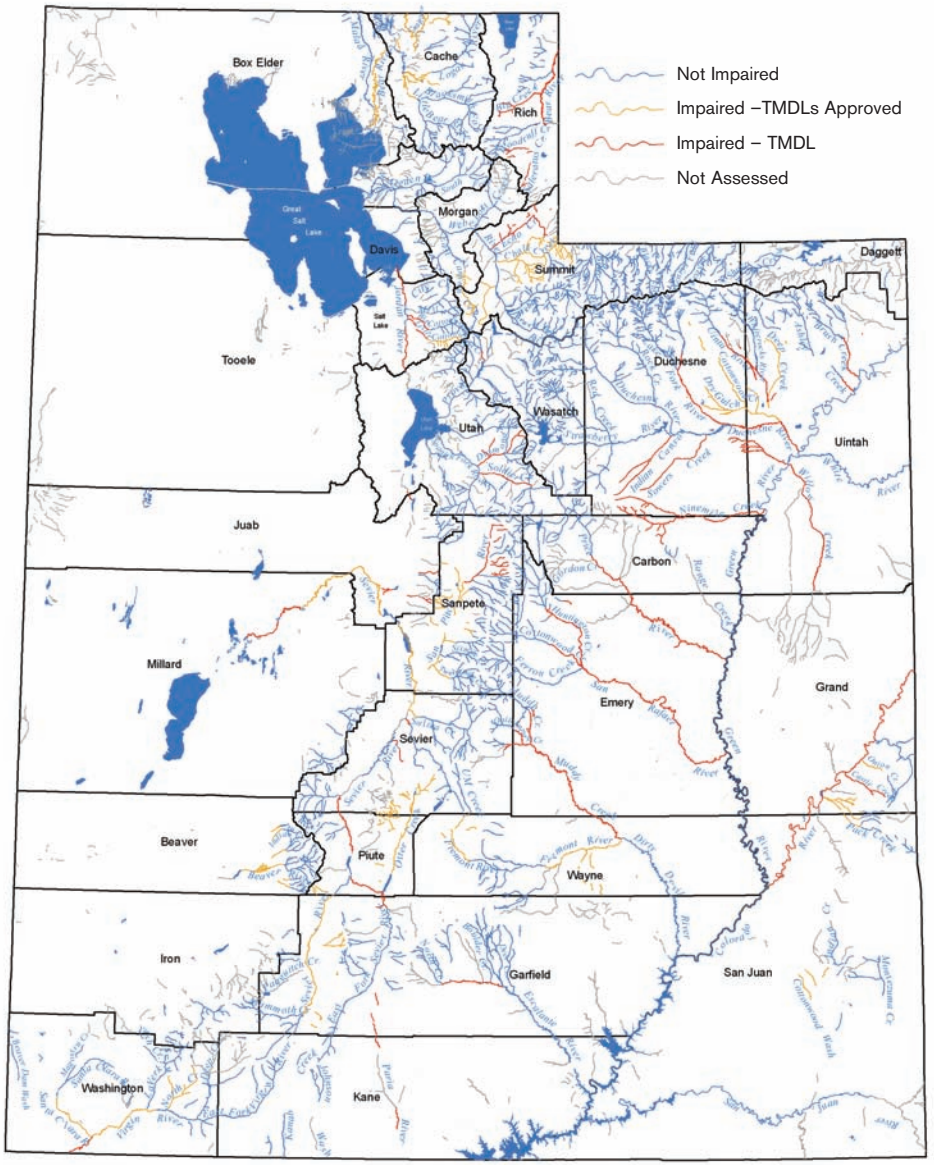
Under section 303(d) of the Clean Water Act, Utah must assess the condition of its waterways and provide a list of "impaired" waters. It then must prepare a restoration plan based on a "Total Maximum Daily Load" (TMDL) study that calculates the maximum amount of pollution a body of water can receive in order to still meet water quality standards.

As of 2006, the Utah Division of Water Quality (DWQ) has examined approximately 10,442 miles of perennial streams to assess the water's ability to fully or partially support aquatic life or recreational uses. Of those stream miles assessed, 72 percent were found to support fish or be safe for swimming, and 28 percent determined to have some form of water quality impairment.

