### AN AFFORDABLE & SECURE FUTURE WATER SUPPLY FOR THE CITY OF DEMING

A LOCAL WATER CONSERVATION AND EFFICIENCY ALTERNATIVE TO IMPORTING WATER FROM THE GILA RIVER







*Audubon New Mexico's* mission is to conserve and restore natural ecosystems, focusing on birds, other wildlife, and their habitats for the benefit of humanity and the earth's biological diversity.

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The lead authors of this report are Jorge Figueroa (WRA) and Beth Bardwell (Audubon New Mexico). Laura Belanger (WRA) is a section author. Drew Beckwith (WRA) is the review editor.

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Cover: Parched, March 29, 2017, West North West of the Florida Mountains.

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# **TABLE OF CONTENTS**

Fi	gures		4
Та	bles		5
Ac	ronyr	ns, Abbreviations, Definitions, and Units	6
Ex	ecutiv	ve Sumary	8
In	trodu	etion	11
1	A Lo	cal Water Conservation and Efficiency Alternative	15
	1.1	Population Drives New Demands	15
	1.2	The City of Deming's Projected Water Demand	15
	1.3	The City of Deming's Existing Water Supplies and Future Needs	16
	1.4	Water Supply Strategies of the Local Water Conservation	
		and Efficiency Alternative	16
2	Susta	ainable Management of the Mimbres Basin Aquifer	17
	2.1	Mimbres Basin Profile	17
	2.2	Trends in Groundwater Use and Storage	17
	2.3	Moving Forward—Using ASWA Funds to Address Priority	
		Groundwater Management Needs and Opportunities	18
3	Prior	ritizing Conservation to Meet Future Urban Water Demands	20
	3.1	Profile of the City of Deming Water Utility Service Area	20
	3.2	Basis for the Conservation Strategy	20
	3.3	Conservation is a Well-Proven, Reliable Option	21
	3.4	Conservation is Much Cheaper than Importing New Water Supplies	21
	3.5	The Conservation Strategy Outperforms New Importation Options	
		in All Major Categories	22
	3.6	Achieving the Conservation Strategy	22
	3.7	Recommendations	24
	3.8	Summary	24
4	Meet	ing Future Demands with Reuse	25
	4.1	AWSA Tier 2 Reuse Proposal	25
	4.2	Recommendations	26
	4.3	Summary	26
5	Plan	ned Ag-Urban Transfers	27
6	Dem	ing's Proposed Projects, Programs, and Policies	28
7	Reco	mmendations	29
Er	idnote	25	31

# **FIGURES**

#### FIGURE 1

FIGURE 1		FIGURE 9	
Water Conservation, Reuse, and Planned Ag-Urban Transfers		Irrigation Use in the Mimbres Basin Has Declined, but Deming's	
Significantly Exceed the Estimated Water Needs for Deming.	10	Municipal Pumping Has Remained Relatively Constant Since 1975.	22
FIGURE 2		FIGURE 10	
New Mexican Voters Clearly Oppose Importing Water from Rivers		Water Use in Deming Is Predominantly Residential, with Sizable	
in Unpopulated Areas to Urban Areas, in Favor of Alternatives.	14	Uses for Commercial, Industrial, and Irrigation Purposes.	25
FIGURE 3		FIGURE 11	
New Mexican Voters Believe Low Levels of Water in Rivers Are an		The Albuquerque Bernalillo County Water Utility Authority's Water	
Extremely/Very Serious Problem, Compared to Other Important		Conservation Program Has Achieved Tremendous Positive Impact.	27
Economic and Environmental Issues, 2013-2017.	14		
		FIGURE 12	
FIGURE 4		The Cost of Conservation Is Significantly Cheaper than New Water	
Water Demands for Deming Are Projected to Increase		Supply Options in Colorado.	28
by 900 AFY by 2060.	17		
		FIGURE 13	
FIGURE 5		Deming's Water Loss Rates Show a Worrisome Trend.	31
Deming Clearly Can Meet Its Future Water Needs			
by Implementing Conservation Strategies.	18	FIGURE 14	
		The Future Water Needs of Deming Are Dramatically Decreased with	
FIGURE 6		Conservation, Enabling Future Needs to Be Met with Existing Supplies.	33
Map of the Mimbres Basin in Southwestern New Mexico.	19		
		FIGURE 15	
FIGURE 7		Active Conservation and Reuse Strategies Combined	
Agriculture Uses the Vast Majority of Both Surface Water		Far Exceed Deming's 2060 Demands.	35
and Groundwater in Luna County.	20		
		FIGURE 16	
FIGURE 8		Implementation of Active Conservation, Reuse, and Planned Ag-Urba	n
Groundwater Storage Changes Have Stabilized in the Mimbres		Transfers, on Top of Permitted Water Rights Exceed the 2060	
Basin Over the Past Decade.	21	Estimate of Water Needs for Deming by More Than 50%.	36

# **TABLES**

#### TABLE 1

Deming Population Projections Show an Increase of Approximately 11,000 Residents by 2060.	16
TABLE 2	
Water Levels in USGS Wells Near Deming Show Slow Rates of Decline.	23
TABLE 3	
Current Water Use Rates by Communities Across the Southwest Already Are Below	
Deming's 2060 GPCD Target.	26
TABLE 4	
Top Municipal Water Users in Deming Are a Natural Target for Increased Conservation Efforts (2006).	32
TABLE 5	
Reuse Supplies Could Increase Significantly with the Proposed AWSA Projects.	35
TABLE 6	
Deming Should Use AWSA Funds to Pay for these Priority Capital Projects Submitted	
by the City to the State of New Mexico Infrastructure Capital Improvement Plan.	37

# ACRONYMS, ABBREVIATIONS, DEFINITIONS, AND UNITS

ABCWUA	Albuquerque Bernalillo County Water Utility Authority
ACRE-FOOT	325,851 gallons (the amount of water 2 to 4 families use in 1 year)
AF	acre-foot or acre-feet
AFY	acre-feet per year
AG-URBAN	agricultural and urban (in reference to cooperative agreements between these two sectors)
АМІ	Advanced Metering Infrastructure
AWSA	Arizona Water Settlements Act
BOR	U.S. Bureau of Reclamation
DBS&A	Daniel B. Stevens & Associates, Inc.
E.O.	executive order
EPA	U.S. Environmental Protection Agency
FMI	Freeport McMoRan Inc.
GPCD	gallons per capita per day
ICIP	State of New Mexico Infrastructure Capital Improvement Plan
ISC	New Mexico Interstate Stream Commission
M&I	municipal and industrial
NEPA	National Environmental Policy Act
NPV	net present value
NM UNIT	New Mexico Unit of the Central Arizona Project
NMCAPE	New Mexico Central Arizona Project Entity
NMED	New Mexico Environmental Department
OM&R COSTS	operation, management, and replacement costs
PASSIVE	Conservation that results from new construction and development, and the replacement of
CONSERVATION	inefficient fixtures and appliances over time in existing buildings.
SCADA	supervisory control and data acquisition (system for gathering and analyzing real-time data)
SFR	single-family residential (water user)
SS COMMERCIAL	self-supplied commercial (water user)
SS RESIDENTIAL	self-supplied residential (water user)
SUSTAINABLE	management of groundwater subbasins to provide for multiple long-term benefits without
GROUNDWATER	resulting in or aggravating conditions that cause significant economic, social, or environmental
MANAGEMENT	impacts, such as long-term overdraft, land subsidence, ecosystem degradation, depletion of
	surface water bodies, or water-quality degradation
	Southwest New Mexico Water Planning Region—an area that encompasses Catron, Grant, Hidalgo
REGION	Chatavaide Water Councils Initiation of Coloreda
3 11 5 6	Statewide water supply initiative of Colorado
0505	United States Geological Survey
WRA	western Resource Advocates
WWTP	wastewater treatment plant



# **EXECUTIVE SUMMARY**

By using AWSA funds to pursue shovel-ready local water conservation and efficiency projects, Deming residents can meet their future water needs and save more than \$25 million in capital improvement costs.

Deming has reached a fork in the road, and must decide how to best spend significant federal and municipal funds to secure the city's future water supply. This local water conservation and efficiency alternative is a cost-effective solution for securing the long-term water needs of Deming, and positions Deming and Luna County as an attractive and reliable hub for new businesses in southwestern New Mexico. This report describes an alternative that can provide water security for Deming residents, and that is much better for the environment, Deming taxpayers, water utility ratepayers, and the local and regional economy.

The evaluation and policy recommendations in this report follow a two-step approach. The future water needs of Deming first are estimated using the most up-to-date, publicly available water planning data from the state of New Mexico and the City of Deming. The report then analyzes and describes the potential for investing in local water conservation and efficiency projects composed of the following key water supply strategies.

- GROUNDWATER MANAGEMENT
- CONSERVATION
- REUSE
- PLANNED AGRICULTURAL TO MUNICIPAL WATER TRANSFERS (OF WATER RIGHTS ALREADY ACQUIRED BY DEMING FOR THIS PURPOSE)

#### Invest in groundwater management to form the foundation of longterm water security.

All of Deming's water supply comes from Mimbres Basin groundwater, therefore Deming's long-term water security relies completely on Mimbres Basin groundwater to meet current and future municipal permitted uses. One of the current Gila River pipeline projects that Deming is supporting will import Gila River water for groundwater recharge of the Mimbres Basin Aquifer rather than for direct use. Because agriculture represents 91% of current groundwater pumping in the area surrounding Deming and its wells, most—if not all—of the recharged water would be captured by larger irrigation pumping and not by the city's wells.

Instead of spending millions of dollars on a water importation project that would provide a negligible contribution toward improving Mimbres Basin groundwater management, Arizona Water Settlements Act (AWSA) funds should be prioritized on the following groundwater management actions that total \$7.8 million.

- DEVELOP A SOUND GROUNDWATER SUPPLY AND QUALITY MONITORING NETWORK
- FACILITATE A MIMBRES BASIN GROUNDWATER MANAGEMENT PLAN
- QUANTIFY THE IMPACTS OF MEXICAN GROUNDWATER PUMPING ON THE
   MIMBRES BASIN, AND THE EFFECTS OF U.S. PUMPING ON MEXICAN AQUIFERS
- PLAN AND DEVELOP A REMOTE WELL FIELD FOR THE LONG-TERM RELIABILITY AND RESILIENCY OF DEMING'S PUBLIC WATER SYSTEM

#### Invest in water conservation to close the gap between 2060 water supply and demands.

Population growth will be the key driver of new water demands in Deming. Currently, the population is about 14,850, and Deming is projected to add 10,080 to 12,900 new residents by 2060.

