"Our whole society was built on the notion that we could and must control nature, that we must master our circumstances, technologically. But natural systems are the consequence of a long evolution, and ecology is teaching us that we must first understand these systems to see how far we may modify them for our benefit without disastrous consequences."

—Environmentalist Roland Clement

Debra Shore, Commissioner
Metropolitan Water Reclamation District

2009 ANNUAL REPORT

Throughout our county people have built in places where nature is telling us we should not have built. We have paved or built or covered over the landscape, providing little chance for water to infiltrate or to be held long enough to evaporate.

We are stewards of a resource that in many places, even in neighboring counties, will increasingly be scarce—freshwater in the form of groundwater and rain. How we manage this resource is vital to our economy and to our ecology. And we cannot have a robust economy without a healthy ecology.

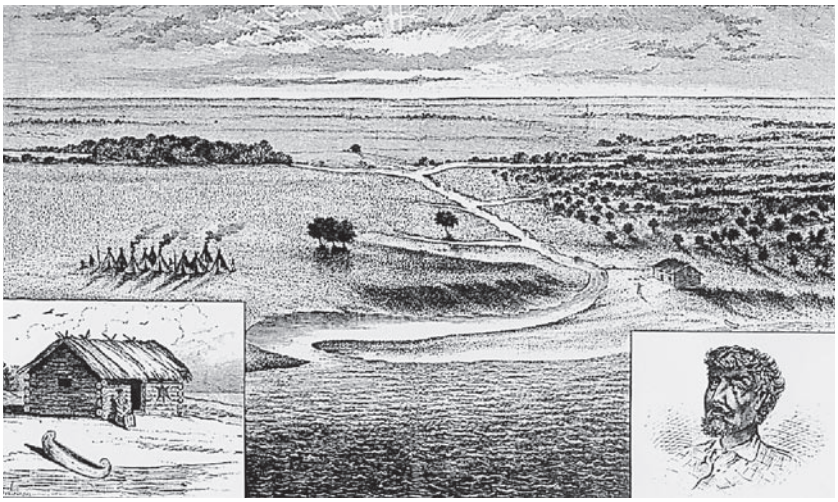
Our Soggy, Sodden History

Blame it on the glacier. Chicago's history—its marvels and messes—is shaped in no small part by the legacy of the last glacier, which left a rich and varied topography as it retreated slowly northward about 17,000 years ago.

As Joel Greenberg has noted in *A Natural History of the Chicago Region,* "The force of the glacier ordained that the Chicago region would straddle the eastern Continental Divide, separating the drainage area of the Atlantic Ocean from that of the Gulf of Mexico. The Des Plaines River, the Fox River, the Kankakee River and their tributaries lie in the Illinois and Mississippi watershed. The Chicago River and the Calumet flowed into the Great Lakes."

As the glacier receded, it not only scoured the landscape, leaving ridges, moraines, and giant ice cubes whose melting created prairie potholes, but it also left a very great lake. When Father Jacques Marquette, Louis Jolliet, and their traveling party paddled their canoes into these waters in 1673—the first Europeans known to have come into the Chicago region—they found a wild and swampy mix of prairie and woodland. Marquette wrote in his journal: "We have seen nothing like this river that we enter, as regards its fertility of soil, its prairies and woods, its cattle, elk, deer, wildcats, bustards, swans, ducks, parroquets, and even beaver. There are many small lakes and rivers. That on which we sailed is wide, deep, and still, for 65 leagues. In the spring and during part of the summer there is only one portage of half a league."

