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Our Water, Our Future:

Policy Options to Safeguard Water Resources in New Mexico

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Policy Options to Safeguard Water Resources in New Mexico

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Introduction

Water is our most precious natural resource. Humans, plants, and animals all need it for survival. However, unplanned and unsustainable development, drought, pollution and lack of conservation and efficiency, has left our water future uncertain.

Water scarcity and contamination is a world-wide issue and will affect an increasing number of people as the world population grows from the current 6 billion to 9 billion by mid-century. United Nations studies indicate that 2.7 billion people will face severe water shortages by 2025 if consumption continues at current rates.[1]

New Mexico's water future faces similar constraints. Our population is projected to increase by 15.4 percent between 2000 and 2030.[2] Between 2004 and 2005 alone, New Mexico's population grew by 1.3 percent. Throughout the Southwest, tremendous growth is happening, as people are drawn to the region for its beauty, open space, economic opportunity and culture. The percentage of the U.S. population living in our Western states increased from 13.3 percent to 22.5 percent between 1950 and 2000.[3]

This rapid growth has consequences for New Mexico's limited water supply. Water policy has simply not kept up with modern needs, nor have we done enough to ensure that existing supplies are used to their maximum benefit.

Unfortunately, these problems have led some of New Mexico's elected officials to call for new, massive water reclamation projects. However, these projects are neither a good use of taxpayer money nor a reasonable and cost-effective way to secure New Mexico's water future. Instead, we must learn to use existing water more efficiently and sustainably. We must:

Conserve Our Water Resources- We must balance our water use with a renewable supply by focusing growth where there is a sustainable amount of water and by planning for future use.

Preserve Our Natural Environment- We must keep enough water in our rivers and streams to support recreation and wildlife—integral parts of New Mexico's natural heritage and quality of life.

Maintain a Local Supply of Water- We must use local ground water supplies in a sustainable manner to protect the environment and local economies.

Use Our Water Efficiently- We must ensure that all sectors of our economy use water wisely, by adopting state-wide water efficiency standards.

Maintain Water Quality- We must reduce and prevent water pollution as a key strategy for addressing the scarcity of this resource.

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[1] Fen Montaigne, "Water Pressure," *National Geographic*, September 2002.
[2] U.S. Census Bureau, "Interim Projections: Ranking of Census 2000 and Projected 2030 State Population and Change: 2000 and 2030," July 2006.
[3] Western Governor's Association, "Water Needs and Strategies for a Sustainable Future," June 2006.

Within this context, the following report will explore the problem of water scarcity in New Mexico.

First, this report looks at the current state of New Mexico's water supply—its origin and sources, its uses, the demands placed on it and current water law. Second, the root causes of New Mexico's water problems will be discussed, particularly as they relate to a failure to conserve, over-pumping and excessive river water withdrawal, inefficiencies and pollution. Third, this report lays out a vision for water use in the state that incorporates conservation, preservation, efficiency and maintaining clean, local supplies of water. We conclude by identifying more than 30 policy options designed at achieving sustainable water practices in the state.

The Current State of New Mexico's Water Supply

New Mexico is a desert state where water is a precious commodity. Agriculture, industry and commerce, ecosystems and residents of all communities—urban, rural and traditional—compete against each other for limited water supplies necessary to survive and grow. Unfortunately, a failure to conserve these supplies, pollution, population growth, and irresponsible development are putting our water future in jeopardy.

Because of its beauty, culture, and opportunity, people from across the nation are moving to New Mexico. However, exploding development in areas where there are few protections and little water threatens to overwhelm New Mexico's limited water resources. Water shortages are compounded by drought, uncertainty and New Mexico's legal obligations to provide water to other states under interstate stream compacts.

The Southwest's water scarcity problem is likely to get much worse. According to the U.S. Geological Survey, the Colorado River basin is now in the midst of perhaps the worst drought in 500 years. These dry conditions will continue into the foreseeable future. Compounding these limitations on water supply is global warming and a relentless increase in demand, as the region's booming economy fuels unprecedented population growth.

At the heart of New Mexico's water scarcity problems are weak state laws that fuel unplanned development and offer little help to deal with its consequences. Currently, developers can build homes even in areas of Albuquerque and Santa Fe where aquifers are already critically depleted or the water supply is not certain.

This path toward crisis is not inevitable. Rather, it is the product of unwise patterns and policies regarding water use in our state including lack of conservation; over-pumping and excessive river water withdrawal; inter-basin and large volume intra-basin transfers that threaten our environment and economy; inefficient water use in industry, agriculture, and development; and pollution.

With a growing population and a strained water supply, New Mexico decision-makers need to act now to make sure that New Mexicans have enough water to meet our needs—now and in the future. Without swift and significant actions at the state and local levels, the crisis will only get worse.