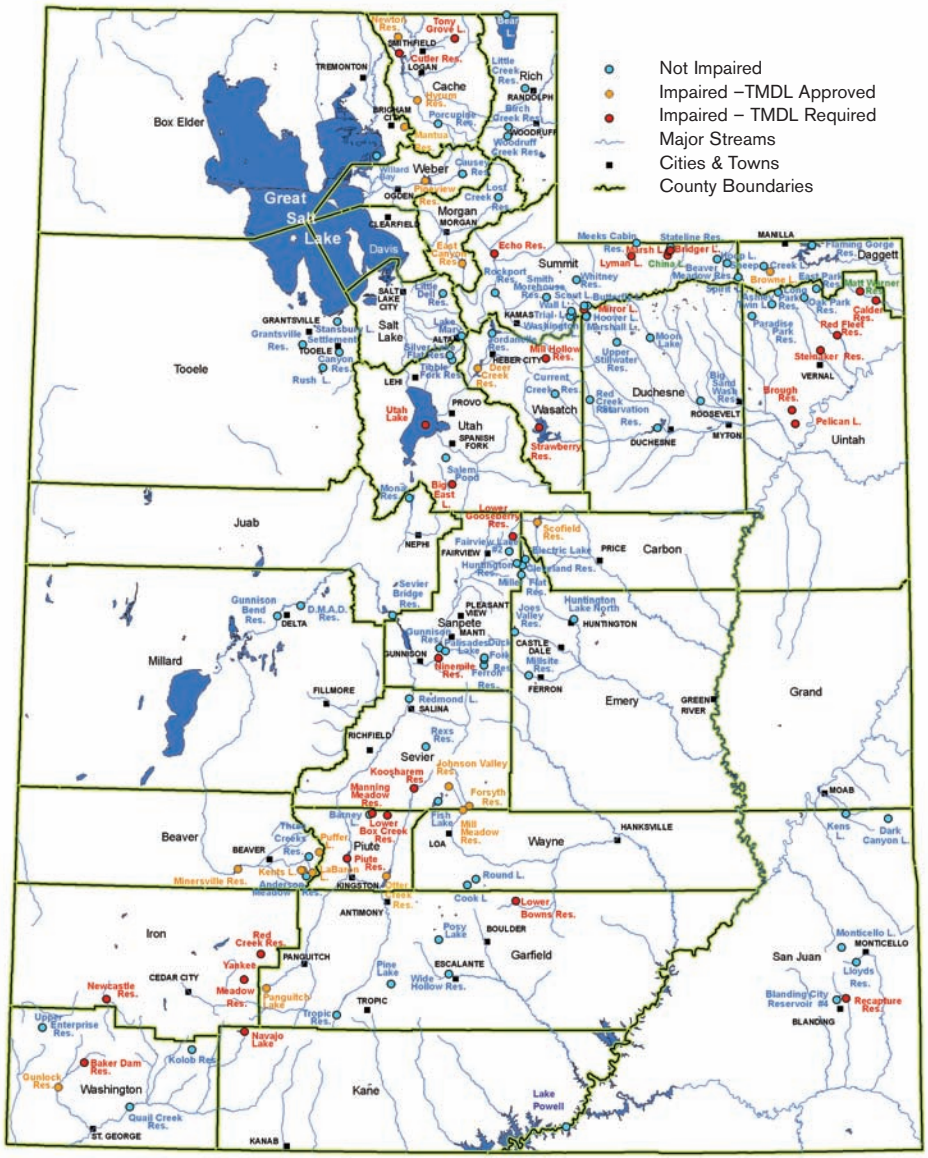
Utah Lakes

As of 2006, DWQ has assessed 97.1 percent of the total lake acreage in the state. The majority – 99.4 percent – of those assessed were found to be either fully or partially supportive of aquatic life and other uses. Only 0.06 percent was found to be impaired, largely because of excessive nutrient levels from non-point sources such as agricultural and industrial runoff. Of the 132 lakes surveyed, 32 are on the 303(d) list. Two of these, Cutler Reservoir and Pelican Lake, were added for the first time. Several lakes remain under additional stress due to drought conditions.

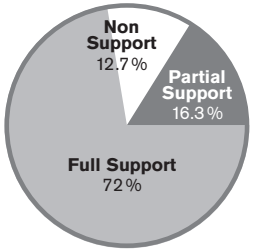
2006 Utah Perennial Stream Assessment



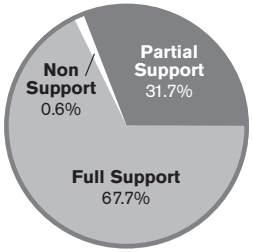
2006 Utah Lake Assessment



Statewide Rivers & Streams Use Support
10,442 Miles of Perennial Streams



Statewide Lake Beneficial Use Support
2006 305(b) Assessment



Permitting Surface Water Discharges

The state of Utah has been delegated authority by EPA to administer the National Pollutant Discharge Elimination System (NPDES) program. Under this program permits are issued to all entities that discharge pollutants to surface waters, including discharges of domestic and industrial wastewater and storm water to protect the quality of our waters for drinking, recreation, agriculture and wildlife. Currently, there are over 2,000 active storm water permits.

DWQ currently oversees 271 domestic and industrial discharge permits. These permits typically require daily sampling of the discharge to determine if it meets the water quality requirements that are imposed. Monthly reports are submitted to validate compliance within the parameters of the discharge permit. Currently there is a 97 percent compliance rate for all the regulated domestic and industrial facilities.

Under the NPDES program, construction projects that disturb more than 1 acre of land must receive a storm water permit to assure that proper practices are in place to protect sediment-laden runoff from polluting any nearby surface water. Storm water permits for construction activities are pertinent only through the duration of the construction and may be secured on-line. The permit outlines the "best management practices" that must be followed during construction. Inspections are performed by DWQ staff to verify that appropriate management practices are in place. DWQ also performs education and outreach activities to assist permittees meet their obligation to prevent water pollution.

The NPDES program also requires storm water permits for industrial facilities that are defined as significant sources of contaminated storm water runoff. The facilities are issued coverage under the "Multi-Sector General Permit for Storm Water Discharges from Industrial Facilities." The permit requires the industry to develop a storm water pollution prevention plan and to conduct annual inspections of their facilities to insure that exposed materials are not contaminating storm water discharging from facilities.

Storm water permits are also required for municipal separate storm sewer systems which serve populations greater than 10,000 people or which are located within urbanized areas. These permits require the entity, usually cities, to develop a system-wide storm water management program that includes developing ordinances, stream surveys of discharge pipes into waters of the state and educational programs. Eighty-four Utah communities and jurisdictions fall into this category. For more information on NPDES, visit: http://cfpub.epa.gov/npdes/.

Chalk Creek Success Story

Chalk Creek, which flows into Echo Reservoir in northern Utah, was placed on the **303(d) list** in 1997, and was considered the third most polluted stream in the state. Excessive **erosion** resulting from uncontrolled grazing and flood irrigation contributed to high levels of phosphorus and suspended solids were found in the creek. Committed to improving the watershed, more than 90 local landowners worked with project partners to successfully restore the creek. Some landowners were able to fence the stream banks to keep livestock out of the creek and plant willows and other native vegetation around the stream. But some projects weren't as simple. Some landowners, in danger of losing a barn or a home to erosion, which were willing to reroute streambeds and stabilize the banks to prevent erosion. These efforts significantly improved Chalk Creek. As of 2004, roughly 106,000 tons of sediment had been prevented from entering the stream, achieving an 82 percent reduction goal in phosphorus and sediment entering the creek. Occasional fish-stocking studies revealed that fisheries have been enhanced in Chalk Creek for **Bonneville Cutthroat trout**, a threatened species.

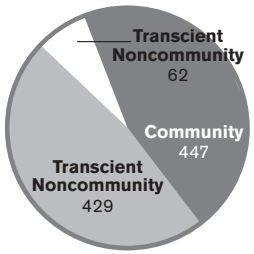
Before

After

Photo: Division of Drinking Water

The Utah Drinking Water Board adopts and enforces rules related to public drinking water systems. The Division of Drinking Water administers the rules. For more information on the rules and laws governing the board, visit: www.drinkingwater.utah.gov/rules.htm

Active Public Water Systems in Utah



Drinking Water

The vast majority – 97 percent — of Utahns drink water from approved public water systems, while some individuals and businesses get their drinking water from private wells. National drinking water standards apply to public water systems, which include municipalities and privately-owned water systems. National health-based standards exist for about 90 regulated contaminants.

Public Drinking Water Systems

Utah has 938 public water supply systems. A public water system is defined as any water system, either publicly or privately owned, which provides drinking water for 15 or more connections, or 25 or more people, at least 60 days of the year. These include community systems serving people year round; non-transient non-community water systems that serve workers at a factory, and transient non-community water systems such as seasonal campgrounds or highway rest stops.

All sources of drinking water used by community and non-transient non-community systems in Utah are required to have a Drinking Water Source Protection (DWSP) Plan. DWSP Plans define the watershed or subsurface area that contributes drinking water and the plan contains a protection strategy that reduces the risk of accidental contamination of a water source. Generally, transient non-community systems are not required to have a full source protection plan, but each, at the least, has a Source Water Assessment, which is essentially a simplified source protection plan.