Two hundred years ago, the area near Fort Dearborn, at the present-day intersection of Michigan and Wacker, was a swamp. The Chicago River flowed in a leisurely fashion emptying into Lake Michigan near Madison Street, but sometimes it reversed direction naturally, meandering down the South Branch and dissipating into low-lying marshes and swamps. Indeed, Chicago has its roots in water—the name comes from "Che-ca-gou," the Native American term for the nodding wild onion that grew in profusion along the riverbanks. Skokie, where I reside, derives from Wabshkoki, aThe land was so wet that settlers had to lay miles and miles of drain tiles to dry out the fields and render them arable. They established drainage districts to levy fees and dug ditches to convey the water away from the fields (see "Drainage Districts" which appears later in this report for more on this archaic governmental entity).



THE BEGINNING OF A CITY, 1834
COURTESY OF MUNICIPAL REFERENCE COLLECTION, CHICAGO PUBLIC LIBRARY

I recount this history because our present-day attempts to manage water in this region must contend with these facts of topography and nature.

Living in a Wet Land

By 2004, when the Metropolitan Water Reclamation District was given authority for stormwater management in suburban Cook County (via Public Act 093-1049), many of our rivers had been channeled or straightened and 42 percent of the landscape was impervious surface—paved or built or covered over. Is it any wonder that rain water has nowhere to go, that basements and yards flood, that roads serve as temporary detention basins?

Read my accounts of the September 2008 storm at debrashore.org/pdf/shore2008report.pdf

The 2004 legislation directed the MWRD to create a stormwater management plan, prepare Detailed Watershed Plans (DWP) for six major watersheds in Cook County, and adopt regulations to reduce flooding and protect water quality in the county. The Cook County Stormwater Management Plan was adopted in early 2007, and the District is now focused on completing the detailed watershed plans and drafting comprehensive regulations for stormwater management.

Stormwater Management in an Urban Land

The District has been working largely through six Watershed Planning Councils: Lower Des Plaines, Poplar Creek, Upper Salt Creek, Little Calumet River, Cal-Sag Channel, and the North Branch of the Chicago River. With the help of local officials, a Technical Advisory Committee and a Public and Private Organization Advisory Committee, the District has drafted a Watershed Management Ordinance for Cook County, and plans to have all of the DWPs completed by the end of the year.

Each of the six DWPs contains extensive hydrological and hydraulic modeling of the watershed, identifies local and regional flooding problems, examines the condition of streams and tributaries, and sets priorities for future capital projects to reduce flooding and protect water quality. Three of these detailed plans have been completed and the rest are due to be finished by the end of 2010.

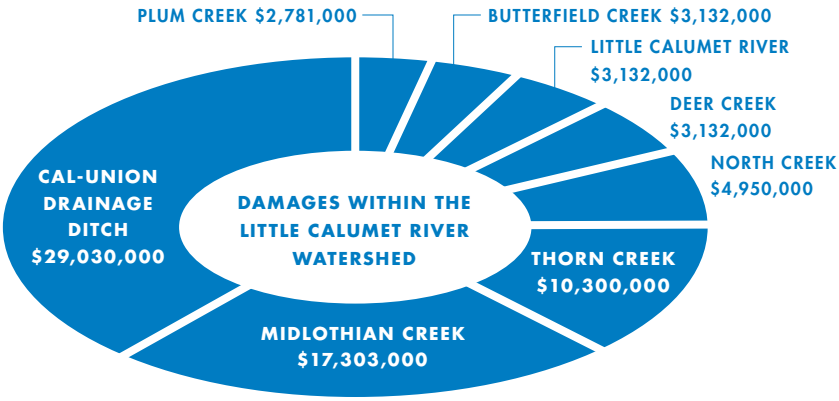
View the completed watershed plans at debrashore.org/watershedplan

The DWPs also include new inundation maps that show areas predicted to flood under certain storm conditions. In some cases, these maps show flood dangers in areas not considered to be at risk in the Flood Insurance Rate Maps currently in use. In other instances, these inundation maps show a reduction in flood-prone areas, in part due to the construction of reservoirs and other efforts to mitigate and reduce flooding.