Using widely accepted municipal water use rates and conservation estimates for the City of Deming published in the 2017 *Southwest New Mexico Regional Water Plan* it is estimated that Deming will be able to meet its projected 2060 high growth demand of 4,667 acre-feet per year (AFY) with water supplies already available to the city. As detailed in the full report, implementing a comprehensive water conservation strategy that includes planned water loss control projects in Deming would cost approximately \$12.8 million (\$5.0 million for water conservation and \$7.8 million for water loss control), and AWSA monies make an ideal funding source to cover these costs.

# Invest in shovel-ready reuse projects to enhance longterm water security.

Reuse is increasingly becoming an important strategy to meet growing demands in the region. When implemented effectively, reuse can double the demand that an acre-foot of water can meet. New (funded)



Figure 1. Water Conservation, Reuse, and Planned Ag-Urban Transfers

Significantly Exceed the Estimated Water Needs for Deming

and proposed (unfunded) non-potable reuse projects can provide an additional 458 acre-feet of water per year to Deming by 2060. The net present value of the reuse strategy is approximately \$12.8 million. To pay the significant costs the city will incur for reuse projects, Deming should use AWSA monies instead of state and local taxes and water ratepayer bills.

#### Transfer existing city-owned agriculture water rights to increase Deming's permitted municipal uses.

As discussed in the *City of Deming 4o-Year Water Plan*, Deming currently owns 3,780 acre-feet of consumptive use in irrigation water rights that it plans to convert to municipal use as needed. Although these transfers do not exemplify the most flexible and innovative agricultural-urban (ag-urban) cooperation strategies (e.g., rotational fallowing and dry-year leasing that do not permanently dry up agricultural lands), the city's existing water supply assets and plans cannot be ignored. Therefore, it is included as a separate water supply strategy.

#### Conserve the Gila River—an invaluable resource for the City of Deming, and the whole southwest for future generations.

The proposed Gila River diversion projects would be too harmful to the environment and too expensive for Deming taxpayers for the nominal long-term water security benefits they might provide. Much better options that are closely aligned with what New Mexican residents actually want include prioritizing water conservation and reuse before diverting more water from New Mexico's rivers. Importantly, the proposed Gila River diversion projects not only would be expensive and environmentally destructive, but also are subject to hydrologic variability outside of human control. Sustainable ground management, water conservation, and reuse are cheaper, faster, and better options that would make Deming more resilient to the variabilities of climate.

# A local water conservation and efficiency alternative

The pages that follow provide a view of a water supply scenario that more than fills projected needs in Deming (Figure 1). Importantly, this portfolio exceeds future water needs without a costly and environmentally destructive Gila River diversion project.

### Recommendations

This report provides several key recommendations for Deming's city council, water planners, and policy makers to implement when forging their water future.

- ENSURE THE LONG-TERM RELIABILITY AND RESILIENCY OF THE CITY'S WATER SUPPLIES BY PRIORITIZING AWSA FUNDS ON THE SUSTAINABLE GROUNDWATER MANAGEMENT OF THE MIMBRES BASIN, AND ON THE EVALUATION AND PLANNING OF A REMOTE WELL FIELD LOCATION FOR DEMING.
- 2. MEET THE PROJECTED 2060 GAP WITH CONSERVATION AND REUSE.
  - DEMING HAS SIGNIFICANT OPPORTUNITIES TO BOOST ITS EXISTING WATER CONSERVATION EFFORTS. CONSERVATION IS THE CHEAPEST AND FASTEST WAY TO STRETCH EXISTING WATER SUPPLIES. CONSERVATION MEASURES CAN BE DEVELOPED INCREMENTALLY OVER TIME AS POPULATION (AND DEMANDS) GROW; THIS DOES NOT FINANCIALLY COMMIT COMMUNITIES—AND FUTURE GENERATIONS— TO EXPENSIVE AND UNNECESSARY STRUCTURAL PROJECTS.
  - THE CITY HAS NUMEROUS SHOVEL-READY REUSE PROJECTS THAT CAN BE FUNDED WITH AWSA MONIES. DEMING SHOULD CONTINUE STRIVING TO MAXIMIZE THE ROLE OF WATER REUSE TO MEET FUTURE NEEDS AND SHOULD WORK TO IMPROVE PUBLIC PERCEPTION AND ACCEPTANCE OF REUSE PROJECTS.
- 3. PROTECT THE REGION'S FRESHWATER RESOURCES AS AN INTEGRAL PART OF ANY FUTURE WATER DEVELOPMENT STRATEGY. OUTDOOR RECREATION AND NON-CONSUMPTIVE USES OF WATER FOR FISHING, RAFTING, AND OTHER USES ARE WORTH BILLIONS OF DOLLARS ANNUALLY TO THE STATE'S ECONOMY AND ARE CRITICAL TO THE QUALITY OF LIFE OF DEMING FAMILIES.

By using AWSA funds to pursue a shovel-ready local water conservation and efficiency alternative, Deming taxpayers and ratepayers can meet their future water need and save more than \$30 million in capital improvement costs. These strategies can help protect state and local taxpayers and water ratepayers from the financial burdens of an unnecessarily expensive and environmentally harmful structural diversion project and conserve the Gila River for current families and future generations.



# INTRODUCTION

I URGE SOUTHERN NEW MEXICO TO LEAVE THE GILA INTACT SO THAT IT MAY CONTINUE TO NOURISH THE HEARTS AND SOULS OF OUR CHILDREN AND GRANDCHILDREN, AND TO SEEK MORE COST EFFECTIVE AND REASONABLE WAYS TO SECURE WATER FOR OUR RESIDENTS." –Most Reverend Bishop Oscar Cantú Bishop of Catholic Diocese of Las Cruces

#### Deming Faces a Fork in the Road: How to Best Spend Significant Federal and Municipal Funds to Secure the City's Future Water Supply

In 2004, the U.S. Congress passed the Arizona Water Settlements Act (AWSA) which, among other things, authorized \$66 million (adjusted for inflation) to meet community water needs in the Southwest New Mexico Water Planning Region<sup>1</sup> *without diverting* the Gila River, and an additional \$34 million (adjusted for inflation) if New Mexico elects to construct a project—called the New Mexico Unit of the Central Arizona Project (New Mexico Unit)—to divert up to 14,000 acre-feet annually from the Gila River.<sup>2</sup>

In November 2014—after years of expensive investigations that had not identified a feasible project configuration—the New Mexico Interstate Stream Commission (ISC) notified the U.S. secretary of the interior of the ISC's intention to develop a New Mexico Unit. In 2015, New Mexico created the NM CAP Entity (NMCAPE), for the purposes of joint continued planning and selection of the NM Unit. Accordingly, the NMCAPE is authorized to plan, design, build, operate, and maintain an NM Unit to divert water from the Gila River.<sup>3</sup>

So far, the City of Deming has supported three different AWSA-funded NM Unit project proposals to import several thousand acre-feet of Gila River water to the city. The cost of the first two proposals (which have been jettisoned) were estimated to be between \$330 million and \$1 billion—most of which was to be paid not by AWSA funds but by New Mexico state and local taxpayers.<sup>4</sup>

The latest NM Unit proposal that Deming is supporting would authorize the NMCAPE to spend more than \$50 million of AWSA funding to plan, design, and construct multiple diversion, conveyance, and storage projects on the Gila River in Cliff-Gila Valley and Virden Valley, and on the San Francisco River.<sup>5</sup> Phase 1 of the proposed NM Unit projects would develop an extremely costly small volume of highly variable water, directly benefiting 10% or less of the residents in the 4-county Southwestern Water Planning Region.<sup>6</sup> Another proposed Gila River diversion project that Deming is supporting would authorize the NMCAPE to spend potentially millions of the \$66 million of AWSA funding for community water needs to operate, manage, and utilize the decreed water resources and infrastructure owned by Freeport-McMoRan (FMI) (one of the world's largest publicly traded mine companies), to pipe water out of the Gila River watershed to recharge the Mimbres Basin Aquifer. Critical legal, hydrological, and economic questions related to this second option remain unanswered. No information has been made publicly available that justifies the NMCAPE prioritizing AWSA funding to investigate and pursue this option over other cheaper and more reliable options (described below) with clear benefits to Deming's public water system, water ratepayer and taxpayers, and the environment.

Importantly, the total volume of water (several thousand acre-feet per year) that Deming wants to import to the Mimbres Basin from the Gila River would provide negligible water security benefits to the city—at much greater risks and costs than the available alternatives.

#### Giving the People What They Want: Water Security, A Bright Economic Future, and Healthy Rivers

As described in this report, AWSA funds would be better invested in groundwater management, municipal water conservation, and reuse. These solutions would help Deming achieve long-term water security without requiring the city to incur any additional debt. Moreover, using AWSA monies to fund foundational water conservation strategies such as retrofitting Deming's pipes to reduce water loss, and providing robust incentives for industry to be "water wise" would help create new jobs and secure existing jobs by increasing the competitiveness of local industries in both the short term and long term.

AWSA funds should be used to save taxpayers and ratepayers more than \$30 million in capital improvement project costs. The City of Deming's poverty rate (32.1%) is more than double the official national poverty rate of the United States.<sup>7</sup> Additionally, investing in local water conservation and efficiency projects would create and secure jobs, protect the environment, and help keep groundwater levels sta-

### BY A WIDE MARGIN—VOTERS PREFER NON-DIVERSION WATER SUPPLY ALTERNATIVES TO DEPLETING THEIR RIVERS TO SERVE URBAN AREAS.

Figure 2. New Mexican Voters Clearly Oppose Importing Water from Rivers in Unpopulated Areas to Urban Areas, in Favor of Alternatives.



 Using our current water supply more wisely, by encouraging more water conservation, reducing use, and increasing recycling of water

• Diverting more water from rivers in less populated areas of the state to communities where more people live

Other

Figure 3. New Mexican Voters Believe Low Levels of Water in Rivers Are an Extremely/Very Serious Problem, Compared to Other Important Economic and Environmental Issues, 2013-2017.



ble thus leaving water supplies available for later use. Increasing water efficiency in local businesses—especially high-water use businesses such as food and beverage processing plants—reduces utility bills for water and energy. All other things being equal, the lower the costs the more competitive the business—and, consequently, this means greater employment security within city limits. Furthermore, Deming's investments in sustainable groundwater management, drought-resilient infrastructure, and water conservation can position the city as an attractive and reliable hub for new businesses in Southwestern New Mexico.