An Overview

New Mexico receives its water supply chiefly from two sources: surface water and ground water. These sources are hydrologically connected, such that over-use or contamination of one source impacts the other. About half of New Mexico's water comes from ground water, like underground aquifers, while the other half comes from surface water, like that found in streams and rivers. However, according to the New Mexico Environment Department, about 90 percent of New Mexicans rely on ground water for their drinking

water. No other western state—and only three other states in the country—get this much of their drinking water from ground water sources.[4]

As demand for both ground water and surface water increases, our supply grows more precarious. Yearly depletions of ground water have increased from about 1 million acre feet (an acre foot is the equivalent to about 326,000 gallons) in 1965 to 1.4 million acre feet in 1990. Although it is estimated that about 20 billion acre feet of water exists in ground water deposits in New Mexico, only about one quarter of that is considered drinkable and most of the rest is not readily accessible or cost-effective to recover.[5]

New Mexico's major aquifers include the valley-fill aquifers occurring along the Rio Grande, the Rio Chama, the San Juan and the Pecos rivers. Other aquifers that supply New Mexico with drinking and irrigation water are the Roswell Basin aquifer system, the Pecos River Basin, the Mesilla Bolson, the Ogallala aquifer and the Mimbres basin.[6] Some of these aquifers are in serious decline, including parts of the Ogallala aquifer, which spans eight states, and the Albuquerque aquifer. In some parts of Albuquerque, the water table has declined by as much as 150 feet.[7]

New Mexico has 110,741 total miles of rivers, streams, ditches and canals, with a total annual average stream flow of over 5.7 million acre feet[8], all of which is currently appropriated. Compounding this, overuse of ground water supplies decreases available surface water, such that senior water rights users and downstream users are often short-changed in their deliveries. The result, according to the Office of the State Engineer and the Interstate Stream Commission, is that in many areas total water use exceeds the amount legally available.[9]

In 1990, total water withdrawals—both surface and ground water—totaled 4.2 million acre feet, with total consumption or depletions at about 2.6 million acre feet. Of this, agriculture accounted for nearly 2 million acre feet of depletions and public and private wells accounted for .3 million acre feet. Nearly 90 percent of these withdrawals came from ground water sources.[10]

While our water supply grows more strained, demand is expected to increase. Already, public ground water use is up from 241 mega-gallons per day in 1990 to 277 mega-gallons per day in 2001. Conservation measures are helping some in parts of the state, however. For example, Albuquerque's per capita useage is down to 204 gallons per day from 250

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[4] Aletta Belin, Consuelo Bokum, and Frank Titus, "Taking Charge of Our Water Destiny: A Water Management Policy Guide for New Mexico in the 21st Century," 2002.
[5] Ibid.
[6] Yongmei Li, Stephen Arnold, Charles Kozel and Sue Forster-Cox, "Water Availability and Usage on the New Mexico/Mexico Border," *Journal of Environmental Health*, Vol. 68, No. 3, October 2005.
[7] Aletta Belin, Consuelo Bokum, and Frank Titus, "Taking Charge of Our Water Destiny: A Water Management Policy Guide for New Mexico in the 21st Century," 2002.
[8] Yongmei Li, Stephen Arnold, Charles Kozel and Sue Forster-Cox, "Water Availability and Usage on the New Mexico/Mexico Border," *Journal of Environmental Health*, Vol. 68, No. 3, October 2005.
[9] New Mexico Office of the State Engineer and the Interstate Stream Commission, *2003 New Mexico State Water Plan, Appendix A: Water Resources Issues*, 9 January 2004.
[10] Yongmei Li, Stephen Arnold, Charles Kozel and Sue Forster-Cox, "Water Availability and Usage on the New Mexico/Mexico Border," *Journal of Environmental Health*, Vol. 68, No. 3, October 2005.

gallons per day.[11] But, more needs done. Some water quantity too is lost to pollution. Therefore, measures to promote good water quality have the effect of safeguarding our limited supply of water.

Further Supply Limitations: Drought and Global Warming

In addition to a growing population and already stressed water supplies, prolonged drought in conjunction with global warming are contributing to reduced snowpack, increased temperatures, and earlier mountain snow thaws which further reduce available water supplies in the state.

The western U.S. has experienced moderate to severe drought conditions for the last decade, and evidence shows drought conditions could continue for as long as 20 to 30 years. Five consecutive years of drought on the Colorado River system have left that storage system at 53 percent of capacity, down from 59 percent last year. According to U.S. Bureau of Reclamation officials, 2004 marks the first time since the reservoirs were initially filled that the combined average capacity of the two larger reservoirs, Lake Mead and Lake Powell, is only at 50 percent of normal. As of the end of April 2004, Lake Mead had dropped 80 feet and Lake Powell was down 120 feet compared to four years prior. Only the much larger size of these reservoirs has allowed downstream users to continue to draw water at normal levels. Some users have in fact taken more than normal quantities to make up for lower in-state runoff.[12]

In addition, the Rio Grande—which provides water to Colorado, New Mexico, Texas and Mexico—one of the most water-short river basins in the country, had flows in New Mexico that fell to only 13 percent of normal in 2002.[13] In fact, by the time the Rio Grande reaches the gulf all that is left is a mere trickle, compared to 1962 average flows of over 2 million acre feet per year.[14]

According to Climate Assessment for the Southwest (CLIMAS) at the University of Arizona, 1999-2003 was one of the driest five-year periods of winter precipitation in the climate record. And most recently, a 2005 study conducted by the Rocky Mountain Climate Organization (RMCO) analyzed government temperature and snowpack records and found that since 1990, 11 of the last 16 years in the Colorado River basin and 10 of the past 16 years in the Rio Grande River basin have had below-average snowpack levels.[15]

Although this past August has been unusually wet, New Mexico's drought problems are not solved. Instead, it is completely plausible that current dry conditions will remain in New Mexico for the foreseeable future, particularly when the effects of global warming are taken into account. Any realistic view of New Mexico's water future must encompass the twin strains of diminished supply and heightened demand.