The figure on the top right of the next page shows the percentage of systems in the state that are fully covered by completed Source Water Assessments[2] (SWAs). The data comes from the Division of Drinking Water's 2006 Annual Report to the Environmental Protection Agency (unpublished). It's important to recognize that systems are always developing new sources, which means that the number of sources/systems with approved SWAs changes regularly. As of October, 2006, 95 percent of people served by Community Water Systems in Utah get their water from sources with completed and approved SWAs, a very high success rate.

Water System Ratings and Operator Certification

Water system ratings are based on the quality of the water the system provides, how well operated the system is, and how well maintained the system facilities are. Almost everyone in Utah gets their water from an "Approved" drinking water system.

In order to become a Certified Operator, a person must be trained in many aspects of the management of a water system, and must pass a test that measures understanding of how to operate a water system. Certified Operators are recertified every three years, and have to attend continuing education. There are over 2,000 certified operators working in Utah. Most Utahns get their water from systems with Certified Operators.

The figure to the bottom left shows that as the number of approved systems and certified operators has increased over the last 13 years, the number of enforcement actions has declined. Well trained operators and approved systems mean better water systems and fewer chances that the public could be exposed to contamination. Unapproved systems, or systems without appropriately certified operators, receive ongoing assistance from the Division of Drinking Water and the Rural Water Association to help them improve their operations.

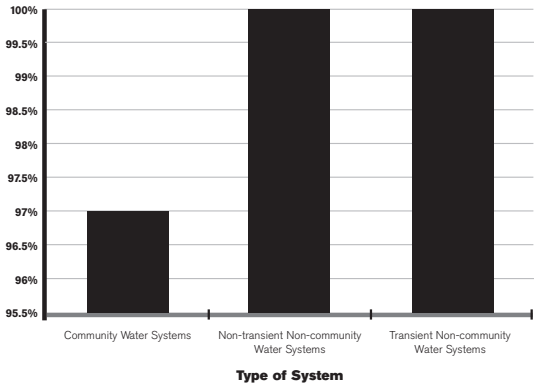
Public Health Threats to Drinking Water

DDW has seen measurable success over the last 16 years in improving compliance with drinking water requirements. The Safe Drinking Water Act mandates that EPA, states, and water systems protect consumers from the risks of unsafe drinking water. It has been over two decades since a water borne disease outbreak has been reported in Utah.

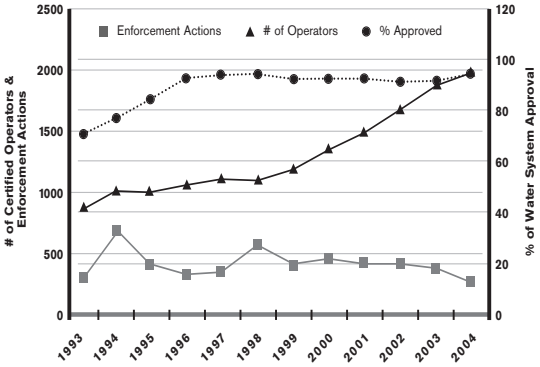
Contaminants can enter drinking water supplies at the source of supply, during construction, from illegal cross-connections with non-potable water supplies (irrigation water), leaching from household plumbing, and from poor operational practices. Public water suppliers must properly treat and disinfect water. Contaminants in drinking water can have both immediate and long term health effects. As an example, drinking water contaminated with pathogens can result in stomach pain, diarrhea, headache, vomiting and fever in a matter of hours after consumption, while other chemicals and naturally occurring minerals may cause cancer, impair fetus development, or cause other longer term health effects, but only after several decades of consumption.

Visit the Division of Drinking Waters web site at www.drinkingwater.utah.gov, in order to learn more about the various drinking water programs.

Percentage of Water Systems Covered by SWAs



Approved Systems, Certified Operators and Enforcement Actions



West Haven Success Story

In the mid-1990s, the 4,000 residents of Weber County's West Haven 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 has 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. West Haven residents pay $30 to $40 a month in sewer bills, a fraction of what it would have been without the loan program, according to city officials.

Utah's Water Loan Programs

Since 1972, some 280 municipal wastewater projects have received funding from U.S. Environmental Protection Agency grants, the State Revolving Fund (SRF) or the Utah Wastewater Project Assistance Program – which includes the Utah Wastewater Loan Program and the Hardship Grant Fund. To date, these projects have totaled more than $575 million. These loans have helped communities improve wastewater treatment plants, extend sewer and water lines to homes previously not served, eliminate failing septic systems and build water towers – all that have helped eliminate existing environmental pollution problems and protect public health. Information about financial assistance for wastewater projects can be found at: www.waterquality.utah.gov/FinAst/index.htm.

Since 1983, the Utah Drinking Water Board has funded 289 projects, totaling $169 million. These loans have helped to construct new treatment plants, replace aging pipes, and develop new sources of water (wells and springs). These projects have helped with economic growth and protected the public's health. Information about financial assistance for drinking water projects can be found at: www.drinkingwater.utah.gov/loan_program_intro.htm.

Several of the drinking water projects funded by the Drinking Water Board have been to regionalize or consolidate several smaller water companies into one larger one. Kane County Water Conservancy District and Central Iron County Water Improvement District have both recently helped several small water systems that had compliance problems by combining them into a larger entity. The larger consolidated systems are more efficient, more streamlined, and more cost effective, and most importantly, more protective of public health.

Groundwater Management

Groundwater is found below the surface in spaces between rocks and soils. Many rural communities are served by public drinking water systems that depend on groundwater, private wells and groundwater systems for their water supply.

Groundwater also is a source of water for industrial and agricultural uses. A groundwater discharge permit is required for facilities which could discharge pollutants into groundwater. Currently, there are 36 active groundwater discharge permits regulating about 150 facilities.

Groundwater Protection

As development in Utah continues the potential for groundwater contamination increases. Once contaminated, groundwater is difficult to clean, and it oftentimes requires great expense. A continued effort is made to encourage local governments to institute groundwater protection measures and the Division of Water Quality has helped garner over $1 million per year to fund non-point source projects for groundwater protection.

Perchlorate in Utah

Perchlorate is an unregulated compound that is increasingly found in the environment. It can occur naturally but it is primarily a byproduct of industrial uses, such as solid rocket fuel.

Since 1997, DEQ has identified some sites with perchlorate contamination in the groundwater. DEQ is working with the facilities to assess the magnitude and extent of the contamination, and manage exposure pathways. For additional information about perchlorate, visit: www.perchloratenews.com/index.html.

Community Partnerships

Utah water officials work cooperatively with federal and local partners to ensure the state's water sources are free of pollution and contamination. These partnerships bring together interested stakeholders to develop plans to better solve environmental problems.