#### Community Leaders and Voters Favor Prioritizing Reuse and Conservation Before Tapping New Mexico's Rivers

On Earth Day, April 22, 2017, the Most Reverend Oscar Cantú—bishop of the Catholic Diocese of Las Cruces—who oversees the Catholic parishes that serve 95% of the New Mexico beneficiaries of AWSA funds, published a letter in the *Las Cruces Sun-News* urging southern New Mexico decision makers and residents to oppose a Gila River diversion project as a moral and ethical imperative.<sup>8</sup>

In 2017, Public Opinion Strategies found that more than threefourths of New Mexico residents prefer local alternatives to a Gila River diversion project.<sup>9</sup> Colorado College's State of the Rockies Project, together with Republican pollster Lori Weigel of Public Opinion Strategies, and Democratic pollster Dave Metz of FM3, also have been producing a valuable body of annual surveys that explore the bipartisan opinions of registered voters of New Mexico on issues related to the environment, conservation, the economy, and citizen priorities. These annual surveys consistently have found that healthy rivers and water conservation are priorities for New Mexicans when it comes to water planning (Figure 2, Figure 3).<sup>10</sup>

### NEW MEXICANS ARE NEARLY AS CONCERNED ABOUT LOW LEVELS OF WATER IN RIVERS AS THEY ARE ABOUT UNEMPLOYMENT.

#### The Gila River is an Irreplaceable Resource for New Mexican Families and is One of the Crown Jewels of New Mexico's Multibillion-dollar Outdoor Recreation Economy

The Gila River headwaters is an immensely rich historical and cultural resource. It is the homeland of the Mogollon civilization and Warm Springs Apaches; the birthplace of the Wilderness movement; and the wild, untamed crossroads of Francisco Vázquez de Coronado, Geronimo, Aldo Leopold, and many others that have helped shape the values, character, and cultural diversity of New Mexico and the American Southwest.<sup>11,12,13</sup>

The Gila River is New Mexico's last free flowing river and one of the very best destinations in the Southwest for birding, boating, fishing, hunting, and hiking. The headwaters of the Gila River are also one of the most ecologically diverse wilderness complexes in North America. It contains some of the largest free-flowing headwaters left in the United States, and one of the largest expanses of Ancient Forest (unlogged) south of Canada's Boreal Forest. As a result, the Gila River in New Mexico harbors some of the greatest breeding bird diversity and density in the country, and some of the last remaining populations of endangered and threatened riparian dependent and aquatic species such as the Southwestern Willow Flycatcher, Western Yellow-billed Cuckoo, loach minnow, spikedace, northern Mexican garter snake and the narrow-headed garter snake. The headwaters of the Gila River also are expected to serve as a critical refuge for tropical species as their ranges expand northward from the expected impacts of climate change. This invaluable resource is readily accessible to families from Southwestern New Mexico, and state and out-of-state visitors who year after year partake in the state's robust outdoor recreation economy that annually generates more \$9.9 billion in consumer spending and \$2.8 billion in wages and salaries.14

#### A Diversion of the Gila River Could Be Catastrophic to the Health of the River and Wildlife

The Nature Conservancy's 2014 *Gila River Flow Assessment* report, which included contributions from 35 scientists and 24 agencies, examined the ecological impacts of an AWSA water diversion from the upper Gila River via an NM Unit.<sup>15</sup> The *Assessment* concludes that:

- THE GILA RIVER IS A ONE OF THE FEW REMAINING EXAMPLES OF A SOUTHWEST RIVER WITH A NATURAL FLOW PATTERN
- THE GILA RIVER AND CLIFF GILA VALLEY ARE HOME TO A RICH DIVERSITY OF NATIVE PLANTS, BIRDS, FISH, MAMMALS, AND REPTILES WHICH DEPEND ON NATURALLY FLUCTUATING HIGH, MID-SIZE, AND LOW RIVER FLOWS TO SUSTAIN THEM
- THE RIPARIAN AND AQUATIC SPECIES IN THE CLIFF GILA VALLEY FACE NUMEROUS CHALLENGES, INCLUDING DROUGHT, HIGH-SEVERITY WILDFIRES, INVASIVE AQUATIC SPECIES, AND CLIMATE CHANGE
- A NEW 14,000 AFY DIVERSION FROM A NM UNIT, AS AUTHORIZED UNDER THE AWSA, WILL NEGATIVELY IMPACT THE NATURAL FLOW REGIME OF THE RIVER, COMPOUNDING EXISTING AND FUTURE STRESSES ON THE ECOSYSTEM, TO THE POINT OF SIGNIFICANTLY INCREASING THE RISK OF A TOTAL LOCAL COLLAPSE (AND ULTIMATELY THE LOCAL EXTINCTION) OF THREATENED FISH SPECIES SUCH AS THE LOACH MINNOW AND SPIKEDACE



### 1 A LOCAL WATER CONSERVATION AND EFFICIENCY ALTERNATIVE

### BY 2060, WATER CONSERVATION COULD REDUCE DEMING'S WATER DEMAND BY NEARLY 770 MILLION GALLONS OF WATER PER YEAR.

The City of Deming's municipal water demands are influenced by population growth, existing supply reliability, and water use efficiency (plus future investments in conservation). Each of these elements is discussed in greater detail below.

#### Population Drives New Demands

The City of Deming is the largest population center both in Luna County and in the Southwest New Mexico Water Planning Region, which includes Catron, Grant, Hidalgo, and Luna counties. The city's population growth is expected to be the key driver of new water demands in Deming and Luna County. The most recent "high" and "low" projections of the Interstate Stream Commission (ISC) indicate that a moderate population growth is expected for Deming in the coming decades—an additional 10,080 to 12,900 new residents by 2060 (Table 1).<sup>16,17</sup>

The ISC's population projections are used in this analysis. The local water conservation and efficiency projects described in this report clearly meet the long-term water needs of both the high and low projected population increases. It is important to note, however, that previous Deming population projections used for water planning purposes by both Deming and the ISC have far exceeded actual growth. For

example, Deming still has not met its *low* 2010 population projection of 16,363, which was provided in Deming's 40-Year Water Plan.<sup>18</sup> Additionally, U.S. Census data indicates that a -2.4% growth rate occurred between 2010 and 2016.<sup>19</sup>

# The City of Deming's Projected Water Demand

The population estimates above, together with widely accepted municipal water use rates and conservation estimates for the City of Deming published in the 2017 *Southwest New Mexico Regional Water Plan* are used here to calculate future water demand projections for Deming. The *Southwest New Mexico Regional Water Plan* conservation target for the City of Deming is 150 gallons per capita per day (GPCD) by 2060.<sup>20</sup> Water conservation can be characterized as passive or active. Passive conservation occurs when inefficient water appliances and fixtures are replaced over time with new, more water-efficient ones. Conversely, active conservation is achieved by deliberately investing in policies, rebates, incentives, and other measures and strategies.

2017 Pop. 14,855	2017-	2020	2020-	-2030	2030-	-2040	2040-	-2050	2050-	-2060
Projection	Growth Rate (%)	Pop.	Growth Rate	Pop.	Growth Rate	Pop.	Growth Rate	Pop.	Growth Rate	Pop.
High	1.00	15,305	1.50	17,762	1.50	20,614	1.50	23,923	1.50	27,764
Low	1.11	15,351	1.16	17,227	1.24	19,487	1.24	22,042	1.24	24,933

Table 1. Deming Population Projections Show an Increase of Approximately 11,000 Residents by 2060.

### APPLYING DEMING'S 150 GPCD CONSERVATION TARGET FROM THE "SOUTHWEST NEW MEXICO REGIONAL WATER PLAN" RESULTS IN AN INCREASED TOTAL WATER DEMAND OF APPROXIMATELY 900 ACRE-FEET BY 2060.

### >

### SUSTAINABLY MANAGING THE MIMBRES BASIN AQUIFER AND MAKING REASONABLE INVESTMENTS IN LOCAL WATER CONSERVATION PROJECTS LEAVES DEMING WITH NO PROJECTED GAP BETWEEN ITS WATER SUPPLY AND DEMAND IN 2060.



With a baseline GPCD of 226, Deming likely meets its 150 GPCD conservation target by reducing per-capita demands by 33.6% between 2017 and 2060; one path describing how to achieve these reductions is provided in Chapter 3. This percentage is equivalent to Deming reducing its per capita water use by less than 1% per year during the same period—a rate currently being achieved by communities across the Southwest—and translates to annual water savings of 2,360 acre-feet per year by 2060.<sup>21</sup> It also is estimated that passive conservation would provide a full third of these savings.<sup>22</sup>

Accounting for passive and active conservation savings, Deming's water demand in 2060 is projected to be 4,667 acre-feet under a high-growth scenario—an increase of approximately 906 acre-feet or 295 million gallons more than currently used (Figure 4).<sup>23</sup>



#### The City of Deming's Existing Water Supplies and Future Needs

Mimbres Basin groundwater is the current source of water for the Deming Municipal Water System.<sup>24</sup> Accounting for water conservation, Deming will be able to meet its projected 2060 high-growth demand of 4,667 AFY with current permitted water rights totaling 6,143 AFY and the ability to collect and deliver these with existing infrastructure (Figure 5).<sup>25</sup>

# Water Supply Strategies of the Local Water Conservation and Efficiency Alternative

This report covers four well-tested water supply planning strategies that are much better for both the environment and the taxpayer's pocket than is a Gila River diversion. These strategies are groundwater management, conservation, reuse, and planned agricultural to municipal water transfers (of water rights already acquired by Deming for this purpose).

### 2 SUSTAINABLE MANAGEMENT OF THE MIMBRES BASIN AQUIFER

#### INSTEAD OF IMPORTING GILA RIVER WATER, A MUCH BETTER WATER SUPPLY PLANNING STRATEGY FOR DEMING IS INVESTING AWSA MONIES TO FORM THE FOUNDATION FOR WELL-INFORMED AND COORDINATED SUSTAINABLE MANAGEMENT OF THE MIMBRES BASIN.

The long-term sustainable yield of the Mimbres Basin aquifer (Figure 6) is vital for the water security of Deming.<sup>26</sup> Groundwater serves 100% of the drinking water and municipal needs of Deming, and the city's long-term water security hinges on the viability of the Mimbres Basin groundwater resource to meet current and future municipal uses.