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[11] Yongmei Li, Stephen Arnold, Charles Kozel and Sue Forster-Cox, "Water Availability and Usage on the New Mexico/Mexico Border," *Journal of Environmental Health*, Vol. 68, No. 3, October 2005.
[12] City of Phoenix, "Drought in Perspective," http://phoenix.gov/WATER/drpers04.html, 7 March 2006.
[13] Rocky Mountain Climate Organization, "Less Snow, Less Water: Climate Disruption in the West," 2005.
[14] Yongmei Li, Stephen Arnold, Charles Kozel and Sue Forster-Cox, "Water Availability and Usage on the New Mexico/Mexico Border," *Journal of Environmental Health*, Vol. 68, No. 3, October 2005.
[15] Rocky Mountain Climate Organization, "Less Snow, Less Water: Climate Disruption in the West," 2005.

Water Uses

All living plants and animals need water for survival. Human water use can be divided into three main categories: agricultural, municipal, and industrial. Additionally, substantial water is lost through evaporation.

According to the New Mexico Office of the State Engineer's 2004 estimate, 76 percent of water use in the state goes to irrigated agriculture. Of the remainder, nine percent is used for public supplies and domestic use; five percent is used for livestock, commercial, industrial, mining and power; and ten percent is lost to evaporation.

Other demands on New Mexico's water also comes from the state's federal obligation to provide water to rivers and other areas required for habitat by endangered or threatened species and to deliver water to Texas under interstate compact agreements.[16]

Current New Mexico Water Policy

New Mexico water law, under New Mexico Statute Chapter 72, is based on a prior appropriation system, whereby "senior" water users, or those with an earlier priority date, have the right to use water first before those with later priority dates, or "junior" users. This has become known as "first in time, first in right."[17] In New Mexico, senior water rights holders typically include agriculture, Tribes, Pueblos, irrigation districts, conservancy districts and acequias, or community ditch systems. Junior water rights holders are typically municipalities, industry, residents and recreational users.[18] Water rights can be bought, sold or lost if not used.

The Office of the State Engineer, appointed by the Governor and confirmed by the State Senate, has authority within the state to administer this program and is responsible for the "supervision, measurement, appropriation and distribution" of our state's water. Permits from the State Engineer are required to appropriate water, develop wells in declared basins, or to divert or store water, and all water must be put to "beneficial use," as determined by the State Engineer's office. Historically, beneficial use has included agriculture, commercial, domestic, industrial, and recreational uses.[19]

Prior appropriation is the foundation for New Mexico's water allocation system. However, as a result of many factors—including intensified ground water pumping and lack of enforcement—this system is broken, and New Mexico continues to deplete its water resources faster than they are replenished.[20]

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[16] New Mexico Office of the State Engineer and the Interstate Stream Commission, *New Mexico State Water Plan*, 23 December 2003.
[17] Aletta Belin, Consuelo Bokum and Frank Titus, "Taking Charge of Our Water Destiny: A Water Management Policy Guide for New Mexico in the 21st Century," 2002.
[18] New Mexico Office of the State Engineer, *Frequently Asked Questions*, 25 July 2006.
[19] The Bureau of Land Management, "Western States Water Laws- New Mexico: Water Rights Fact Sheet," *National Science and Technology Center*, http://www.blm.gov/nstc/WaterLaws/newmexico.html, 15 August 2001.
[20] Aletta Belin, Consuelo Bokum and Frank Titus, "Taking Charge of Our Water Destiny: A Water Management Policy Guide for New Mexico in the 21st Century," 2002.

As the population of New Mexico and the greater Southwest region grew, surface water became fully appropriated and disputes emerged between states to determine how much water each state was able to use from each surface water source. As a result, interstate stream compacts emerged, dividing up water rights and setting use limits. For example, the Rio Grande Compact, signed in 1938, limits New Mexico's Rio Grande water use north of Elephant Butte Reservoir to 393,000 acre feet in an average year.[21] In total, New Mexico's water use is guided by eight compacts: the Colorado River Compact, the Upper Colorado River Compact, the Rio Grande Compact, the Pecos River Compact, the Canadian Compact, the La Plata Compact, the Animas La Plata Project Compact and the Costilla Creek Compact.[22]

In time, however, people turned more and more to ground water to meet their water needs and New Mexico's ground water code was enacted in 1931. Reliance on ground water, both regulated and unregulated, has caused several problems. First, ground water aquifers and rivers and streams are hydrologically-connected, such that surface water rejuvenates ground water supplies through leaching, while ground water often flows into streams in the form of springs. So, pumping ground water reduces surface water supply. Second, ground water is being pumped out of the ground faster than it can be recharged, a problem which can lead to lowered water tables and land subsistence, in addition to reduced river and stream flow.[23]

Theoretically, a "fully appropriated" water system in New Mexico means that all surface water is appropriated. So, in dry years all junior water rights users may not be able to access water, if that water is required by senior water rights holders. However, full appropriation quickly becomes over-appropriation when junior users rely on ground water, which in some cases comes from unmetered and unregulated domestic wells. Drawing on this ground water means that less water flows at surface levels, and is therefore unavailable for senior water rights holders. Moreover, depletion of ground water and the long-term impacts are difficult to detect immediately, prevent or remedy once identified.[24]

This situation leaves the state in a difficult position. To date, only minimal steps have been taken by the Office of the State Engineer to address the problem of impairment of water rights to senior users, because, among other reasons, doing so would mean cutting off water to cities and New Mexico families. According to the Western Governor's Association, "As municipal and industrial water use increase relative to older agricultural uses, the demand becomes more inelastic. A farmer can forgo a crop year when water supplies are tight; a municipal water system cannot cut back or shut down without serious consequences to the community served."[25] As a result, residential needs continue to infringe on the water rights of agricultural users.