Great Salt Lake Water Quality Steering Committee

The Great Salt Lake is a unique terminal lake adjacent to a growing metropolitan area. The lake is also a critical ecological resource as well as an important recreational and mineral resource. Working with a stakeholder committee, DWQ has begun a process to establish numeric standards for the Great Salt Lake, with an initial focus on selenium. Public concern over the potential of adding more selenium to the lake as a result of the Southwest Jordan Valley groundwater cleanup project brought a renewed focus on the need for numeric standards. Under the committee's oversight, a science panel will look at the existing selenium studies on the lake and conduct additional work where necessary. The committee will consider a science panel's work and then make a recommendation to the Water Quality Board. If the Board accepts the recommendation, the standard will be sent out for public comment before the action becomes final. Visit www.deq.utah.gov/issues/GSL_WQSC/index.htm for more information.

Jordan Valley Success Story

In April 2006, the cities of West Jordan, South Jordan, Riverton and Herriman started receiving water from a new reverse osmosis treatment plant, a first phase of a years-long effort to provide more than 8,000 acre-feet of water per year through Southwest Jordan Valley Groundwater Project. For years, DEQ, Jordan Valley Water Conservancy District, Kennecott Utah Copper Corp. and EPA worked together to develop a project that captures deep underground waters impacted by mining and other activities, purify it and make it a source of drinking water for the communities in the southwestern Salt Lake Valley. Kennecott paid for the cost of developing and treating the underground water by a trust fund, managed by the executive director of DEQ, acting as the Trustee for Natural Resources. Jordan Valley and Kennecott developed the project which is overseen by the trustee and other regulatory agencies. Many have hailed this project as the most significant project in America because of the high level of cooperation between the entities involved.

Perchlorate Success Story

Perchlorate has contaminated the aquifer that Magna Water and Sewer Improvement District uses for part of its water supply. Magna Water and Sewer Improvement District has worked with the company that caused the source of contamination, and state and federal officials to determine a unique method of treating the contaminated source of water to make it drinkable and dispose of the waste stream with a biologically safe method.

Arsenic Success Story

When EPA's new arsenic limits in drinking water went into effect on Jan. 23, 2006, the vast majority of Utah's water utilities were already in compliance. But a few systems are still working on achieving the higher standard. DDW is working with those Utah systems, and in some cases it has granted three-year extensions to make necessary adjustments to ensure compliance with the new 10 parts per billion (ppb) standard – much lower than the 50 ppb that was once considered safe to drink.

Mercury Work Group

Mercury is also a cause of concern for the Great Salt Lake. The Mercury Work Group (see next chapter on Mercury) is a group of stakeholders that convene to coordinate mercury studies that are ongoing. For more information on the group, visit www.deq.utah.gov/Issues/Mercury/workgroup.htm.

Working with Animal Feeding Operators to Control Runoff

In 1999, the U.S. Department of Agriculture and the EPA released a joint unified strategy to address runoff from animal feeding operations (AFOs). Following the release of a national strategy, DWQ organized a Utah AFO committee to develop a workable strategy for Utah, an innovative approach that is recognized nationally. State Program partners include the Utah Department of Agriculture, Utah Farm Bureau Federation, Utah Association of Conservation Districts, Utah State University Extension, and the National Resources Conservation Service. Animal operations that confine their animals, such as dairies, are the focus of the strategy. In the national strategy, all operations with animal units equivalent to or greater than 1,000 mature beef cattle are automatically considered Concentrated Animal Feeding Operations (CAFO). Smaller operations with polluted runoff problems can also be defined as CAFOs and are required to complete nutrient management plans and acquire a discharge permit.

Utah allows smaller operations a window of opportunity to fix problems and come into compliance while still qualifying for federal grants, an opportunity regulated operations do not receive. The strategy includes technical assistance to farmers and ranchers writing Comprehensive Nutrient Management Plans (CNMPs). It also requires implementation of best management practices and funding opportunities, and on-farm assessments of all animal operations in the state.

By 2004, essentially all on-farm assessments of 2,893 operations had been completed. The vast majority – 2,054 – had no water quality problems. Of the 380 potential CAFOs, 112 have completed CNMPs and 50 have implemented their plans and were taken off the potential CAFO list.

The Utah AFO Strategy document can be viewed at: www.waterquality.utah.gov/documents/ DOC_RULE.htm, along with many other documents pertaining to Division of Water Quality activities. Other information about the issue can also be found at the following Web sites: www.ut.nrcs.usda.gov, www.uacd.org and www.ag.state.ut.us.

Feedlot Runoff Success Story

A Department of Agriculture video illustrated the following successes: In 2004, Jon Beck completed a CNMP that involved building a runoff retention dike below the slope of his feedlot located in Utah County, next to the Spanish Fork River. In Summit County, the Brown's Dairy and Summit Valley Milk Production facility, a 350 cattle dairy production, is located on a slope that presents a challenge to control runoff. Glen Brown built a scraping ramp that allows the manure to flow down to a storage area. It's configured in such a way that all runoff is funneled into one central area away from nearby streams. In Morgan County, Mike Morgan and his nephew, Jason, run a 500-cow mother cow-calf operation in Stoddard. They farm 600 acres of irrigated cropland and ranch 12,000 acres of grazing land. It's the feedlot near the creek that presented problems. Morgan fenced off the creek, built a dike to keep runoff out of it and built water troughs away from the creek so the cattle won't enter the creek for water.

Before (Beck)
435 lbs Nitrogen/Yr
221 lbs. Phosphorus
1,647 lbs BOD

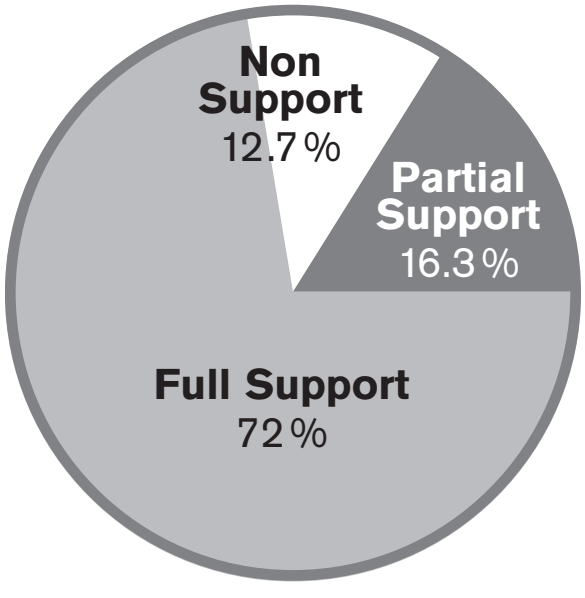
After (Beck)
57 lbs Nitrogen/Yr
28 lbs. Phosphorus
206 lbs BOD

1 Data (as text and in graphics) in this report section was obtained from Division of Drinking Water databases, August 2006.