#### **Mimbres Basin Profile**

The Mimbres Basin is an international closed basin dominated by alluvial aquifers. It covers most of Luna County and parts of Grant, Sierra, and Doña Ana counties in southwestern New Mexico, and extends into the northernmost tip of the Mexican state of Chihuahua, west of Ciudad Juarez. Deming and Silver City are the major urban centers of the Basin. Land uses include forest, irrigated farmland, rangeland, and mining.<sup>27</sup> Groundwater and surface water provide 75% and 15%, respectively, of water used in the Basin. The Mimbres River is the only perennial stream located in the Basin, though it ceases to flow on the surface near its desert terminus, 15 miles east of Deming.<sup>28</sup>

The Mimbres River is the source of a significant volume of recharge to the shallow alluvial aquifer that provides water to the city's wells. The United States Geological Survey (USGS) Faywood gage readings show an average of more than 15,000 acre-feet per year at the upper reaches of the river. Most of this water is recharged into the groundwater aquifer; relatively little water reaches Deming as surface water, where the remaining water is diverted for irrigation.<sup>29</sup>

Agriculture represents 91% of the total water use in Luna County—100% of the county's total surface water use and 87% of its groundwater use. Although 100% of Deming's water use relies on groundwater, Deming water use represents only 7% of total groundwater use in Luna County (Figure 7).

### Trends in Groundwater and Storage

#### ACROSS THE MIMBRES BASIN

Rinehart et al. (2016) report a decline in the rate of change in groundwater storage in the Mimbres Basin that began in the early 1980s and continues to date (Figure 8).<sup>30</sup> This stabilizing trend in total groundwater storage is well-correlated with data from other studies that show significant reduction of agricultural water use in the Mimbres Basin, Figure 6. Map of the Mimbres Basin in Southwestern New Mexico.







which peaked in 1979 and currently only is about 40% of its maximum.<sup>31</sup> Urban water use in the Basin has remained relatively constant in the last 20 years (Figure 9).<sup>32, 33</sup>

In sum, the following factors indicate that current groundwater use in the Mimbres Basin might be sustainable in the long term.

- SIGNIFICANT, LONG-TERM REDUCTIONS IN AGRICULTURAL WATER USE (1980S TO PRESENT).
- MULTI-DECADAL EASING OF LARGE DECLINES IN STORAGE LEVELS (1980S TO PRESENT).
- RELATIVELY CONSTANT MUNICIPAL USE IN THE LAST DECADE, WITH A SMALL INCREASE IN MUNICIPAL USE BASIN-WIDE PROJECTED FOR 2060.

#### DEMING TRENDS

A report commissioned by the U.S. Bureau of Reclamation (BOR) for the 2010 New Mexico–Gila Basin Arizona Water Settlements Act Supply and Demand Correlation Study ("Correlation Study") estimates that Deming has about 5,000,000 acre-feet of potential water supply available to its wells.<sup>34</sup> After a technical evaluation of priority groundwater depletion issues in the Mimbres Basin and Deming, the Correlation Study concluded that:

Depending on actual well configurations, the current rate of groundwater decline could continue for over 100 years before impacting wells, other than increased energy costs associated with the higher lift. The aquifer depth underlying Deming's well fields is estimated at 2,500 feet thick, indicating wells/pumps could be deepened if necessary.

The *City of Deming 40-Year Water Plan* provides data recorded between 1931 and 2006 from 8 USGS wells within 4 miles of Deming that indicates an average -0.74 feet per year historical change in Deming groundwater levels (Table 2).<sup>35</sup>

The Correlation Study—published a year after the Deming 40-Year Water Plan—included a commissioned technical report produced by Daniel B. Stevens & Associates, Inc. (DBS&A) (which also wrote Deming's 40-Year Plan) to evaluate Mimbres Basin groundwater use and water storage in Deming and Luna County. The DBS&A technical report adopts an average decline rate in Deming groundwater of 0.6-feet per year and calculates that under this rate of decline Deming's Well #14 still would have a 200-foot water column by the year 2100—which is only 50 feet less water to pump from in the next 90 years.<sup>36</sup>

#### Moving Forward: Using ASWA Funds to Address Priority Groundwater Management Needs and Opportunities

The Gila River diversion, storage, and pipeline projects that have been supported by Deming would provide a negligible contribution towards improving Mimbres Basin groundwater management issues and reliability for Deming's municipal water supply.

One report estimates that a proposed 2,500 acre-feet (AF) importation of water to the Mimbres Basin Aquifer from the Gila River would amount to less than 0.008% of the volume of high-quality water in storage in the Mimbres Basin (estimated at 30,060,000 AF).<sup>37, 38</sup> Addi-



Change between 2000s and 1950s (h) Wells (2000-2009) Wells (1950-1959) 10mi 5 <-80 feet **5 – 20** 20 - 40 -80 - -60 0 5 10km -60 - -4040 - 60-40 - -20 60 - 80 -20 - -5 80 - 100 -5 - 5 >100 feet Bedrock USA MEXICO





### **COST OF SUSTAINABLE MANAGEMENT OF MIMBRES BASIN STRATEGY:** \$7,800,000.<sup>39</sup>

tionally, the Mimbres Basin has many agricultural water users that are pulling water out of it. Deming has no control over this use, and does not have readily available means to systematically monitor and evaluate the impact that this water use has—and could continue to have on the future quantity and quality of the shared groundwater.

The long-term sustainable yield of the Mimbres Basin aquifer remains vital for the long-term water security of Deming. Ensuring the long-term sustainable use of the Mimbres Basin aquifer therefore should be a water planning priority for Deming and other Mimbres Basin water users.

As discussed above, trends in groundwater use and storage in the Mimbres Basin and Deming appear to indicate that there are no major groundwater depletion concerns related to the reliability of Deming's current water supply through 2060. That said, those same reports and others find that the Deming area has some of the greatest declines in groundwater storage in the Mimbres Basin, and that existing data gaps and the need for additional monitoring efforts pose legitimate challenges for water managers to accurately understand the water availability and make informed decisions.

Accordingly, it is strongly recommended that NMCAPE and Deming prioritize use of a portion of the more than \$66 million in available AWSA funds for community water needs to cover the costs of the following groundwater management actions in the Mimbres Basin.

Table 2. Water Levels in USGS	Wells Near Deming Show Slow
Rates of Decline.	

		Change in Water Level				
		Period of Red	Amounta	Avg. Rate (ft/yr)		
Aquifer Well ID		Dates	No. of Years		(ft)	
	32114510743201	1958—1997	39	-36.20		
	321304107425801	1954—2002	48	-37.90		
	321352107493901	1939—2006	67	-34.63		
Alluvial	321434107483402	1961-2002	41	-2.09	-0.74	
Anaviar	321513107425701	1942-2002	60	-48.59	0.74	
	321553107485701	1940—1997	57	-97.92		
	321607107392301	1931-2002	71	-46.02		
	321648107385201	1950-2002	52	-22.53		

Source: USGS, 2007. a Negative numbers signify a drop in water levels

- DEVELOP A SOUND MONITORING NETWORK THAT PRODUCES HIGH-QUALITY DATA ON GROUNDWATER SUPPLY AND WATER QUALITY FOR THE MIMBRES BASIN THROUGH LONG-TERM DEDICATED FUNDING THAT PROVIDES, AMONG OTHER THINGS, A RELIABLE AND WELL-DEFINED HYDROLOGIC WATER BUDGET FOR THE MIMBRES BASIN.
- 2. FACILITATE A FORMAL AND EFFECTIVE GROUNDWATER MANAGEMENT PLAN FOR THE MIMBRES BASIN THAT INCORPORATES MONITORING NETWORK DATA, IDENTIFIES AND ADDRESSES POLICY AND INFORMATIONAL GAPS, AND INFORMS AND SUPPORTS STAKEHOLDERS' WATER SUPPLY MANAGEMENT AND PLANNING EFFORTS IN A COORDINATED MANNER.
- QUANTIFY THE IMPACTS OF MEXICAN GROUNDWATER PUMPING ON THE MIMBRES BASIN AND, CONVERSELY, THE EFFECTS OF U.S. PUMPING ON MEXICAN AQUIFERS THROUGH MODELING STUDIES.
- 4. PERFORM A FEASIBILITY STUDY FOR THE IDENTIFICATION AND DEVELOPMENT OF A REMOTE WELL FIELD LOCATION FOR DEMING IN AN AREA WHERE THE MIMBRES BASIN AQUIFER IS THICK, PRODUCTIVE, AND STABLE AS A SOLUTION TO INCREASING THE RESILIENCY OF THE DEMING MUNICIPAL WATER SUPPLY OVER THE LONG TERM.

### **3 PRIORITIZING CONSERVATION TO MEET FUTURE URBAN WATER DEMANDS**

#### THE CHEAPEST WATER THAT A UTILITY WILL EVER HAVE IS THE WATER THAT IT ALREADY HAS FLOWING IN

ITS SYSTEM." –H.W. (Bill) Hoffman, Former Assistant Director of Texas Water Development Board

# Demonstrates Profile of the City of Deming Water Utility Service Area

Located in the Mimbres Basin and Luna County, the City of Deming is the largest urban center in the Southwest New Mexico Water Planning Region, which includes Catron, Grant, Hidalgo, and Luna counties. As mentioned, 100% of Deming's water supply comes from the Mimbres Basin aquifer. Nearly 80% of the total water deliveries of the Deming public water system are used by the residential (50%), industrial (16%), and commercial (12%) sectors (Figure 10).

#### Basis for the Conservation Strategy

The conservation strategy presented in this section adopts and achieves the Southwest New Mexico Regional Water Plan's conservation target for Deming of reducing system water use to 150 GPCD by 2060. This water conservation target is equivalent to reducing Deming's per capita water use by 33.6% between 2017 and 2060 or reducing the city's per capita use by less than 1% per year during the same period. A 33.6% reduction in per capita water use would result in annual water savings of 2,360 acre-feet or 770 million gallons of water per year by 2060.

This report estimates that about one-third of this reduction would require no effort from water providers, for it would be achieved from passive conservation resulting from new, more water efficient development and the replacement of inefficient appliances and fixtures over time. The remainder, 1,660 AFY, would be achieved through cost-effective, active conservation programs funded under the conservation strategy. As demonstrated by numerous cities in New Mexico and the Southwest, a 150 GPCD target is a very reasonable goal (Table 3).<sup>40</sup> Figure 10. Water Use in Deming Is Predominantly Residential, with Sizable Uses for Commercial, Industrial, and Irrigation Purposes.



Table 3. Current Water Use Rates by Communities Across the Southwest Already Are Below Deming's 2060 GPCD Target.