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[21] Aletta Belin, Consuelo Bokum and Frank Titus, "Taking Charge of Our Water Destiny: A Water Management Policy Guide for New Mexico in the 21st Century," 2002.
[22] New Mexico Office of the State Engineer and the Interstate Stream Commission, *New Mexico State Water Plan*, 23 December 2003.
[23] Aletta Belin, Consuelo Bokum and Frank Titus, "Taking Charge of Our Water Destiny: A Water Management Policy Guide for New Mexico in the 21st Century," 2002.
[24] Ibid.
[25] Western Governor's Association, *Water Needs and Strategies for a Sustainable Future*, June 2006.

Hence, water demand continues to increase, more water is withdrawn from the system than is being introduced and we continue to risk violating—and therefore incurring substantial expense—our interstate stream compacts that require us to deliver surface water to downstream users.[26]

We cannot continue to use our ground water unsustainably. We must adopt policies that balance our use with a renewable supply.

[26] Aletta Belin, Consuelo Bokum and Frank Titus, "Taking Charge of Our Water Destiny: A Water Management Policy Guide for New Mexico in the 21st Century," 2002.

The Root Causes of New Mexico's Water Problem

The state of New Mexico's water supply is precarious. The demands on our water supply are increasing while our ground water supplies are dwindling. The main problems associated with water in New Mexico are: (1) lack of conservation, over-pumping and excessive river water withdrawal; (2) the threats of inter-basin and large volume intra-basin transfers of water to our environment and economy; (3) inefficient water use in industry, agriculture, and development; and (4) pollution.

By addressing these problems now with sound policy, New Mexico can ensure that it will have enough water to prosper, now and in the future.

Lack of Conservation

Currently, thousands of homes are being planned across New Mexico in areas with inadequate water supplies. Already, approximately 266,000 private domestic wells are in existence[27] and nearly 6,000 wells are drilled every year in areas of the state that already have dangerously depleted water supplies. Such unsustainable development puts our entire water system at risk.

Moreover, an over-reliance on ground water, particularly in parts of New Mexico that are growing, leave citizens at risk for water shortage. For example, the Mesilla Bolson, which serves as the primary source for municipal and industrial water for the city of Las Cruces, has only enough water to supply the city for the next 20 years.[28] Overuse like this is causing the permanent depletion of our ground water.

When the amount of water we use each year exceeds the amount of water available to us, the results can be dire. In some parts of the state where aquifers are being depleted, the land is starting to sink, or "subside." In time, land subsistence leads to infrastructure failures—crumbling home foundations, burst pipes and cracked streets. In other cases, using more water than we get each year means that when drought hits, water will not be available to some users.

As New Mexico's population continues to grow, this problem will only get worse unless action is taken. New Mexico needs to do better to conserve its most precious natural resource—a clean, local water supply.

Damaging and Unsustainable Water Transfers

Human and environmental needs are best met when water is kept where nature put it – in its local area of origin. Although some intra-transfers of water will be necessary to sustain a growing population and economy, these transfers should be restricted to ensure that the

[27] Yongmei Li, Stephen Arnold, Charles Kozel and Sue Forster-Cox, "Water Availability and Usage on the New Mexico/Mexico Border," *Journal of Environmental Health*, Vol. 68, No. 3, October 2005.
[28] Ibid

agricultural community, the environment, public welfare and economic potential in the area of origin are protected.

Unfortunately, growing towns and cities are looking to fuel development through new inter-basin transfers. Inter-basin transfers, however, are damaging to the economy and environment of the area in which the water is taken. Economies suffer as the businesses and sources of revenue that relied on the water - directly like farmers or indirectly like businesses that rely on farmers – erode. The environment suffers because decreased river flows may diminish wildlife and vegetation, increasing salinity concentrations in the water.[29]

Intra-basin transfers are a mixed blessing. They can be harmful if they interrupt ecosystems and communities who currently use the water. Particularly harmful are situations where farmers permanently retire water rights, leading to the decay of rural communities and urban sprawl. However, these transfers can be helpful if they alleviate water scarcity through temporary leasing of agricultural water rights in dry years or when cities pay farmers to invest in agricultural efficiency.

New development needs a permanent and stable water supply to grow, but this must be balanced with intra-basin transfers that do not permanently retire water rights and are least damaging to the environment and communities. This, used in conjunction with conservation and efficiency, will help alleviate New Mexico's water shortages.

Inefficiencies

While New Mexico cities have made some strides in reducing water use inside the home, we are still squandering gallon after gallon on landscaping and lawn-watering practices. According to the Environmental Protection Agency (EPA), nationally about 37 percent of home water use is used outside and in dry Southwestern states this figure is even higher. Unfortunately, there is little regulation – or even effective pricing or incentives – aimed at reducing this outdoor water use. The problem is especially acute in desert communities, where residents use a significantly larger amount of water on their lawns and trees since little natural watering occurs through rainfall. Xeriscaping can reduce outdoor water use by 50 percent and installing low-flow toilets and showerheads can reduce resident indoor water use by 20 percent, with no change in lifestyle.[30]

Agriculture uses approximately 76 percent of water consumed each year in New Mexico. In Elephant Butte Irrigation District alone, there are approximately 75,000 acres of irrigated agricultural lands.[31] Crops most often are flood irrigated, which leads to high evaporation rates and the waste of water. Simple efficiency measures, like the use of plastic and organic mulch or drip irrigation are not as widespread as they could be.