In September, the District released a draft Watershed Management Ordinance (WMO) for a 90-day public review and comment period. A set of rules that will apply to certain new development and re-development projects in suburban Cook County, the WMO is intended to provide uniform minimum stormwater standards from a regional standpoint without interfering with municipalities who desire to regulate local issues to a greater extent. It will require developers to receive a permit from the MWRD before beginning construction. To obtain that permit, developers must show that new development on parcels of a certain size will handle rainwater in a responsible way, mitigating flooding impacts and protecting nearby streams and wetlands.

To review the ordinance and Technical Guidance Manual, visit debrashore.org/technicalguidancemanual

These proposed regulations cannot correct mistakes of the past, alas, or address flooding caused by poorly planned development years ago. Changes need to be made moving forward to prevent flood damage in the future. The pie chart below illustrates damages from flooding to be expected over the next 50 years in the Little Calumet River watershed if existing conditions are not mitigated.



A sound set of regulations will help us move into the future in a way that is reasonable, responsible, and good for both people and nature.

As chair of the MWRD's Stormwater Committee, in November and December I presided over a series of five public hearings to invite public comments on the proposed ordinance. In addition, the Board of Commissioners met with a large group of mayors to listen to their concerns, principally that the proposed detention requirements would stifle development in their communities. At their request, the MWRD Board has agreed to commission an economic impact analysis to assess the costs and benefits of some of the provisions of the ordinance. As we begin 2010, MWRD staff are reviewing the numerous public comments and will ultimately release a revised ordinance to be submitted to the Board of Commissioners for approval. My sincere hope is that we can pass a strong ordinance in 2010. Stay tuned.

The Audacity of Slope

BUBBLY CREEK, WITH ROOSTER STANDING ON CRUSTED SEWAGE, 1911
COURTESY OF CHICAGO HISTORY MUSEUM (DN-0056899); PHOTOGRAPHER CHICAGO DAILY NEWS

Reversing a River

When the Illinois & Michigan Canal was completed in 1848, it became the first direct link between the Mississippi River and the Great Lakes. By promoting trade and the passage of goods between the Midwest and the East, the canal—and the arrival of railroads in 1848—led to Chicago's explosive growth as a transit hub. As Chicago grew in the mid-19th century, people dumped all manner of human, animal, and industrial waste directly into the Chicago River, which flowed in marshy, sluggish fashion into Lake Michigan, the source of the city's drinking water. Storms would swirl contaminated filth out toward the water intake pipes. Episodes of cholera, typhoid, and other water-borne diseases afflicted the populace. It was an untenable and unsanitary situation.

Hence Chicago's Common Council established a Commission on Drainage and Water Supply in 1886 to find a solution to the problem of Chicago's contaminated water. The Council proposed three possible solutions, the cheapest (at $28 million) and most practicable being to dig a new canal connecting the South Branch of the Chicago River to the Des Plaines River and to use water from Lake Michigan to flush Chicago's sewage downstream.* The solution to pollution was dilution! Thus was formed the Chicago Sanitary District in 1889 with the mission to protect the drinking water supply for the burgeoning city.

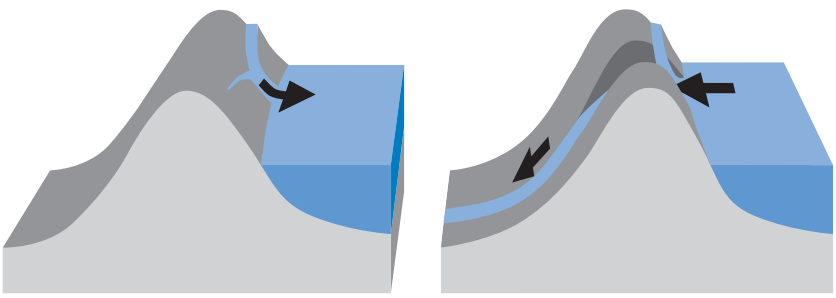
* Historical information from *"So They Reversed The River," A History of the Construction of the Main Channel and Improvements to the Chicago and Des Plaines Rivers from 1892 to 1900 for the Reversal of the Chicago River.* Paper by Richard Lanyon, Evanston, IL, 1999.