City	Current GPCD	Conservation Strategy/ SW NM Regional Water Plan 2060 Target (GPCD)
4-County Public W	ater Systems	
Deming, NM	226	150
Lordsburg, NM	168	150
Silver City, NM	141	150
Other Public Wat	er Systems	
Albuquerque, NM	127	
Aurora, CO	121	
Santa Fe, NM	95	

#### DEMING'S WATER USE HAS REMAINED RELATIVELY STEADY IN THE PAST 20 YEARS. THE RESIDENTIAL SECTOR REPRESENTS HALF OF THE TOTAL WATER DEMAND IN THE SERVICE AREA.

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60

Water Conservation Program Has Achieved Tremendous Positive Impact. 70 220 Gallons) 200 ds) 60 ousa 180 (Billions of 50 160

Year

Production Accounts

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1989 90 91 92 93 94

Production

Water

Figure 11. The Albuquerque Bernalillo County Water Utility Authority's



Rainfall (inches)

Water utilities in the United States have successfully invested in active water conservation programs as an effective water-supply planning strategy for decades. The City of Albuquerque, for example, reduced its GPCD by almost 50% since the beginning of its water conservation program, resulting in a total 2015 system water use that is as low as their 1983 water use (Figure 11).

#### Conservation is Much Cheaper than **Importing New Water Supplies**

In the long term, robust conservation programs will result in reduced water rates. Some utility managers and city councils are hesitant to invest in robust conservation programs, thinking it will require increased water rates to compensate for the loss of revenue resulting from reducing demand. This concern is misplaced. Although there are short-term revenue impacts to consider, conservation programs can help keep water rates lower because they reduce or eliminate the need to develop more expensive new water resources and infrastructure.

Although the impact of water conservation on a utility's water rates always differs, a number of studies from the Alliance for Water Efficiency's "Financing Sustainable Water" initiative consistently make a compelling case to assume by default that, in the long term, water efficiency and conservation will keep a utility's water rates lower.

Figure 12. The Cost of Conservation Is Significantly Cheaper than New Water Supply Options in Colorado.





#### CASE STUDY: CONSERVATION LIMITS RATE INCREASES IN WESTMINSTER, COLORADO<sup>41</sup>

In 2012, residents and businesses paid water and wastewater rates that were 47% less and development (tap) fees that were 44% less than they would have been without conservation efforts.

#### CASE STUDY: WATER CONSERVATION KEEPS RATES LOW IN TUCSON, ARIZONA42

The impact of 30 years of municipal water conservation has resulted in residents and businesses paying current water and wastewater rates that are at least 11.7% lower than they would be if it weren't for conservation.

#### CASE STUDY: WATER CONSERVATION KEEPS RATES LOW IN GILBERT, ARIZONA43

The impact of 20 years of municipal water conservation has resulted in residents and businesses paying water and wastewater rates that are 5.8% less and system development (tap) fees that are 45% less than they would be if no conservation efforts were mad.

By comparison to other new water supply options, conservation is the most cost-effective investment. Colorado's Statewide Water Supply Initiative estimates that a 34% per capita reduction conservation target (virtually the same target that is considered herein) would cost an average of \$9,270 per acre-foot of water saved.<sup>44</sup> A 2010 report by the Natural Resources Law Center of the University of Colorado estimates the cost of conserved water at \$5,848 per acre-foot. By comparison, the same report found that water from new water supply infrastructure project proposals in Colorado cost an average of \$23,473 per acre-foot (Figure 12).45

### AN ACRE-FOOT OF CONSERVED WATER COSTS ABOUT ONE-QUARTER OF THE AVERAGE OPTION FOR NEW STRUCTURAL WATER SUPPLY PROJECTS.

#### The Conservation Strategy Outperforms New Importation Options in Almost All Major Categories

In 2012, as part of its "Colorado River Basin Supply and Demand Basin Study," the Bureau of Reclamation in partnership with the Colorado River Basin states conducted a comprehensive performance assessment of the major water supply options and strategies that Colorado River water users and decision makers have available to address long term water shortages and meet new water demand.<sup>46</sup>

Municipal water conservation outperformed all other options and strategies evaluated, including water importation; reuse; desalination; energy water-use efficiency; agricultural conservation; and agricultural water transfers, banking, and exchanges, in all of the following major categories.

- TIMING
- COST
- TECHNICAL FEASIBILITY
- LONG-TERM VIABILITY
- OPERATIONAL FLEXIBILITY
- ENERGY NEEDS
- ENERGY SOURCE
- PERMITTING
- OTHER ENVIRONMENTAL
- LEGAL

Although a Gila diversion was not one of the importation options evaluated in the Basin Study, many of the low scores of the importation options are the result of issues inherent in transbasin importation projects (cost, timing, long-term viability, operational flexibility, energy needs) and thus are applicable to any option related to importing Gila River water to Deming.

#### **55** Achieving the Conservation Strategy

The Southwest New Mexico Regional Water Plan assumes that Deming can achieve a target of 150 GPCD. Achieving the conservation target nonetheless will require an increased and sustained effort by the City of Deming and its residential and nonresidential customers. Deming can use a portion of the more than \$66 million in available AWSA funds for community water needs to cover the costs for—among other things—a full-time conservation program manager, incentives, education, and conservation planning and programs to help achieve the conservation target.

#### Indoor Use

For residential customers, Deming should establish a goal of reducing indoor water use to an average of 30 to 35 GPCD by 2050 and implement measures to meet that goal. Presently, many families in New Mexico already use less than 35 GPCD.

People typically do the same things inside a home (e.g. cook, clean, wash clothes, shower), therefore the variation of indoor residential per capita water use across the United States is low. Indoor water use commonly is determined through end-use studies. In an end-use study, data loggers are used to record flows at a household water meter in short time increments (10 seconds or less). This data then can be processed to identify which fixture or appliance in the home was using the water. By logging multiple homes over an extended period, a water provider can estimate the amount of water used by residential customers for various purposes.

A 2011 end-use study conducted by Aquacraft for Salt Lake City and the U.S. Environmental Protection Agency (EPA) found that new homes built with fixtures and appliances using the best available water efficiency technology (similar to those built to the EPA Water-Sense New Home specification) *currently* achieve an indoor GPCD of 36.<sup>47</sup> Existing homes also can reduce current water use to 35 GPCD through existing retrofit technology. In 2011, the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) conducted a retrofit study with high single-family residential (SFR) water users to estimate the conservation potential of high-efficiency retrofits and appliances. The ABCWUA found that its high-volume SFR water users achieved a GPCD of 31 after implementing a retrofit program.<sup>48</sup> These studies all indicate a 35 GPCD indoor target for Deming is reasonable.

Key measures for indoor conservation include installing high-efficiency fixtures in new housing developments and retrofitting many existing homes over the next 20 years. Several different ordinances and rebate programs can achieve this outcome in residences. For nonresidential customers, indoor use can be reduced through similar ordinance and rebate programs, as well as through water audits and business-specific water rates.

#### **Outdoor Use**

Outdoor irrigation averages 39% of total use of the annual potable water supply in Deming. Similar to how ordinances affect indoor water use, land use ordinances affecting new construction (such as irrigation design, turf restrictions, or plant lists appropriate for the community) can play a significant role in reducing water demands for homes that are not yet built. For example, the City of Deming has numerous landscape standards and outdoor water conservation programs that ensure water conservation by limiting turf and encouraging the use of native and low-water-use plants. Deming's landscape standards stipulate that all landscape plant material in the city must be a low-water-use type and be drought-tolerant, with the following exceptions.<sup>49</sup>



- SINGLE AND TWO-FAMILY RESIDENCES: UP TO 50% OF LANDSCAPE CAN BE TURF, BUT TURF AREA CANNOT EXCEED 3,000 SQUARE FEET.<sup>50</sup>
- SUBDIVISION COMMON AREAS: A MAXIMUM OF 15% MAY BE DEVOTED TO TURF.<sup>51</sup>
- MULTIPLE DWELLINGS, MOBILE HOME PARKS, AND INSTITUTIONAL DEVELOPMENTS: 25% OF TOTAL LOT OR SITE AREA MUST LANDSCAPED WITH LOW-WATER-USE OR DROUGHT-TOLERANT PLANTS, AND NO MORE THAN 20% OF THE REMAINING LOT AREA (EXCLUDING CONCRETED AND PAVED AREAS) MAY BE PLANTED USING TURF. TURF CANNOT EXCEED 20% OF COMMON AREAS.<sup>52</sup>

Water audits, budget-based rates, and incentives to replace high-waterusing landscapes all can be used to reduce outdoor use in existing homes.

#### Water Loss Control

Water loss control is a foundational best practice that should be implemented by all water providers to provide stewardship and accountability in their operations.<sup>53</sup> Water loss control is more than just finding and fixing leaks at the individual homeowner or utility level. It also means system auditing, loss tracking, and infrastructure maintenance. Reducing utility water loss is a significant water savings strategy. Water loss control programs also can generate substantial new revenue streams by additional billing on "lost" gallons of potable water. This can be determined by using more accurate metering practices and technologies.

The following is a list of unfunded, shovel-ready water loss control and conservation projects that the city has prioritized for development and that could be funded by a portion of the more than \$66 million in available AWSA funds for community water needs.

- DEMING SUPERVISORY CONTROL AND DATA
   ACQUISITION (SCADA) SYSTEM
- WATER SYSTEM LINE REPLACEMENT/REPAIR
- REGIONAL WATER CONSERVATION
- WELL UPGRADES/OPTIMIZATION/CONVERSION/SCADA
- SEWER LINE REPLACEMENT

Water User Acre-Feet/Year % Total Water Billed Food Manufacturers 481 12.01% **Golf Courses** 167 4.18% Hotels and Motels 92 2.30% Top 26 Residential/ 2.02% 81 Multi-Family Water Users Churches 66.4 1.66% ΤΟΤΑΙ 821 22.17%

Table 4. Top Municipal Water Users in Deming Are a Natural

Target for Increased Conservation Efforts (2006).

Deming's 2007–2011 water audit showed a steady, five-year increase in system-wide, unnacounted water, that should be addressed (Figure 13). Deming also should harness and utilize the full spectrum of benefits of its Advanced Metering Infrastructure (AMI) devices (for water planning , drought management, revenue, customer support, peak demand, leak detection and repair). A portion of the more than \$66 million in available AWSA funds for community water needs could be used to cover these costs.

The *Southwest New Mexico Regional Water Plan* and the *City of Deming 40-Year Water Plan* provide a more comprehensive description of both the water sectors and water conservation programs that can be implemented in Deming to achieve the conservation strategy.<sup>54, 55</sup>

### Targeting High Water Users

Increasing water efficiency in local businesses by targeting education and incentive programs to high water users—such as the food processing plants in Deming—can reduce utility bills for water and energy (Table 4). All other things being equal, lower costs provide a competitive advantage to businesses, and more employment security within the city. Furthermore, Deming's investments in drought-resilient infrastructure and water conservation and sustainability can position the city as an attractive and reliable hub for new businesses in southwestern New Mexico.