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[29] Water Conservation, Reuse and Recycling, *Proceedings of an Iranian-American Workshop: National Research Council of the National Academies*, 2005.
[30] Aletta Belin, Consuelo Bokum and Frank Titus, "Taking Charge of Our Water Destiny: A Water Management Policy Guide for New Mexico in the 21st Century," 2002.
[31] Rhonda Skaggs and Zohrab Samani, "Farm Size, Irrigation Practices, and On-Farm Irrigation Efficiency in New Mexico's Elephant Butte Irrigation District," 2001.

Power plants also use significant volumes of water. For example, Peabody Energy estimates that a 300 megawatt conventional coal-fired power plant proposed for Milan, New Mexico would consume 750 acre feet of water per year. To put this in perspective, one acre foot could supply a family of four for one year. [32] Moreover, just since 1960, as demand for energy boomed, New Mexico has added 4,382 megawatts of new coal-burning power plant capacity.[33]

This waste continues even though plants can use dry cooling technology, which require significantly less water than a typical plant. For example, the Pacific Power and Light Company's Wyodak Generating Station in Wyoming was converted to dry cooling, and this technology reduced the station's water requirement by 3,700 gallons per minute.[34]

Pollution

In 1972, Congress passed the Clean Water Act with the interim goal of making all our waterways "fishable and swimmable" by 1983. Unfortunately, more than thirty years later, pollution remains a grave threat to our nation's waters.

Polluted water affects quantity because it removes needed water from an already stressed supply. Unfortunately, both surface and ground water are highly susceptible to pollution, and once contaminated, these water sources are difficult to treat. According to the New Mexico Environment Department (NMED), between 1920 and 1999, over 1,400 reports of water contamination have been identified, affecting nearly 200 public and 2,000 private wells.[35] Surface water is also affected by contamination, so much so that approximately 92 percent of New Mexico's rivers and streams are affected by nonpoint sources of pollution.[36]

Sources of ground water pollution in New Mexico are varied, but they include domestic, military, and industrial sources. The largest source of ground water pollution comes from septic tank and cesspool discharge. There are approximately 208,000 septic tank systems and cesspools in New Mexico, which produce 78 million gallons of wastewater each day. Other pollution comes from spills and leaks of fuel and hazardous materials; active and abandoned mines and mills; liquid waste seepage from pits and ponds; landfills and dumps; industrial, military, and laboratory waste that is improperly stored; fertilizer and pesticides; waste-injection wells and other sources.[37]

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[32] Western Resource Advocates, "The Last Straw: Water Use by Power Plants in the West," http://www.westernresourceadvocates.org/media/pdf/WaterBklet-Final.pdf, 2003.
[33] NMPIRG Education Fund, *The Carbon Boom: National and State Trends in Global Warming Pollution Since 1960*, June 2006.
[34] U.S. Environmental Protection Agency, "How to Conserve Water and Use It Effectively," http://www.epa.gov/OW/you/chap3.html, 8 March 2006.
[35] New Mexico Office of the State Engineer and the Interstate Stream Commission, *New Mexico State Water Plan*, 23 December 2003.
[36] Yongmei Li, Stephen Arnold, Charles Kozel and Sue Forster-Cox, "Water Availability and Usage on the New Mexico/Mexico Border," *Journal of Environmental Health*, Vol. 68, No. 3, October 2005.
[37] The New Mexico Environment Department Ground Water Quality Bureau, http://www.nmenv.state.nm.us/gwb/gwqbhome.html, 27 July 2006.

The result is a combination of artificially-introduced and naturally-occurring contaminants that make their way into New Mexico's ground and surface water supplies. Inorganic contaminants like nitrate, sulfate, chloride, iron and manganese, which occur naturally at small levels, result from sewage systems, mines and mills, landfills and other industrial sources. Mines, mills and metal industries can also cause water contamination by arsenic, admium, chromium, copper and other metal compounds. In areas near uranium mines and mills, above normal concentrations of uranium, radium and radon have been found. Oil spills lead to benzene and other petroleum hydrocarbon contamination, while pesticides and high explosives have also been detected in our ground water.[38]

High salinity is also a major problem in parts of New Mexico. The main sources of the salinity are: 1) agricultural runoff; 2) industrial practices that require "ultra pure water," such as semiconductor manufacturing, and release large volumes of saline water; 3) waste water treatment, in which one cycle of municipal use increases the salt content of water by 200 to 400 milligrams per liter; 4) household water softeners and 5) natural sources from rock and soil.[39] This pollution problem becomes a genuine water scarcity issue when salinity is above 500 parts per million (ppm) – the point at which water is neither potable nor usable for irrigating crops or landscaping.

New Water Extraction: The Wrong Way to Go

New Mexico Governor Bill Richardson has declared the 2007 legislative session the Year of Water. The administration's ideas on the table for the session include moving forward with the development of a pipeline from Ute Lake Resevoir to New Mexico's eastern counties[40] and exploring options for tapping into the Salt Basin, an aquifer south of Alamogordo[41]. Unfortunately, large water reclamation projects like these do not address the roots of New Mexico's water problem and are not a wise use of taxpayer money.

Instead, we must pursue a new vision for water use in New Mexico.

[38] The New Mexico Environment Department Ground Water Quality Bureau, http://www.nmenv.state.nm.us/gwb/gwqbhome.html, 27 July 2006.
[39] Water Resources Research Center, "Desalination: An Emerging Water Resource Issue?" *Arizona Water Resource,* Vol. 11, No. 4, http://www.ag.arizona.edu/AZWATER/awr/mayjune03/feature1.html, 2003.
[40] Staci Matlock, "Governor looks to tackle water problems in coming session," *Santa Fe New Mexican,* 16 August 2006.
[41] Tania Soussan, "Gov. Predicts 'Year of Water' for 2007," *The Albuquerque Journal*, 28 June 2006.