Remember, in the late 1880s, we had no Environmental Protection Agency. No one knew about watersheds or ecosystems. Ecology was a nascent discipline. With enough money and enough will, human agency could solve any problem. Thus, 120 years ago, in part because it was the cheapest alternative, we reversed a river and saved a city. The audacity of slope!

The Chicago Sanitary and Ship Canal (CSSC)—a 28-mile engineering marvel—became a wide, new water highway to convey sewage downstream and provide a route for commercial navigation between the Mississippi River system and the Great Lakes. No more would Chicago's sewage flow into the lake. The drinking water was safe.

The completion of the eight-mile North Shore Channel in 1910 diverted wastes from the northern suburbs into the North Branch of the Chicago River, again using water from Lake Michigan to flush sewage downstream. And in 1922, the 16-mile Cal-Sag Channel was constructed between Blue Island and Sag Bridge to link the Little Calumet River to the Sanitary and Ship Canal. This 78-mile network of canals and rivers is now referred to as the Chicago Area Waterways System, or CAWS.

Today we no longer discharge raw sewage into our rivers (except during storm events that cause overflows in our older communities, when stormwater mixed with highly-diluted waste water exceeds our sewer capacity and flows directly into our waterways through any of 406 outfalls along the CAWS. During 2009, overflows occurred on 76 days). Instead, beginning in the late 1920s, the Chicago Sanitary District built sewage treatment plants around Cook County. Today, the District's seven plants treat an average daily flow of 1.4 billion gallons. Still, the treated wastewater—called effluent—is discharged into the CAWS and constitutes 70 percent of the flow in these waterways, which ultimately join the Mississippi and terminate in the Gulf of Mexico.



BEFORE CANAL EXCAVATION **AFTER CANAL EXCAVATION**

COURTESY OF METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

Advance of the Asian Carp

Why the history lesson? To paraphrase Eric Sevareid, all problems started out as solutions. The grand solution to the problem of Chicago's contaminated drinking water was to dig a canal and reverse the river. It worked!—and Chicago became a great metropolis. But that solution has created other vexing problems.

By breaking through the continental divide, the Sanitary & Ship Canal created a passageway for invasive species to move between the Lake Michigan and Mississippi River watersheds that did not exist in nature. One result is that we are now spending millions of dollars to try to prevent invasive species, especially Asian carp, from traveling up the Mississippi and Illinois Rivers and entering the Great Lakes, where it is feared they will decimate the sport and commercial fisheries, valued at approximately $7 billion annually. These carp—bighead and silver carp are together known as Asian carp—are considered a menace because they can grow as big as 100 pounds and can consume 20 percent of their weight in plankton each day, thus outcompeting other fish species for their basic food source. In some reaches of the Missouri and Illinois Rivers, Asian carp have established enormous populations and dramatically altered the river ecosystem. They've knocked other fish out of contention in the battle for habitat and survival and knocked boaters off their feet.

▶ Watch video of silver carp jumping at debrashore.org/carpjumping or debrashore.org/carpjumping2

The Army Corps of Engineers, which controls and operates the locks along the CAWS, including one where the Chicago River meets Lake Michigan and the O'Brien Lock where the Little Calumet River connects to the lake, has been working with numerous state and federal agencies to address the looming threat of Asian carp. Several years ago, the Corps constructed a barrier in the Sanitary & Ship Canal near Romeoville that uses an electric current to prevent fish from proceeding upstream. (Fish find the current unpleasant and swim away; testing by the Coast Guard has determined what levels are safe for commercial boat and barge traffic to pass.) A second, more powerful electric barrier was put into service in 2009, and a third and final barrier is currently due to be completed and put into operation in the fall of 2010.