#### TOTAL COST OF WATER CONSERVATION STRATEGIES IS \$12,800,000, INCLUDING \$5,000,000<sup>56</sup> FOR A WATER-CONSERVATION PROGRAM AND \$7,800,000<sup>57</sup> FOR WATER-LOSS CONTROL PROJECTS PLANNED BY DEMING THAT COULD BE FUNDED BY AWSA MONIES.

#### Education

In 2013, Deming received a grant from the ISC to conduct a pilot study to advance municipal water conservation by funding, among other things, turf conversion and cooling tower retrofits. Deming reported to the ISC eight HVAC conversions from evaporative coolers to refrigerated air units; two landscape conversions to xeriscaping; and four red bricks installed in toilet tanks. They found little interest from the community, and negligible changes in water usage attributed to the rebate programs. The performance of this pilot program seems to have given the impression to Deming staff that a robust water conservation program with incentives is not a good fit for Deming residents because generally a conservation ethic and culture in the community does not exist.

The authors of this report believe that the opposite is the case. The results of the pilot project demonstrate the great need for water education for the Deming community. Water education and water conservation campaigns can be very powerful when designed and implemented effectively; however, water education should be approached not as a quick fix, but rather as a long-term investment.

Albuquerque is one of the best examples for the powerful impact that water education can have in a service area. As described at the beginning of this section, ABCWUA has one of the best water conservation programs in the Southwest and the United States. Its staff believes that the most effective conservation tool has been education of the public—through every means possible, including TV, radio, bill inserts, billboards, public meetings, an education program for K-12, and adult classes where customers earn a rebate for attending. As proof of the effectiveness of having an educated public, ABCWUA points to 2012. That year, rainfall was well below average and it also had been well below average in the previous year, but ABCWUA spent money informing their customers of the drought and the need for increased conservation. The result was that water use dropped by 12 GPCD in a single year. The AB-CWUA spent 20 years educating the public about the importance and value of their water resources, so that when asked to conserve water during the drought, the customers did so voluntarily. From a municipal water conservation perspective, long-term (40 years' worth) funds for water conservation would be invaluable for Deming.

#### **D** Recommendations

The City of Deming should use a portion of the more than \$66 million in available AWSA funds for community water needs to fund:

- A FULL-TIME WATER CONSERVATION PROGRAM MANAGER;
- A LONG-TERM (2018-2060) WATER CONSERVATION STRATEGY;
- ALL OF THE SHOVEL-READY WATER LOSS CONTROL INFRASTRUCTURE PROJECTS THAT THE CITY HAS IDENTIFIED AND IS PLANNING TO PURSUE; AND
- PRIORITIZATION OF PUBLIC EDUCATION, WATER AUDITS, AND INCENTIVES FOR BOTH COMMERCIAL AND RESIDENTIAL HIGH WATER USERS, WATER LOSS CONTROL, AND OUTDOOR IRRIGATION CONSERVATION PROGRAMS.

#### **Summary**

Active and passive conservation can reduce demand in Deming by 2,360 acre-feet per year by 2060 (Figure 14). This means Deming can meet its projected 2060 high-growth demand of 4,667 acre-feet per year with its currently permitted water rights totaling 6,143 AFY. Achieving the proposed conservation levels requires a sustained, coordinated effort between utilities, the state, city planners, private industry, the general public, and the conservation community. A portion of the more than \$66 million in available AWSA funds for community water needs likely could cover much—if not all—of the costs of new active conservation programs.



Figure 14. The Future Water Needs of Deming Are Dramatically Decreased with Conservation, Enabling Future Needs to Be Met with Existing Supplies.

# 4 MEETING FUTURE DEMANDS WITH REUSE

### APPLYING DEMING'S 150 GPCD CONSERVATION TARGET FROM THE "SOUTHWEST NEW MEXICO REGIONAL WATER PLAN" RESULTS IN AN INCREASED TOTAL WATER DEMAND OF APPROXIMATELY 900 ACRE-FEET BY 2060.

Reuse can help communities better optimize existing and future reusable supplies, alleviating some of the need to secure additional supplies from other sources. When implemented very effectively, reuse can essentially double the demand that an acre-foot of legally reusable water is able to meet. The report *Regional Water Demand Study for Southwest New Mexico Catron, Grant, Hidalgo and Luna Counties* recognizes that reuse is increasingly becoming an important strategy to meet growing demands in the four-county region.<sup>58</sup> The City of Deming has been awarded almost \$2.5M of AWSA funds for water reuse projects.

The following is a list of additional, unfunded, shovel-ready reuse projects totaling \$12,800,000 that are planned by the city and that could be funded by a portion of the more than \$66 million in AWSA funds available for community water needs.<sup>59</sup> These shovel-ready projects would provide an additional 158 acre-feet of water to Deming.

- DEMING COUNTY COURTHOUSE
- DEMING PEARL PARK
- DEMING PARK, T-BALL, BMX
- DEMING FLORIDA PARK
- DEMING POND
- DEMING SOCCER, FOOTBALL FIELDS
- DEMING GOLF COURSE
- EFFLUENT REUSE AND IRRIGATION IMPROVEMENTS
- DRILL NEW WELL, EFFLUENT EXPANSION PROJECT

#### AWSA Tier 2 Reuse Proposal

As mentioned above, the city received almost \$2.5 million under an AWSA Tier 2 Funding Proposal to build a Reuse Alternative that expanded the city's reuse program. Before the Tier 2 proposal, treated return flows were used in the city for irrigating the cemetery, golf course, and croplands, as well as for industrial cooling. The AWSA proposal increased the use of recycled water for park, athletic field, and courthouse irrigation, reducing demands on groundwater supplies. The project is described as an alternative that will result in more than 300 acre-feet of supply for municipal irrigation purposes.

The city currently reuses 336 acre-feet each year. Assuming 300 acre-feet of new yield from the Tier 2 reuse project, total city reuse would increase to 636 acre-feet. The city also notes that storm water could be used to supplement the project, further increasing the yield.<sup>60</sup>

The City of Deming is the only municipality in the Southwest New Mexico Water Planning Region with a significant existing reuse program.<sup>61</sup> Table 5 includes existing, new (funded), and the proposed (unfunded) shovel-ready reuse projects that the city has identified as priority projects in the *Southwest New Mexico Regional Water Plan*.<sup>62</sup> As represented by the purple wedge in Figure 15, it's assumed that new reuse in Deming will reach 458 acre-feet per year by 2050 (but most likely this will occur much sooner).



Table 5. Reuse Supplies Could Increase Significantly with the Propos AWSA Projects.					
	Annı	ual Reuse Proje	ect Yield (AF/Yea	ar)	
Project Applicant	Existing	New (Funded)	Proposed (Unfunded)	Total	
City of Deming	336	300	158	794	



City of Deming's Permitted Water Rights (Current) - 6,143 AFY

Projected Demand with Conservation (High Population Growth) - 4,667 AFY

#### **Recommendations**

Deming should use a portion of the more than \$66 million in available AWSA funds for community water needs to fund the shovel-ready planned reuse projects that the city has identified and currently is pursuing funding for.

#### **Summary**

New (funded) and proposed (unfunded) reuse projects can provide an additional 458 acre-feet of water per year by 2060. AWSA monies, instead of taxpayers and water ratepayer bills, should be used to pay for the significant cost the city is planning to spend on reuse projects. The AWSA funds could likely cover much—if not all—of the costs of the reuse strategy.

### 5

### PLANNED AG-URBAN TRANSFERS

As discussed in its 40-Year Water Plan, the City of Deming already owns 3,780 acre-feet of consumptive use in irrigation water rights that it plans to convert to municipal use in the future as needed (Figure 16).<sup>64,65</sup> This water supply should be accounted for, and therefore is included as a separate strategy in this assessment. As a core part of its water planning strategy, Deming anticipates continuing to acquire additional agricultural water rights to meet future municipal demands.

It is recommended that Deming:

- PRIORITIZE AND MAXIMIZE MUNICIPAL WATER CONSERVATION AND REUSE BEFORE RELYING ON PLANNED AG-URBAN TRANSFERS; AND
- INVOLVE ALL STAKEHOLDERS (E.G. IRRIGATORS, THIRD PARTIES THAT RELY ON THE AGRICULTURAL ECONOMY, ENVIRONMENTAL INTERESTS) TO ADDRESS AND MITIGATE THE ADVERSE IMPACTS OF ANY PLANNED TRANSFERS AND ADVANCE THE PRESERVATION OF AGRICULTURAL HERITAGE.

Figure 16. Implementation of Active Conservation, Reuse, and Planned Ag-Urban Transfers, on Top of Permitted Water Rights Exceed the 2060 Estimate of Water Needs for Deming by More Than 50%.



### 6 DEMING'S PROPOSED PROJECTS, PROGRAMS, AND POLICIES

FEW MUNICIPALITIES HAVE CASH RESOURCES TO FINANCE CAPITAL IMPROVEMENT PROJECTS WITH LARGE PRICE TAGS. MOST MUST INCUR DEBT IN THE FORM OF A BOND ISSUE TO FINANCE SUCH IMPROVEMENTS AND FACILITIES, SIMILAR TO THE HOMEBUYER WHO MUST INCUR DEBT IN THE FORM OF A MORTGAGE. THE INCURRING OF DEBT BY A MUNICIPALITY SHOULD BE CONSIDERED AMONG THE MOST SERIOUS OF ALL COURSES OF ACTION AVAILABLE TO A CITY COUNCIL.<sup>69</sup>

This section provides the list of projects, programs, and policies submitted by Deming as planning priorities for anticipated capital projects under the Southwest Regional Water Plan (Appendix 8-A) and the State of New Mexico Infrastructure Capital Improvement Plan (ICIP).<sup>66,67</sup> Deming can use a portion of the more than \$66 million in available AWSA funds for community water needs to cover the priority capital improvement projects that the city plans to invest in (Table 6). <sup>68</sup> Not using AWSA funding for these projects would create significant new debt commitments, and additional tax and water rate burdens on Deming residents.