A Vision for Water Use in New Mexico

To ensure that water will be available for future generations of New Mexicans, we must act now to develop new water policies that incorporate a basic five-point water vision: (1) Conserving our water resources; (2) Preserving our natural environment; (3) Maintaining a local supply of water; (4) Using our water efficiently and (5) Maintaining water quality.

Conserving Our Water Resources

In order to conserve our water, we need to live within our means and balance our water use with a renewable supply. Given the precious and limited nature of our water supplies, we should be at least as careful managing our water budget as our fiscal budget. Instead of "deficit spending," we must balance our water budget by managing demand so that we don't use more water than is available to us in any given year. We can accomplish this by focusing growth where there is a sustainable, long-term supply of water and by monitoring our current use and planning for future use.

Preserving Our Natural Environment

We must keep enough water in our rivers, streams and lakes to support a full range of recreation and wildlife—integral parts of New Mexico's natural heritage and quality of life. Beyond their importance to wildlife, quality of life and their intrinsic value, aquatic and riparian ecyosystems provide many benefits to humans, including aquifer recharge, filtration of pollutants and temperature moderation. Beyond this, New Mexico's natural environment is important for the state's economic vitality, as tourists and newcomers are drawn to New Mexico for its wide open spaces, pristine environment and scenic rivers and wilderness.

Maintaining a Local Supply of Water

We must use local ground water supplies in a sustainable manner to protect the environment and local economies. When ground water is transferred from one part of the state to another, that water is no longer available to the communities and ecosystems where it originated. If it isn't available to the community, then farms, homes and businesses can't use it. Over time, these water losses can threaten a community's future.

Although some intra-transfers of water will be necessary to sustain a growing population and economy, these transfers should be restricted to ensure that the environment, public welfare and economic potential in the "area of origin" are protected. For that reason, New Mexico needs intra-transfer policies that encourage efficiency and temporary leasing, while preventing harm to ecosystems and communities.

Using Our Water Efficiently

We must ensure all sectors of our economy use water wisely, not wastefully, to obtain the most value from this precious resource. We should make the most of current water supplies before we start building dams and pipelines to develop new ones. In order to accomplish this, state-wide water efficiency standards should be set for urban, agricultural and industrial uses.

Maintaining Water Quality

We must reduce and prevent water pollution as a key strategy for addressing the scarcity of New Mexico's water supply. Water that is contaminated from agricultural runoff, military, nuclear or drilling and mining waste is no longer available for plant and animal communities to safely drink.

Policy Recommendations

We recommend the adoption of several policies to protect and maintain New Mexico's water resources.

Conserving Our Water Resources

In order to conserve our water we must balance our use with a renewable supply. Currently, our aquifers are being depleted and The Rio Grande does not reach the gulf. Water should be taken from rivers and pumped from underground sources only as fast as rainfall can replenish them. Policies should recognize that water is not an unlimited resource and should reflect the necessity of preserving water resources and the integrity of flowing rivers for future use. We can accomplish this by focusing growth where there is a sustainable, long-term amount of water and by monitoring and planning for our current and future use. We recommend the following policies:

1. Require developers to show that there is a 100-year renewable supply of local, clean water as a condition of permitting new industrial, commercial or residential development anywhere in the state. The Assured Supply program, already adopted in parts of Arizona as part of the historic 1980 Ground water Management Act, requires every developer to demonstrate an assured water supply that will be physically, legally, and continuously available for the next 100 years of new use before the developer can record plats or sell parcels. This solution would keep homes from being built with inadequate supplies of water and protect homebuyers. We can conserve our water supplies by ensuring that growth only occurs where there is sufficient water, but must accomplish this without drying up our rivers or relying on costly and damaging water reclamation projects. With this overarching policy, New Mexico can ensure that its continued growth occurs in balance with its finite water supplies.

2. Prohibit new wells or withdrawals where ground water levels are dropping or there is an inadequate supply. In order to conserve our ground water supplies, we must not remove more water from depleted areas or areas with minimal resources.

3. Measure and meter all water usage to have a better handle on balancing supply and demand of our water resources. In order for New Mexico to conserve water for its future, all water sources and demands must be known, and they must be monitored in order to accurately project future needs.

4. Implement balanced water budgets at the local, state and regional levels, in part, by facilitating communication between water management agencies. These budgets—linking land use and water planning—should be used to ensure that any new uses of water are compatible with a balanced water budget.

5. Adopt a certification process that prioritizes efficiency and conservation measures. In order to receive funding for a large water project, the Office of the State Engineer would first have to deem that the recipient has already taken all

reasonable and cost-effective water efficiency and conservation measures or these measures could not achieve similar gains as the project in question. The Office of the State Engineer would provide certification on a case by case basis for all new water project proposals. This approach finds support in a recent report from the Western Governor's Association,

> "Western states recognize the difficulty of constructing new large water projects. Instead, projects for the future are more likely to be more innovative, environmentally sensitive and smaller in scale. Further, before new water supply projects are built, opportunities to conserve water in ways that will stretch existing supplies will be fully examined, and to the extent practical, implemented."[42]

6. Provide incentives for the public to use community water systems, instead of private domestic wells, when possible. There are many advantages to community water and wastewater treatment systems since they are required to provide safe drinking water and require an adequate water right determination and permit, whereas domestic wells are not subject to thorough review. New developments should be required to use existing utilities, if available, rather than build new domestic wells.