▶ To learn more about the barriers, visit debrashore.org/fishbarriers

The carp crisis jumped into the headlines in November when a new scientific test of water samples in the CAWS showed that carp had likely moved past the electric barrier.

Read about the crisis at debrashore.org/asiancarp

ASIAN CARP JUMPING OUT OF THE RIVER
COURTESY OF ILLINOIS RIVER BIOLOGICAL STATION, HAVANA, ILLINOIS
PHOTO NERISSA MICHAELS

This new test for environmental DNA (eDNA) was developed by Professor David Lodge, director of the Center for Aquatic Conservation at the University of Notre Dame. By subjecting water samples to DNA analysis, Lodge and his team were able to detect bits of tissue from silver and bighead carp. In part because DNA matter deteriorates rapidly, Lodge asserts that the positive eDNA findings indicate that actual live carp have been in the CAWS upstream from the barrier. (An independent audit of the eDNA tests and methodology by the EPA confirmed their validity.)

All Hands on Deck

All of a sudden, a raft of state and federal agencies moved to deploy a Rapid Response Plan that led to the closure of the canal for a week and the application of a fish poison—Rotenone—along six miles of the CSSC in December. Though thousands of fish were killed, only a single silver carp was found six miles downstream from the barrier. (Some of the carp, however, may have sunk to the bottom of the channel, so we don't know if others were present in that stretch.)

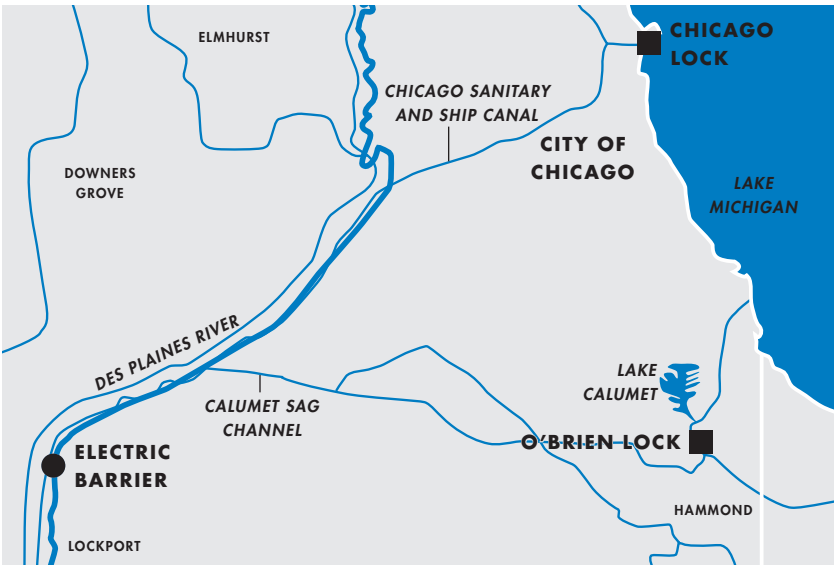
Then, in late December, Michigan Attorney General Mike Cox filed suit in the U.S. Supreme Court seeking a temporary injunction to compel the Corps to close the locks on the Chicago River and connecting channels, operate electric barriers in the canal at full strength, and monitor for Asian carp and eradicate any carp found. Other Great Lakes states jumped on board, while the state of Illinois, the MWRD and the U.S. Solicitor General filed briefs opposing Michigan's suit.

Read about the filings at debrashore.org/filings

In the meantime there have been a series of hearings hosted by the EPA, a high-level White House summit, and a rush of money from the Great Lakes Restoration Initiative to support research and control efforts. The Asian Carp Regional Coordinating Committee—a mouthful!—issued an Asian Carp Control Strategy Framework.