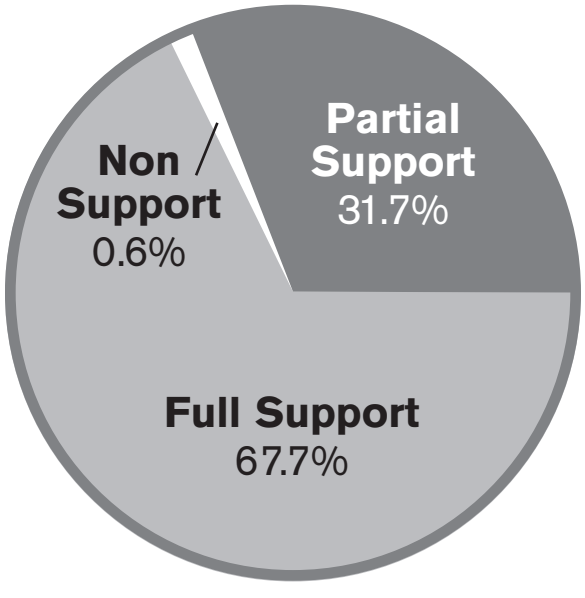
2 Defined by EPA as a source with an approved delineation of protection zones, an approved susceptibility assessment, and approved public notification. Note that this figure includes both Drinking Water Source Protection Plans and also the Source Water Assessments completed by DDW for transient non-community water systems.

Statewide Rivers & Streams Use Support

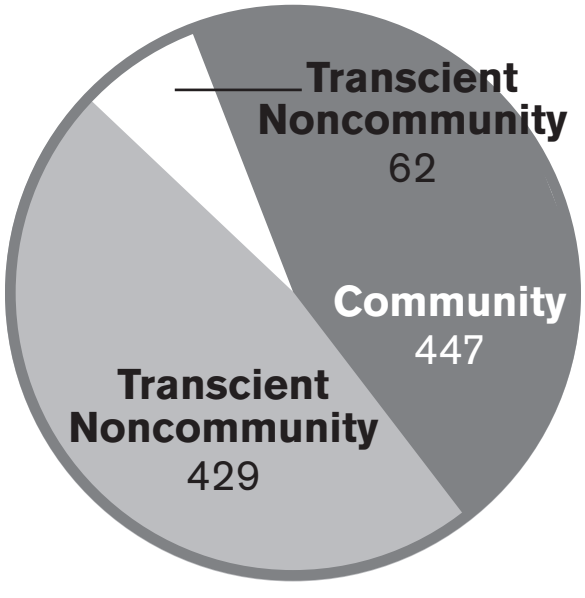
10,442 Miles of Perennial Streams



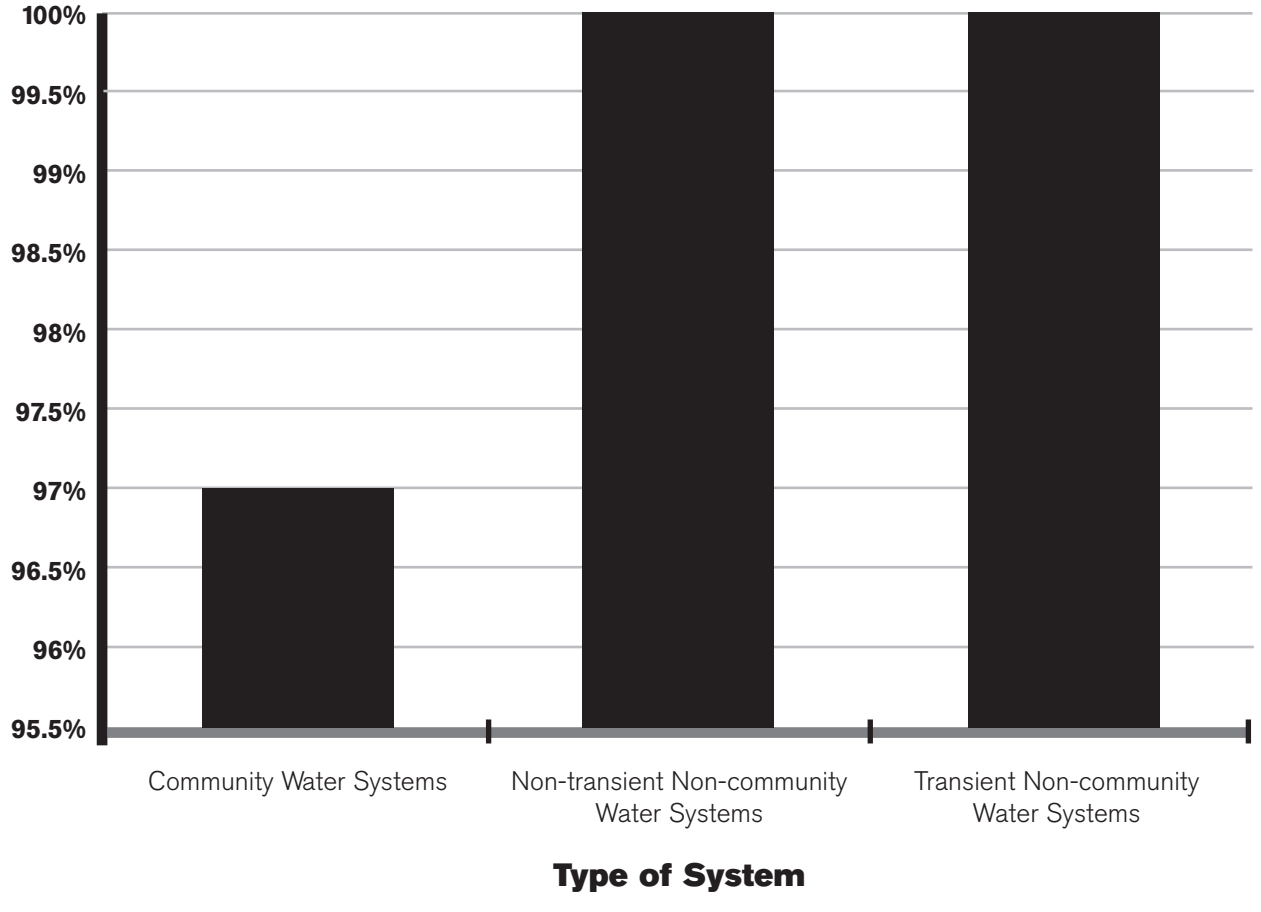
Statewide Lake Beneficial Use Support
2006 305(b) Assessment