Preserving Our Natural Environment

We must keep enough water in our rivers and streams to support recreation and wildlife—integral parts of New Mexico's natural heritage and quality of life. In order to preserve and protect our rivers for generations to come, we must control the amount of water removed from rivers and not draw water beyond what the river needs to remain healthy. We recommend the following policies:

1. Establish "sustainable yields" criteria, or the amount of water that can be drawn from a river or aquifer while leaving enough to sustain the river's environment, for the state's rivers and ground water basins, while protecting New Mexico's senior water rights holders. The Yakima River in Washington State provides an example of how this type of criteria can be used successfully to determine how much water can be removed while keeping the river healthy. The Yakima River Basin Water Enhancement Project legislation, developed by the Secretary of Interior's Yakima River Basin Conservation Advisory Group, ensured that minimum in-stream flows allowed for healthy river channel maintenance and river ecology.[43]

2. Prohibit additional ground water pumping that would, singularly or cumulatively, reduce a river's in-stream flow.

3. Establish strict criteria for inter-basin transfers that ensure they do not adversely affect the natural flow or habitat source of water.

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[42] Western Governor's Association, *Water Needs and Strategies for a Sustainable Future*, June 2006.

[43]American Rivers, "Water Scarcity – Instream Flow Toolkit", http://www.americanrivers.org/site/PageServer?pagename=AMR_content_fa87, 8 March 2006.

4. Within each local, state and regional balanced water budget, make sure that environmental needs are met, by including allocations to aquatic and riparian habitats, while simultaneously ensuring that senior water rights are not impaired.

5. Establish a permanent conservation pool of voluntarily-acquired water to meet the needs of New Mexico's rivers by providing adequate funding to the Strategic Water Reserve.

Maintaining a Local Supply of Water

We must use local ground water supplies in a sustainable manner to protect the environment and local economies. When ground water is transferred from one part of the state to another, that water is no longer available to the communities and ecosystems where it originated. We recommend the following policies:

1. Restrict harmful intra-basin transfers that remove large volumes of ground water and surface water from local ecosystems and aquifers and encourage beneficial transfers that are minimally harmful to the environment and communities. There should be a comprehensive impact statement performed before approving the transfer that takes into account not only the water needs of the environment, but also the economic and social interests of the area that would be losing water.

2. Establishing strict criteria for intra-basin transfers to ensure that they do not adversely affect the natural flow or habitat of the source water, that the receiving users are employing maximum efficiency and that the transfer infrastructure is fully paid for by the new users, not general taxpayers.

3. When water is transferred to a new use in a different area, a percentage of the water should be dedicated to meeting environmental needs in the area from which the water is being transferred.

4. Restrict all inter-basin transfers of water. Inter-basin transfers are inherently ecologically harmful; an adequate set of conditions that would be sufficient to minimize harm to existing communities and ecosystems has yet to be developed.

5. We must ensure that local communities have the right of first refusal over water transfers. Local governments or water trusts should have the option of purchasing or exercising options on water transfers before any water leaves their community. Additionally, public involvement surrounding larger water issues should also be expanded in order to ensure that the public is actively involved in the water budget development process, for example, at both the local and regional levels.

Using Our Water Efficiently

Municipal, agricultural and industrial water users should adopt aggressive water efficiency practices, both on large and small scales. Efficiency measures should focus on both

residential and non-residential users, utilize pricing mechanisms that reflect the true value of water and ensure the implementation of water-recycling technologies, as well as better designed communities. Effective water reduction techniques for residential users include both indoor and outdoor measures, like special shower heads and eco-friendly landscaping practices.

The need to conserve water in the home is critical, yet decisions by individual homeowners actually account for a small fraction of water use. Agriculture accounts for roughly 76 percent of water consumption, and agricultural practices need to be assessed in light of conservation needs. Growing water intensive crops in arid areas should be re-evaluated, as well as the government subsidies that make such practices possible. The use of inefficient irrigation mechanisms—ditches, large spray devices, flood irrigation—should be replaced with water saving techniques, when possible, like drip irrigation.

We must ensure all sectors of our economy use water wisely, not wastefully, to obtain the most value from this precious resource. In order to accomplish this, state-wide water efficiency standards—both restriction and incentive-based—should be set for urban, agriculture and energy sources, across the state. We recommend the following policies:

1. Establish mandatory minimum efficiency standards for all water uses. These standards will ensure that water is not wasted in any sector and that agricultural and industrial users of water will be held accountable for the amount of water they use. In addition, effective efficiency incentive programs should be created. There are already examples of this solution working at the local level. For example, the city of Tempe, Arizona has substantially decreased consumption of water and reduced wastewater discharges through its incentive program.[44] Water efficiency programs in Phoenix, Arizona have been estimated to save 40 million gallons per day.[45] Arizona has made these gains even while their population growth far exceeds that of New Mexico. Management plans should be implemented across New Mexico to establish strong state-wide efficiency standards.

2. Exemplary efficiency standards should be modeled by all branches of government in New Mexico who can "lead by example." Large lawns and wasteful water practices, for example, continue even in our state buildings.

3. Create and expand state-wide efficiency standards for new housing. One example is to require new developments to capture rainwater and gray water through gutters and piping from drains and washing machines for use in the home's irrigation. Many technologies are currently available to increase efficiency, including low-flow toilets (already required in new homes across the state), faucets, washing machines and showerheads.