Project	Funding Request	Cost					
Water Loss Control and Conservation							
Deming SCADA System	2017	\$510,000					
Water System Line Replacement/Repair	2016	\$1,222,886					
Regional Water Conservation	2016-2020	\$1,500,000					
Well Upgrades/Optimization/Conversion/SCADA	2016-2020	\$2,150,000					
Sewer Lines Replacement	2017-2021	\$3,000,000					
Subtotal		\$8,382,886					
Reu	ise						
Deming Golf Course	2020	\$175,900					
Deming County Courthouse	2018	\$105,900					
Deming Pearl Park	2018	\$218,200					
Deming Park, T-Ball, BMX	2017	\$228,200					
Deming Florida Park	2019	\$386,700					
Deming Pond	2016	\$422,600					
Deming Soccer, Football Fields	2017	\$445,400					
Effluent Reuse and Irrigation Improvements	2016, 2018-19	\$5,600,000					
Drill New Well, Effluent Expansion Project	FY2014	\$800,356					
Subtotal		\$13,983,256					
TOTAL		\$22,366,142					

Table 6. Deming Should Use AWSA Funds to Pay for these Priority Capital Projects Submitted by the City to the State of New Mexico Infrastructure Capital Improvement Plan.

# 7 RECOMMENDATIONS

This report lays out a portfolio of cheaper, more effective, and easier to implement water supply strategies to meet the future water needs of Deming without sacrificing the ecosystems of the majestic Gila River. We must look beyond outdated strategies to develop and import new water and recognize that better solutions are available for meeting the city's future water needs. Today's decisions are critical to state and local taxpayers and the quality of life for residents across the four-county Southwestern Planning Area.

Based on rigorous data analysis, this report offers several key recommendations that Deming decision makers and water planners should consider carefully in forging the city's water future.

- ENSURE THE LONG-TERM RELIABILITY AND RESILIENCY OF THE CITY'S WATER SUPPLIES BY PRIORITIZING AWSA FUNDS ON THE SUSTAINABLE GROUNDWATER MANAGEMENT OF THE MIMBRES BASIN, AND ON THE EVALUATION AND PLANNING OF A REMOTE WELL FIELD LOCATION FOR DEMING
- 2. MEET THE PROJECTED 2060 GAP WITH CONSERVATION AND REUSE
  - DEMING HAS SIGNIFICANT OPPORTUNITIES TO BOOST ITS EXISTING WATER CONSERVATION EFFORTS. CONSERVATION IS THE CHEAPEST AND FASTEST WAY TO STRETCH EXISTING WATER SUPPLIES, AND CONSERVATION MEASURES CAN BE DEVELOPED INCREMENTALLY OVER TIME AS POPULATION (AND DEMANDS) INCREASE, WHICH DOES NOT FINANCIALLY COMMIT COMMUNITIES—AND FUTURE GENERATIONS—TO EXPENSIVE AND UNNECESSARY STRUCTURAL PROJECTS.
  - THE CITY HAS NUMEROUS SHOVEL-READY REUSE PROJECTS THAT CAN BE FUNDED WITH AWSA MONIES. IT SHOULD CONTINUE STRIVING TO MAXIMIZE THE ROLE OF WATER REUSE TO MEET FUTURE NEEDS AND SHOULD WORK TO IMPROVE PUBLIC PERCEPTION AND ACCEPTANCE OF REUSE PROJECTS.
- 3. PROTECT THE REGION'S FRESHWATER RESOURCES AS AN INTEGRAL PART OF ANY FUTURE WATER DEVELOPMENT STRATEGY. OUTDOOR RECREATION AND NON-CONSUMPTIVE USES OF WATER FOR FISHING, RAFTING, AND OTHER SUCH USES ARE WORTH BILLIONS OF DOLLARS ANNUALLY TO THE STATE'S ECONOMY AND ARE CRITICAL TO THE QUALITY OF LIFE OF DEMING FAMILIES.

By using a portion of the more than \$66 million in available AWSA funds for community water needs to implement shovel-ready local water conservation and efficiency projects, Deming's current water supply can meet future water needs, create and secure jobs, protect the environment, and help keep groundwater levels stable and water supplies available for many generations into the future. Importantly, these strategies can help protect Deming taxpayers and water ratepayers from the financial impacts of an unnecessarily expensive and environmentally harmful structural diversion project and protect the significant natural and cultural heritage of the Gila River.



# **ENDNOTES**

- 1 The Southwestern New Mexico Water Planning Region includes Catron, Grant, Hidalgo, and Luna counties.
- 2 In addition to the \$100 million total, if the rate of return of carryover funds in the federal Lower Colorado Basin Development Fund exceeds an average annual rate of 4% for the period between the enactment of AWSA and the date of initiation of an NM Unit, then an additional \$28 million would be made available for construction. Earnings in the Development Fund to date do not support the additional \$28 million. See New Mexico Interstate Stream Commission, Status of the New Mexico Unit Fund. Report to the New Mexico Legislative Finance Committee (Santa Fe, NM, November 2016).
- 3 The NMCAPE is composed of the ISC and 13 local entities from Southwest New Mexico: Upper Gila Irrigation Association, Fort West Irrigation Association, Gila Farm Irrigation Association, Gila Hot Springs Irrigation Association, Catron County, Grant County, Hidalgo County, Luna County, Village of Santa Clara, Hidalgo Soil and Water Conservation District, San Francisco Soil and Water Conservation District, City of Lordsburg, and City of Deming.
- 4 Section III(f) of the NMCAPE Joint Powers Agreement provides that "the Parties agree that they may provide financial support to the extent they are able to, in each Party's individual discretion, as necessary in perpetuity to plan, design, construct, operate and maintain the NM Unit, including without limitation, the issuance of bonds, the levy of taxes, the assessment of membership dues and the assessment of user fees."
- 5 New Mexico Central Arizona Project Entity, Amended Proposed Action (December 20, 2017), http://www.documentcloud.org/ documents/4357769-Amended-Proposed-Action-of-the-NM-Unit-12212017-Wt.html (accessed February 14, 2018).
- 6 Ibid.
- 7 U.S. Census Bureau, "2012-2016 American Community Survey 5-Year Estimates," https://www.documentcloud.org/documents/4357769-Amended-Proposed-Action-of-the-NM-Unit-12212017-Wt.html (accessed March 7, 2018).
- 8 Bishop Oscar Cantú, "A Moral Perspective on the Gila River Diversion Plan," *Las Cruces Sun-News* (April 22, 2017), http://www. lcsun-news.com/story/opinion/commentary/2017/04/22/moralperspective-gila-river-diversion-plan/100746150/ (accessed July 28, 2017).
- 9 Colorado College Conservation in the West Poll, https:// www.coloradocollege.edu/other/stateoftherockies/

conservationinthewest/2018/index.html (accessed February 14, 2018).

#### 10 Ibid.

- 11 U.S. Forest Service, USDA, *History of the Gila Wilderness*, https://www.fs.usda.gov/detail/gila/learning/historyculture/?cid=stelprdb5038907 (accessed July 28, 2017).
- 12 John A. Murray, The Gila Wilderness: A Hiking Guide (University of New Mexico Press, May 1, 1988).
- 13 Aldo Leopold, "Wilderness As a Form of Land Use," *Institute* for Research in Land Economics and Public Utilities (1): 4. 1925 (October).
- 14 Outdoor Industry Association, "New Mexico Report" (Boulder, CO: July 25, 2017), https://outdoorindustry.org/wp-content/ uploads/2017/07/OIA\_RecEcoState\_NM.pdf (accessed August 29, 2017).
- 15 The Nature Conservancy, *Gila Flow Needs Assessment* (September 2014).
- 16 The 2017 Baseline population of 14,855 for the Deming Public Water System comes from the *City of Deming 2017 Comprehensive Plan* (City of Deming: 2017).
- 17 Decadal, high, and low growth rates (2017-2060) come from State of New Mexico Interstate Stream Commission, Office of the State Engineer, *Southwest New Mexico Regional Water Plan*, Table 6-3 (March 2017).
- 18 Deming data from Daniel B. Stephens & Associates, Inc. City of Deming 40-Year Water Plan. Prepared for the City of Deming (Deming, NM: July 2009).
- 19 See United States Census Bureau. QuickFacts: Deming city, New Mexico https://www.census.gov/quickfacts/fact/table/ demingcitynewmexico/RHI805210 (accessed on August 1, 2017).
- 20 The Southwest New Mexico Water Plan (2017) assigns a 150 GPCD water conservation target to Deming by virtue of Deming meeting the following two conditions described in the Plan: (1) For future water demand projections, the ISC has adopted a consistent statewide method that assumes that conservation will reduce water use to 150 GPCD in counties whose current average per capita use is between 200 and 300 GPCD; (2) the current county-wide per capita water use of Luna county is 209 GPCD. Accordingly, the Southwest New Mexico Water Plan (and this report) assumes that water conservation will reduce water use in Deming to 150 GPCD by 2060. State of New Mexico Interstate Stream Commission, Office of the State Engineer, *Southwest New Mexico Regional Water Plan* (2017).

- 21 This calculation is based on a baseline GPCD of 226 for the Deming Municipal Public Water System, as published in the 2007 *Southwest New Mexico Regional Water Plan.* State of New Mexico Interstate Stream Commission, Office of the State Engineer, *Southwest New Mexico Regional Water Plan* (2017), Table 6-4.
- 22 This reduction represents the same "high" passive conservation scenario adopted by Colorado in its statewide water supply planning process, and it is based on existing regional and national passive conservation studies, regional municipal and industrial water demand reports, and water conservation plans on file with the state of Colorado. This reduction is estimated to occur as a result of retrofitting housing stock and businesses that exist prior to 2017 with high-efficiency fixtures and appliances. It takes into account the 1992 National Energy Policy Act, the 2002 California Energy Commission (CEC) Water Efficiency Standards, and the 2007 California Assembly Bill 715. It assumes that (1) water and energy savings will become increasingly important to water customers as water and fuel costs rise; (2) high-efficiency fixtures and appliances will become increasingly efficient as technology improves and customers strive to reduce their variable costs related to water and energy; and (3) due to the size and power of California's economy, products compliant with California efficiency standards will dominate the stream of commerce in the Western United States, including New Mexico.
- 23 The Southwest New Mexico Water Plan assumes that water conservation will reduce water use in Deming to 150 GPCD by 2060. With a current (2017) GPCD of 226, in order for Deming to meet a 150 GPCD target by 2060, we estimate that Deming must reduce its per capita water use by 33.6% by 2060 (or reduce its per capita water use by almost 1% per year until 2060). Population projections used to estimate 2060 water demands are based on Deming's 2017 Comprehensive Plan and the population growth rates for Luna County published in the 2017 Southwest New Mexico Regional Water Plan. For the current withdrawal estimate of 3,794 acre-feet for the Deming Municipal Water System, see also the State of New Mexico Interstate Stream Commission, Office of the State Engineer, Southwest New Mexico Regional Water Plan (2017), Table 6-4.
- 24 State of New Mexico Interstate Stream Commission, Office of the State Engineer, *Southwest New Mexico Regional Water Plan* (2017), Table 6-4.
- 25 Deming published its total permitted water rights (6,143 AFY) in its Deming Comprehensive Plan 2017, referencing City of Deming 40-Year Water Plan (July 20, 2009) (City of Deming: 2017). Approved February.
- 26 Map from A.S., Cuddy, E. Keyes, Groundwater Model of the Mimbres Basin, Luna, Grant, Sierra and Doña Ana Counties, New Mexico Hydrology Bureau Technical Report 11-1 (New Mexico Office of the State Engineer: January 2011). http://www.ose.state.nm.us/ Pub/TechnicalReports/Technical%20Report%2011-1.pdf (accessed February 14, 2018).
- 27 A. Rinehart, S. Timmons, B. Felix, C. Pokorny, *Groundwater Level* and Storage Changes—Regions of New Mexico Technical Completion Report (New Mexico Bureau of Geology and Mineral Resources: 2015 June).