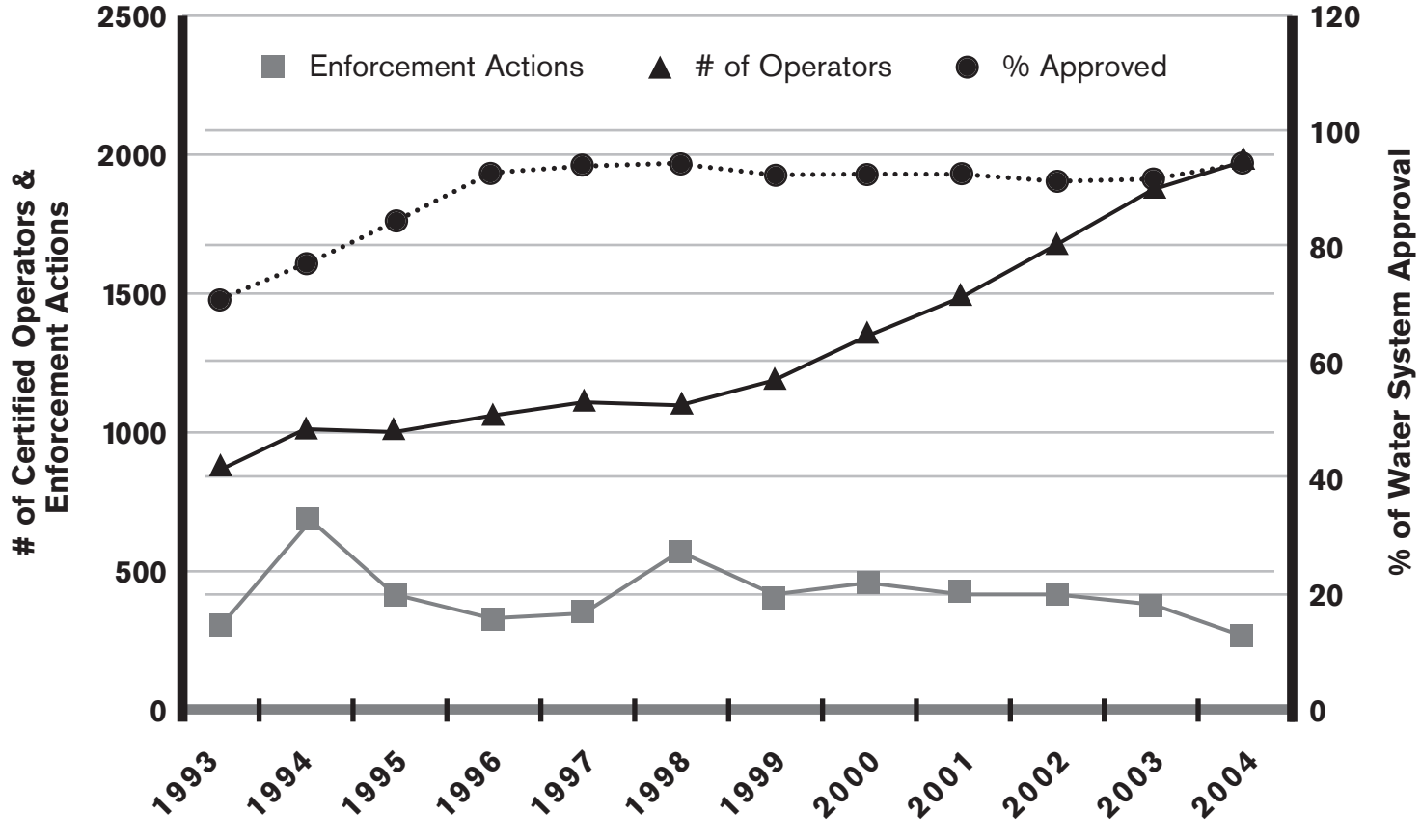
Active Public Water Systems in Utah



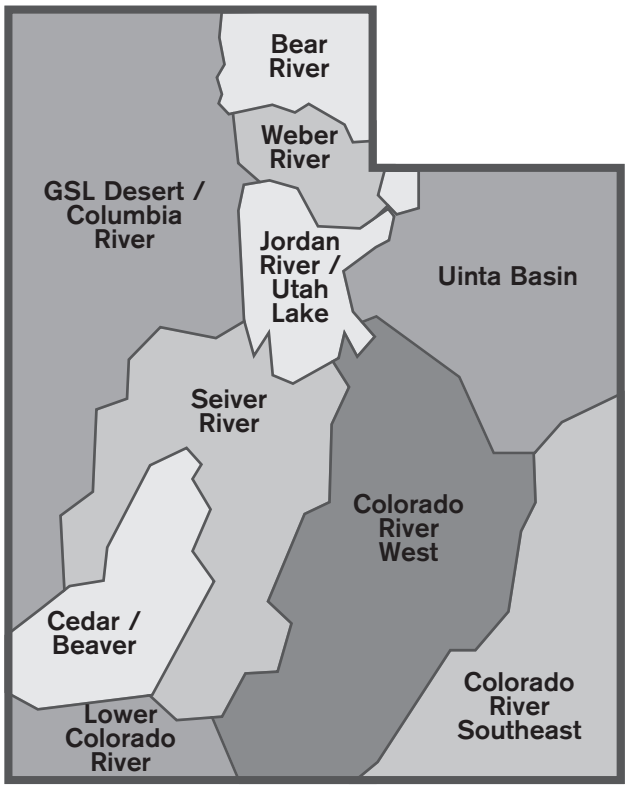
Percentage of Waters Systems Covered by SWAs