Read the framework at debrashore.org/carpcontrolstrategy

Representatives of some conservation groups, such as Tom Cmar of the Natural Resources Defense Council, promptly charged that the framework "does not include a clear plan that will actually work." On the other hand, representatives of the commercial barge industry and operators of tour boats along the Chicago River and Lake Michigan shoreline expressed their outrage and dismay at the potential closure of the locks, attesting significant and perhaps terminal harm to their business interests. Some called for increasing commercial harvest of carp to reduce propagule pressure at the barriers; others asserted that carp are already in the Great Lakes since several individual fish have been caught in Lake Erie near Toronto over the years. "Kill 'em, just poison them all," said one man at an EPA hearing. It's clear this is a highly contentious issue.



What's To Be Done?

Current activities include improving the barrier operations, expanding eDNA sampling, and intensive electrofishing and netting efforts to verify positive eDNA results and remove any carp. Beyond that, the Corps is considering intermittent closure of the locks and other modifications to lock operations, while some are advocating moving towards a complete and permanent ecological separation of the two watersheds. This step would be drastic and require major infrastructure modifications, visionary leadership, and even cultural changes. It wouldn't be easy, but all the eight Great Lakes states and two Canadian provinces have supported this path. And it may be the only way to end the ecologically catastrophic transfer of aquatic invasive species between the Great Lakes and the Mississippi watersheds.

A witty guru once said that "all important decisions must be made on the basis of insufficient data." * Cue the music. Asian carp are swimming upstream and we are in a race against time. Vital questions remain: can these carp establish sustaining populations in a lake ecosystem? Are there sufficient food sources for them to thrive? Can we find chemical or biological techniques to stop their advance? Yet, lacking sufficient data, we will still be required to make decisions that have far-reaching consequences and will cause significant disruptions—for us and for ecosystems, just as our ancestors did more than a century ago.

* No. 33 in Sheldon Kopp's Eschatological Laundry List, webdata2.soc.hawaii.edu/illumlife/abelist.htm

Drainage Districts

Relics from our Agrarian Past?

Living in a wet land has always been problematic. In order to convert soggy, swampy areas into highly productive cropland, farmers had to install drains in their fields. However, drains don't work if they dead-end at property boundaries—they have to have outlets, and so they often must cross several different properties. This led to the establishment of drainage districts in 1879.

Drainage districts, as government entities, could levy assessments on properties within their boundaries in order to construct and maintain drains, ditches, tiles, and levees, and thus provided a means by which a majority of landowners interested in draining their properties could force reluctant neighbors to cooperate with the financing and construction of drainage infrastructure. They proved so popular that by 1937, more than 1,500 drainage districts had been established in Illinois, 40 of them wholly or partially in Cook County. The farms that define so much of Illinois today represent a profound change to the state's hydrology and ecology, one made possible, to a large extent, by drainage districts.

Given the enormity of the changes that have occurred—to science and policy as well as to our state—over the last 130 years, perhaps we might reconsider whether drainage districts are adequate to the task of watershed management in the 21st century and in an urbanized area? Many of the state's drainage districts still perform important maintenance work. In general, however, drainage districts have assumed a much smaller role than they once had. No districts have been formed since 1937, and almost half of those districts that remain are now inactive. Drainage districts typically cover very small segments of individual waterways; they reflect the wisdom and priorities of the age of their invention. While the very local design of drainage districts was suitable for increasing property values and available cropland, it has several critical drawbacks.

First, their small size limits the size of their assessment, which in turn limits the amount they can invest in new infrastructure. Where districts have remained primarily agricultural, they have mostly managed to keep up. But the rapid urbanization that has occurred across much of the state, and especially in Cook County, has led to dramatic increases in impervious surface area and, consequently, stormwater runoff. This can overwhelm drainage structures designed for agricultural areas. Moreover, flooding that wouldn't damage cropland can be devastating to residential and industrial properties in a very short period of time.