[44]City of Tempe, AZ "Water Conservation", *Water Conservation Information*, http://www.tempe.gov/water/conserve.htm , 8 March 2006.
[45] Environmental Protection Agency, "Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Costs," http://www.epa.gov/owm/water-efficiency/utilityconservation.pdf, 2003.

4. Water pricing should take use into account and reward efficiency in all sectors and should be scaled by use within each sector. Pricing water at appropriate levels encourages efficiency. There are many examples of cities that have implemented water pricing structures to save water. One of the most effective has been the Irvine Ranch Water District's plan in California. Here, a tiered rate structure was implemented to reward water efficiency and identify areas where water is being wasted. In this structure, users' rates are adjusted to reflect estimated needs. When users waste water, they are given progressively expensive penalties, and they are rewarded for saving water. In the first year this program was implemented, water use declined by 19 percent. [46]

5. Establish water efficiency incentives for businesses. One good example is the Water Efficient Technologies (WET) program in Nevada which offers financial incentives to participating businesses who cut their water use by at least 500,000 gallons per year. Under the program, one laundry company alone has cut its water use by nearly 44 million gallons per year.[47]

6. Increase efficiency in agricultural and landscape irrigation by substantially converting to drip irrigation, instead of flood irrigation, when it is reasonably cost-effective to do so. According to the University of Arizona, subsurface drip irrigation provides the ultimate in water use efficiency for open-field agriculture, often resulting in water savings of 25-50 percent compared to flood irrigation. [48] Drip irrigation also leads to less salinity and pollutant runoff. Additionally farmers and irrigation districts should be given financial incentives to incorporate Best Management Practices and need to have access to low-cost investment funds to modernize their irrigation systems.

7. Adopt a moratorium on water-cooled power plants. New Mexico gets nearly 90 percent of its energy from coal-fired power plants, and nearly half of the energy produced in the state is exported to other states. Using New Mexico's water to provide energy to other states is a fundamentally inefficient use of our desert's scarce water resources.

8. Ensure that a significant portion of future energy needs will come from renewable energy, which will conserve the most water. Renewable technologies use less water and produce less pollution than fossil fuel generating plants. Adopting a renewable energy standard to increase electricity generation from clean and renewable sources to 30 percent by 2020 in New Mexico would conserve substantial water resources.

9. Assist local community water systems in maintaining and improve existing water supply infrastructure in order to minimize leakage.

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[46] Environmental Protection Agency, "Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Costs," http://www.epa.gov/owm/water-efficiency/utilityconservation.pdf, 2003.
[47] Henry Brean, "Incentive Program Helping to Save Water," *Las Vegas Review Journal*, 14 August 2006.
[48] University of Arizona, "Subsurface Drip Irrigation Demonstration and Research Project," *Department of Soil, Water, and Environmental Science*, http://ag.arizona.edu/crops/irrigation/azdrip/SDI.htm, 8 March 2006.

Maintaining Water Quality

Pollution is exacerbating our water quantity problems by rendering countless gallons beyond use. We must reduce and prevent water pollution as a key strategy for addressing the scarcity of this resource. We recommend the following policies:

1. Require all dischargers, including wastewater treatment plants and semiconductor manufacturers, to utilize the best available technology to minimize salinity output, as Clean Water Act permit holders are required to do.

2. Establish a permitting and monitoring process for the discharge of salinity into ground water. To protect surface water discharges, industrial dischargers of salinity, such as semiconductor manufacturers, should be required to reduce salinity as a condition of their National Pollutant Discharge Elimination System (NPDES) permits.

3. Provide adequate funds and support to build and maintain environmentally-sound wastewater treatment plants to produce useable water and remove pollutants like arsenic, nitrate and perchlorate from water supplies. The funding for this policy should come from a polluter pay provision that all dischargers pay requiring polluting industries to pay into a centralized fund for remediation of the environmental degradation that they collectively have created.

4. Curb agricultural runoff of pollutants by mandating use of Best Management Practices for application of fertilizer and insecticide, including nutrient management and reduced use of pesticides, and by requiring vegetative buffers between agricultural land and waterways.

5. Promoting the “Polluter Pays” principle by requiring polluting industries to pay into a centralized fund for remediation of the environmental degradation that they collectively have created, establishing mandatory minimum penalties for permit violators and requiring polluting industries to pay for testing and monitoring of drinking water supplies. Holding polluters accountable when they compromise New Mexico’s ground and surface water is a matter of justice and fairness.

6. Ensure that all unused or abandoned wells are adequately plugged and abandoned.

7. Since septic tanks are a primary source of water contamination in New Mexico, the state should work to ensure that mandatory maintenance standards are set for all septic systems. These standards should include yearly inspections of septic systems and regularly pumping. In addition, residents should be provided with incentives to use community water systems.

Conclusion

A clean, reliable supply of water is vital to the economy, ecology and quality of life in any state or nation. This is particularly true in the arid Southwest – a region blessed with beautiful rivers but also with vast desert landscapes. As such, New Mexico is faced with a variety of challenges and threats to its limited water supply that have potentially profound implications for the future of the state.

Luckily, there are policy solutions that the state can adopt that will help protect this most precious natural resource. If New Mexico wants water for future generations we need to manage our state's water more carefully and implement policy that will help to conserve water, maximize efficiency, protect our local communities and the wildness of our natural environment and protect our water from contamination. New Mexico has too long neglected adopting adequately protective water policies, as other western states have done, that will help the state balance current and future use with a renewable supply. It is time to move forward with a new vision for water use in the Land of Enchantment.