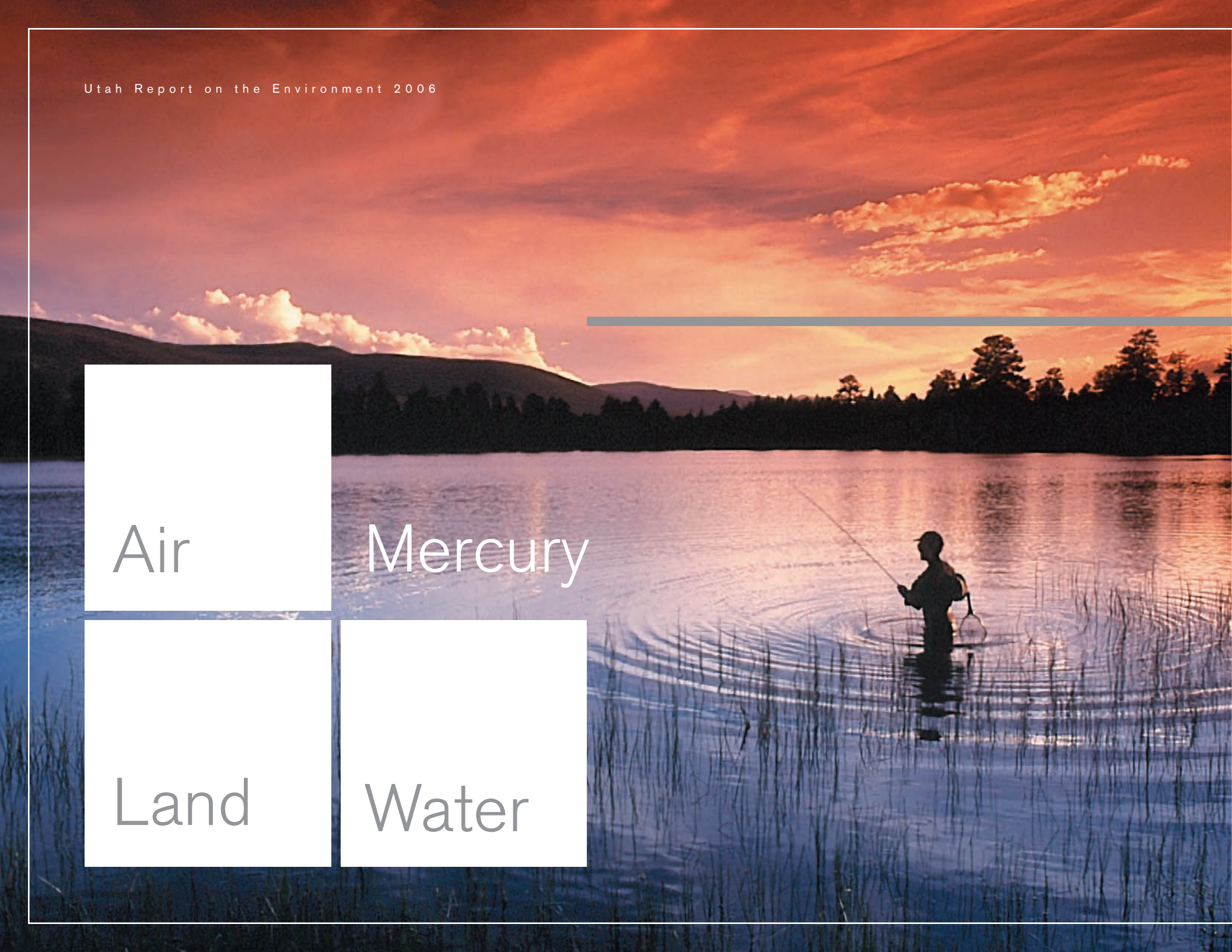


Approved Systems, Certified Operators & Enforment Actions



Utah Watershed Management Areas





Air

Mercury

Land

Water

Contamination Mercury

Introduction

Mercury is a naturally occurring element that can be transformed into very toxic compounds. Mercury has two primary forms – naturally occurring elemental mercury, which is less toxic, and the more toxic organic form methylmercury, which can affect the human central nervous system.

Mercury is spread by emissions into the atmosphere, subsequently settling onto the ground, and deposition in the bottoms of lakes and oceans. It can come from a variety of sources, including natural sources, such as volcanic and geothermal activity, marine environments or forest fires. Mercury can be released from coal-fired power plants and other industrial activities. It can be released during scrap metal recycling, if mercury switches are not removed before the metal is recycled. Mining processes can also release mercury, when mercury is present in soils or waste rock and volatizes into the atmosphere. In addition, the erosion of mercury bearing rocks is released in the water and air during precious metals extraction. Thermal processing of gold ore can release mercury, as can burning coal in power plants. Incineration of municipal and medical wastes can be a source of mercury emissions. Even household waste can be a source of mercury contamination, if old thermometers, light fixtures, and other items are disposed of improperly.

In 2004, Utah companies reported releasing 120,847 pounds of mercury into the air, land and water, according to EPA's Toxic Release Inventory. DEQ has assembled representatives from each of DEQ divisions to address mercury issues in a coordinated manner. The team has developed a draft strategic plan to make sure mercury is addressed in a coordinated fashion.

Many states across the nation are grappling with the impact of mercury, a naturally occurring metal that in its more toxic form can lead to health problems. Utah scientists studying the issue are still investigating mercury deposition in the state, but realize it could be coming from emissions generated as far away as Asia and as close to home as Utah and neighboring Nevada. Like many other contaminants, mercury is an example of how contamination can affect all aspects of the environment: air, land and water.

Photo: Tom Till, UOT

Success Story in the Air

DEQ worked with the 2006 Legislature to pass House Bill 138, sponsored by Rep. Ronda Menlove, that requires automakers to pay a $5 incentive to scrap dealers to remove the small mercury switches in automobiles before the vehicles are crunched and incinerated for scrap metal recycling. Millions of cars made before 2003 contain the switches that were used for anti-lock brakes and convenience lights under hoods and in trunks. According to a March 19, 2006 Salt Lake Tribune article by Judy Fahys "estimates suggest there are 35 million of them (switches) still in vehicles on the road. Nucor Steel in Utah recycles more than 250,000 vehicles each year that might contain the switches. Nucor reports releasing about 139 pounds of toxic mercury into the air each year."

Mercury in the Air

Mercury is regulated as a Hazardous Air Pollutant in Utah, and strict requirements are in place to control emissions from coal-fired power plants and other industrial sources. The Department of Environmental Quality (DEQ) is currently working with EPA on further mercury emissions reductions from coal-fired power plants. DEQ has already taken steps to reduce emissions, including mercury, from municipal and medical waste incinerators. These actions will ensure that Utah continues our success in lowering mercury emissions from sources within the state.

Nevada, Utah's neighbor to the west, produced 81 percent of the gold mined in the United States in 2003 and continues to lead the nation in gold production. Mercury is a common by-product of gold mining and processing, and Nevada mining activities therefore represent a very large potential source of mercury emissions that could affect Utah. DEQ supports the efforts of the state of Nevada to reduce mercury emissions at gold mines.