28 Ibid.

- 29 Daniel B. Stephens & Associates, Inc. *City of Deming 40-Year Water Plan* (Deming, NM: July 2009).
- 30 A. Rinehart, E. Mamer, T. Kludt, B. Felix, C. Pokorny, S. Timmons, "Groundwater Level and Storage Changes in Basin-Fill Aquifers in the Rio Grande Basin, New Mexico," Technical Completion Report (New Mexico Bureau of Geology and Mineral Resources June 2016), https://geoinfo.nmt.edu/resources/water/amp/brochures/ Groundwater\_level\_storage\_changes-Rio\_Grande\_Rift-NM\_2016.pdf (accessed February 14, 2018).
- 31 A. S. Cuddy and E. Keyes, Groundwater Model of the Mimbres Basin, Luna, Grant, Sierra and Doña Ana Counties, New Mexico, Hydrology Bureau Technical Report 11-1 (New Mexico Office of the State Engineer: January 2011).
- 32 Irrigation data from A. S. Cuddy and E. Keyes, *Groundwater Model of the Mimbres Basin, Luna, Grant, Sierra and Doña Ana Counties, New Mexico,* Hydrology Bureau Technical Report 11-1 (New Mexico Office of the State Engineer: January 2011).
- 33 Deming data from Daniel B. Stephens & Associates, Inc. City of Deming 40-Year Water Plan. Prepared for the City of Deming (Deming, NM: July 2009).
- 34 Within a 100,000-acre area delineated around Deming's well field, assuming an average aquifer thickness of 500 feet, and a typical specific yield of .10. This estimate does not consider legal or economic limitations or an analysis of impairment should additional supplies be developed. See Daniel B. Stevens & Associates, Inc. (DBS&A). 2010. Estimates of Region-Wide and Deming Area Water Supplies. June 30. This study was part of U.S. Bureau of Reclamation. 2010. Supply and Demand Correlation for the New Mexico-Gila Basin-Arizona Water Settlement Act. Phoenix Area Office. December.
- 35 Deming data from Daniel B. Stephens & Associates, Inc. City of Deming 40-Year Water Plan. Prepared for the City of Deming (Deming, NM: July 2009).
- 36 Daniel B. Stevens & Associates, Inc. (DBS&A), *Estimates of Region-Wide and Deming Area Water Supplies* (June 30, 2010).
- 37 John Ward, Assessment of Water Use and Supply, Mimbres Basin, New Mexico. Final Report. Prepared for the Gila Conservation Coalition (February 11, 2014).
- 38 J. Hawley et al., Trans-International Boundary Aquifers in Southwestern New Mexico, New Mexico Water Resources Research Institute, Technical Completion Report (prepared for the US Environmental Protection Agency and the International Boundary and Water Commission: 2000).
- 39 Cost in net present value. Assumptions: (a) Initial cost to develop and coordinate foundational groundwater monitoring and modeling studies for development of Mimbres Basin Management Plan, 2017-2020: \$4 million; (b) cost of remote well field feasibility study for Deming, 2023-2025: \$1.5 million; (c) annual cost of groundwater monitoring, planning, and coordination, 2020-2060: \$200,000; (c) discount rate: 3.5%; (d) total cost: \$13,500,000.
- 40 Current GPCD of Southwest New Mexico cities are from Table 6-4, Southwest New Mexico Regional Water Plan (2017). Santa Fe GPCD is from 2014, as reported at City of Santa Fe, Water Division,

http://savewatersantafe.com/saving-water/ (accessed March 7, 2018). Albuquerque 2015 GPCD provided by via email from Carlos A. Bustos, Water Conservation Program Manager, Albuquerque Bernalillo County Water Utility Authority to report authors (May 23, 2017).

- 41 S. Feinglas, Christine Gray, and Peter Mayer, *P.E. Conservation Limits Rate Increases for a Colorado Utility* (Chicago: Alliance for Water Efficiency).
- 42 P. Mayer, Water Conservation Keeps Rates Low in Tucson, Arizona (Chicago: Alliance for Water Efficiency. June 2017), http://www. financingsustainablewater.org/resource-search/water-conservationkeeps-rates-low-tucson-arizona (accessed March 7, 2018).
- 43 P. Mayer, Water Conservation Keeps Rates Low in Gilbert, Arizona (Chicago: Alliance for Water Efficiency, June 2017), http://www. financingsustainablewater.org/resource-search/water-conservationkeeps-rates-low-gilbert-arizona (accessed March 7, 2018).
- 44 2017 cost adjusted for inflation. Colorado Department of Natural Resources, Colorado Water Conservation Board. "Appendix L-SWSI 2010 Municipal and Industrial Water Conservation Strategies." In *Colorado's Water Supply Future, Statewide Water Supply Initiative* 2010 (Denver, CO: January 2011).
- 45 D. Kenney, M. Mazzone, and J. Bedingfield, *Relative Costs of New Water Supply Options for Front Range Cities. Prepared for the Colorado Water Institute* (Boulder, CO: University of Colorado, Natural Resources Law Center. July 2010).
- 46 U.S. Bureau of Reclamation, *Colorado River Basin Supply and* Demand Basin Study, Technical Report F—Development of Options and Strategies (December 2012).
- 47 Aquacraft, Analysis of Water Use in New Single-Family Homes (2011). http://www.aquacraft.com/sites/default/files/pub/Analysisof-Water-Use-in-New-Single-Family-Homes.pdf.
- 48 Aquacraft. Albuquerque Single-Family Water Use Efficiency and Retrofit Study. Prepared for Albuquerque Bernalillo County Water Utility Authority (2011). http://www.aquacraft.com/sites/default/ files/pub/Aquacraft-(2011)-Albuquerque-Single-Family-Water-Use-Efficiency-and-Retrofit-Study.pdf.
- 49 Deming, N.M., Code § 12-18-2(C)(2).
- 50 Deming, N.M., Code § 12-18-2(D)(2).
- 51 Deming, N.M., Code § 12-18-2(D)(3).
- 52 Deming, N.M., Code § 12-18-2(E)(2).
- 53 Colorado WaterWise and Aquacraft, Inc., *Guidebook of Best Practices for Municipal Water Conservation in Colorado* (Denver, CO, Colorado WaterWise: 2010).
- 54 See the 2005 Regional Water Plan. Daniel B. Stephens & Associates, Inc., *Southwest New Mexico Regional Water Plan*. Prepared for the Southwest New Mexico Regional Water Plan Steering Committee, City of Deming, New Mexico, Fiscal Agent (Albuquerque, NM: May 2005).
- 55 Daniel B. Stephens & Associates, Inc. *City of Deming 40-Year Water Plan.* Prepared for the City of Deming (Deming, NM: July 2009).
- 56 Based on average medium level cost of acre-feet saved of \$8,101, from among all Colorado Municipal Water Conservation Plans submitted to the Colorado Water Conservation Plan. Appendix L: SWSI 2010 Municipal and Industrial Water Conservation Strategies

(Colorado Water Conservation Board. 2010).

- 57 Assumes a 3.5% discount rate for net present value (NPV) calculation of shovel-ready conservation and water loss infrastructure projects identified and planned by Deming. *See* State of New Mexico Interstate Stream Commission, Office of the State Engineer. *Southwest New Mexico Regional Water Plan* (2017). Appendix 8-A.
- 58 AMEC Earth & Environmental, Inc., Regional Water Demand Study for Southwest New Mexico Catron, Grant, Hidalgo and Luna Counties. Prepared for New Mexico Interstate Stream Commission (New Mexico Office of the State Engineer, Socorro, NM: October 10, 2010).
- 59 In net present value. Assuming a 3.5% discount rate, for the shovelready reuse projects identified and planned by Deming under the *Southwest New Mexico Regional Water Plan. See* State of New Mexico Interstate Stream Commission, Office of the State Engineer, *Southwest New Mexico Regional Water Plan* (2017). Appendix 8-A.
- 60 Per Deming's AWSA Tier 2 proposal, the city also would evaluate using storm water runoff to supplement its reuse system. The city's new storm water retention pond has a 50-acre-foot capacity and could potentially be refilled multiple times in a year.
- 61 Silver City does have a reuse system in its golf course.
- 62 State of New Mexico Interstate Stream Commission, Office of the State Engineer, *Southwest New Mexico Regional Water Plan* (2017). Appendix 8-A.
- 63 In net present value. Assuming a 3.5% discount rate, for the reuse shovel-ready reuse projects identified and planned by Deming under the *Southwest New Mexico Regional Water Plan. See* State of New Mexico Interstate Stream Commission, Office of the State Engineer, *Southwest New Mexico Regional Water Plan* (2017). Appendix 8-A.
- 64 This total does not count the Murdock rights 16 miles outside the city limits that are too far to pipe into the city's municipal area.
- 65 Daniel B. Stephens & Associates, Inc. *City of Deming 40-Year Water Plan.* Prepared for the City of Deming (Deming, NM: July 2009).
- 66 See State of New Mexico Interstate Stream Commission, Office of the State Engineer, Southwest New Mexico Regional Water Plan (2017). Appendix 8-A.
- 67 See ICIP list at http://nmdfa.state.nm.us/ICIP.aspx (accessed March 7, 2018).
- 68 These are the costs used to estimate the Net Present Value for Additional Water Loss and Conservation (Section 2.2.2.1), and Reuse solutions (Section 2.4).
- 69 Michigan Municipal League, *Handbook for Municipal Officials* (Ann Arbor: July 2015).