DRAIN THE WET LAND
(INTERNATIONAL HARVESTER, 1921)

Second, ecology has taught us that everything is connected. It seems obvious to us now, but drainage districts were not designed to deal with the fact that stormwater upstream or uphill eventually becomes a problem for communities downstream. Drainage districts only have authority within their narrow corporate boundaries, even though development and management decisions in one place can affect entire watersheds. Consequently, environmental problems are often better tackled on larger regional scales. Indeed this is the principal reason that the MWRD is now advancing a Watershed Management Ordinance for suburban Cook County, to address stormwater issues on a watershed level.

In 2008, a number of residents of the Cal-Union Drainage District (CUDD), which includes portions of Markham, Harvey, Dolton, and South Holland, petitioned the MWRD to dissolve the drainage district. They contended that the sections of the ditch had widened dramatically and erosion was threatening several structures. The flow of water from upstream development had outstripped CUDD's ability to manage flooding. MWRD held a public meeting in Markham in October 2009 to listen to residents' concerns and our board has directed staff to undertake a thorough study. Could northern Illinois get by with one less unit of government? Can we bid farewell to this relic of our agrarian past in our urban-suburban matrix?

New Role: Board Chair of the Great Lakes Protection Fund

"Congratulations, you're the chair!" The e-mail arrived two days before a scheduled board meeting and only three months after Illinois Governor Pat Quinn appointed me to the Board of the Great Lakes Protection Fund. The universe serves up challenges and opportunities—suddenly I had a full platter!

GREAT LAKES
PROVIDED BY THE SEAWIFS PROJECT, NASA/GODDARD SPACE FLIGHT CENTER, AND ORBIMAGE

The Fund is a permanent environmental endowment formed in 1989 by the Governors of the Great Lakes states with a goal of supporting collaborative actions to improve the health of the Great Lakes ecosystem. Seven of the eight Great Lakes states (Indiana has not participated) contributed a total of $81 million to establish the Fund. The governors of those seven states each appoint two representatives to the Board of Directors and the chairmanship rotates annually—and alphabetically—among the states. Since 1989, the Fund has made 228 grants and program-related investments representing more than $57.4 million in regional projects to improve the health of the Great Lakes ecosystem.

Sustainability

In 2009, the District analyzed its fleet operations with an eye on reducing the number of vehicles the District leases and operates. In addition, staff prepared an analysis of greenhouse gas emissions and a number of projects are underway to capture methane produced by treatment plant operations, to assess and reduce energy use, to use less paper, and to examine the potential for reuse of wastewater effluent.

Out & About

Throughout the year I spoke with numerous civic and community groups from Western Springs to Wilmette and made presentations to classes at Northwestern University, Elmhurst College, the University of Chicago, and the Illinois Institute of Technology. Highlights from 2009 include:

March Hosted a Town Hall meeting on water issues in Des Plaines that drew close to 100 people.

May Major address delivered to the annual outreach luncheon of the Field Museum's Women's Board.

July Moderated a panel discussion at the Field Museum called "It All Flows Downstream: Following Our Oil and Water Footprints" with Clare Butterfield, Director, Faith in Place, and Marty Melosi, Distinguished University Professor of History and Director of the Center for Public History, University of Houston.

August Climbed to 13,350 feet on Wilson Peak in the Lizard Head Wilderness of Colorado.

November The Chicago Council on Science and Technology invited me to speak about "Water: The New Oil?"

December Moderated a plenary session on "Greening the Economy" at the annual conference in San Francisco of the Gay & Lesbian Leadership Institute.

CLIMBING WILSON PEAK

Disposal of Unused or Expired Pharmaceuticals

In July 2008, the MWRD Board authorized the UIC School of Pharmacy and Survey Research Center to survey at least 500 Cook County residents about their habits, attitudes, and beliefs regarding the disposal of unused medicines. We hope to have a report on that study very soon. In the meantime, the District has posted information on its web site about safe disposal locations.

To find a local disposal location, visit debrashore.org/pharmaceuticaldisposal

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2009 Annual Report

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