Mercury on the Land

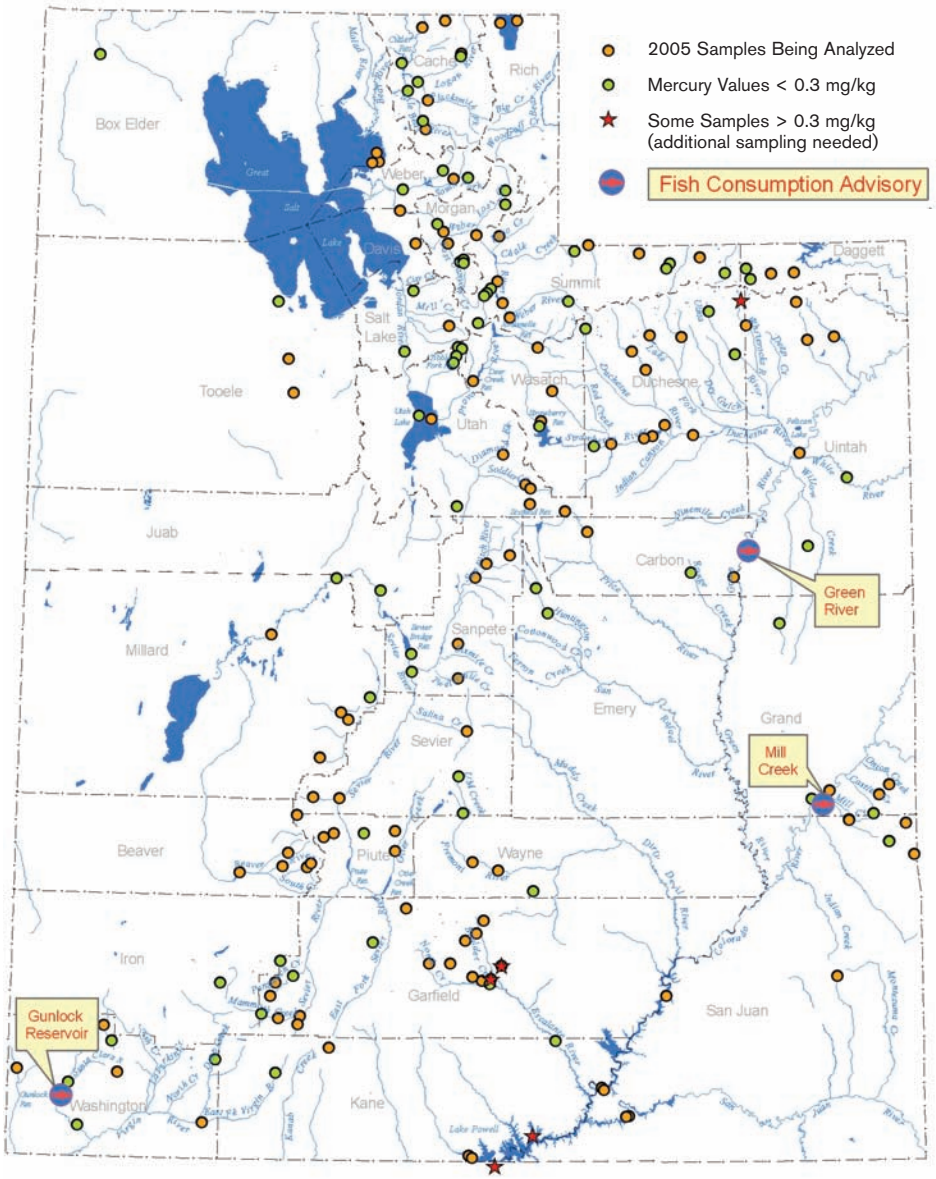
Mercury occurs naturally, in some rocks and watersheds in Utah. DEQ is working to identify these areas. Mercury also is found in many household products, including mercury thermometers, fluorescent light bulbs, thermostats, blood pressure gauges and old chemistry sets and toys. To reduce the amount of mercury in the landfills, the local health departments around the state have partnered with DEQ to set up mercury collection sites where citizens dispose of their old mercury products free of charge.

Mercury in the Water

When mercury is deposited in waterways, bacteria converts it to methylmercury, which can build up in the tissue of fish and other wildlife, which may be eaten by wildlife and people. Exposure to mercury occurs most frequently through eating contaminated fish.

In February 2005, U.S. Geological Survey and Fish and Wildlife researchers gathering information on selenium in the Great Salt Lake also reported finding high mercury levels. To protect human health, Utah issued its first fish consumption advisories due to elevated levels of mercury in fish tissue at Gunlock Reservoir, Mill Creek and Green River in Desolation Canyon. Also, Utah has issued duck consumption advisories due to elevated mercury levels – the first ever reported in the nation. In 2006, an additional duck species was added to the advisory list. Testing is ongoing.

2006 Mercury in Fish Tissue



Success Story on Land

The **"Get the Mercury Out"** campaign, a partnership between **DEQ** and local Health Departments, allowed residents **free disposal** of mercury products at various drop-off locations throughout the state. In April alone, 145 pounds of mercury was collected, and the program was extended. As of October 2006, a total of 375 pounds of mercury has been collected. Because mercury is still a valuable commodity, the mercury collected can be recycled or disposed at a hazardous landfill. Either method ensures that mercury is not disposed of in the landfills and does not pose a potential health hazard.

Success Story in Water

In November 2005, **DEQ** purchased a $50,000 **mercury analyzer** for the Utah Department of Health State Laboratory to analyze the fish tissue samples more rapidly and report the results to the public in a timely manner. Previous to the purchase, DEQ had to take the fish tissue samples to an out-of-state lab for testing. The backlog caused delays and the mercury analyzer has allowed more timely results.

Utah Statewide Mercury Work Group

In 2005, DEQ established the Mercury Work Group (MWG) to coordinate mercury studies and investigations in Utah. Stakeholders from a broad base of state, federal, non-profit agencies, industry, and the public participate. There are presently nineteen members, representing fishing and waterfowl groups; mining and power generating industries; environmental advocacy groups; state, federal and local agencies; the Utah Medical Association; and academic and tribal interests.

The objectives of the group are:

- To provide the citizens of Utah with current, accurate and understandable information on the human and ecological concerns posed by mercury.
- To develop an ongoing systematic, logical, and defensible mercury monitoring program to assess mercury levels in fish and waterfowl tissue.
- To share technical information, data, and results of any investigations on mercury.
- To coordinate efforts by private and public entities in researching mercury issues in Utah in order to most effectively utilize the limited resources available.
- To provide the citizens of Utah with access to mercury data, advisories, and information via websites, printed materials, and contact information for public health officials.

MWG meetings are open to all interested parties. Visit www.deq.utah.gov/Issues/Mercury/workgroup.htm for information about upcoming meetings, past meeting agendas, current work group member list, and other information about mercury.

Other Activities

DEQ is in the process of developing a DEQ Strategic Plan to coordinate mercury related activities between the different divisions within DEQ. The Department is also currently developing a Source Assessment Protocol for mercury, which is a standardized approach to assessing contaminated areas, allowing us to look at and identify all the possible ways that mercury could enter and contaminate an area. Within DEQ, the Division of Environmental Response and Remediation (DERR) provides technical support to local and county public health agencies responding to mercury spills. There were twelve such incidents in the Fiscal Year 2006. Resources provided include monitoring instruments, support from DERR staff toxicologist, and cleanup protocols.

Activities outside of DEQ include the Hospitals for Healthy Environment (H2E) Grant, School Chemical Clean Out Pilot, and the previously mentioned “Get The Mercury Out” Campaign, through local health departments.

Notes: