# Water Rate Structures in New Mexico:
## How New Mexico Cities Compare Using This Important Water Use Efficiency Tool

WESTERN RESOURCE ADVOCATES

February 2006

This report was prepared by Western Resource Advocates and Professor Denise Fort, from the University of New Mexico School of Law. Please contact Western Resource Advocates to request hardcopy or electronic versions of the report.

**Western Resource Advocates**
2260 Baseline Road, Suite 200
Boulder, CO 80302
Phone: (303) 444-1188
www.westernresourceadvocates.org

Western Resource Advocates' work on this report was funded with the help of generous contributions from:

The William and Flora Hewlett Foundation;
The General Service Foundation;
The Surdna Foundation; and
The Winslow Foundation

---

**Front Cover Photo Credits:**
U.S. Bureau of Land Management
American Water Works Association

February 2006

# TABLE OF CONTENTS
# of
# Water Rate Structures in New Mexico


Executive Summary…………………………………………………………………………………1

Introduction…………………………………………………………………………………………3

<u>Background Information on Water Rate Structures</u>

What Is a Water Rate Structure?..........................................................................................3

What Are the Different Types of Water Rate Structures?.................................................................3

How Do Water Rate Structures Relate to Efficient Water Use and Conservation?.......................... 5

Which Types of Rate Structures Promote the Most Efficient Water Use?.......................................5

What Other Factors Affect a Water Rate Structure Design?............................................................ 6

What Factors Can Weaken the Effectiveness of a Water Rate Structure?........................................ 7

How Can I Evaluate My City's Water Rate Structure?......................................................................8

<u>Rate Structure Comparative Analysis of New Mexico Cities</u>

How Do Water Rate Structures Compare Across New Mexico?........................................................9

Conclusion………………………………………………………………………………… 17

# Water Rate Structures in New Mexico:

**How New Mexico Cities Compare Using This Important Water Use Efficiency Tool**

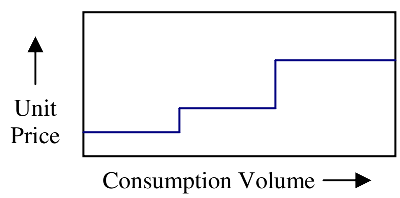
## Executive Summary

In semi-arid and arid New Mexico, precious rivers, streams, and aquifers sustain cities and towns by feeding urban water supply systems. With a finite supply, New Mexico citizens, policymakers, and water utility managers must fulfill the dual role of ensuring water in customer taps and in New Mexico's rivers and aquifers, as New Mexicans place a high value on both.

Municipal water consumption is a relatively small percentage of overall water use, but it warrants close attention from policy makers. One reason is that municipal uses have been the drivers for new water acquisitions in New Mexico, such as the San Juan-Chama water, and these new sources of water often have high costs, both economically and environmentally. Second, municipal water uses, by their nature, must be supplied regardless of how dry a particular year is. In contrast, if snowpacks are low, and reservoirs empty, agricultural uses may be interrupted, but typically resume again in wetter years (and farmers often are compensated under drought relief programs). Municipal demand is not as flexible, and the high economic values associated with it ensure that most municipal water needs will be met, even in very dry years. The authors believe that water conservation is important in every sector of water use, but this report focuses on the fastest-growing sector in New Mexico—municipal water use.

Water rate structures play an essential role in communicating the value of water to water customers, thus promoting long-term efficient use. The value of water includes: (1) the utility's operation and maintenance costs; (2) costs to procure and develop additional water supplies to meet growing demands; and (3) social and environmental "opportunity costs" of losing other benefits of the water and natural waterways.

***Increasing block rate structures*** most effectively communicate this value and encourage efficient use when compared to other types of rate structures. Through an increasing block rate design, the unit price for water increases as the volume consumed increases, with prices being set for each "block" of water use. Customers who use low or average volumes of water are charged a modest unit price and rewarded for conservation; those using significantly higher volumes pay higher unit prices.




In a broader regional study, we found a close correlation between cities with dramatically increasing block rates and those with the lowest per capita consumption levels.[1] Along with other conservation and efficiency programs, effective rate structures can help stretch existing water supplies farther and avoid much of the cost, delay, and controversy that result from large, new water development projects. If designed appropriately, increasing block rates:

- Provide water at low prices for basic and essential needs, so *all* customers can afford it;
- Reward conserving customers with lower unit rates for water;
- Encourage efficient use by sending a strong conservation price signal;
- Assign water supply and development costs proportionately to the customers who place the highest burden on the supply system and the natural supply sources; and
- Do all of the above while still maintaining a stable flow of revenue to the utility.

[1] Western Resource Advocates, *Smart Water: A Comparative Study of Urban Water Use Efficiency Across the Southwest*, December 2003, at 74-86.

New Mexico communities use a wide variety of water rate structures, ranging from efficiency-based designs to rate structures that promote little or no efficient water use. A number of New Mexico cities and towns have incorporated increasing block rate designs that send strong conservation price signals. However, the results from this analysis indicate that most still have a lot of room for improvement.

This report discusses the various types of water rate structures and their effect on promoting efficient water use (pages 3 to 8). It then offers a comparison of the rate structures used in the seven largest New Mexico municipalities to see how these cities compare using rate structures as a water efficiency tool (pages 9 to 16).

## ***Introduction***

Water rate structures are becoming an important tool for encouraging the most efficient use of our precious water in the arid West. Many cities with water rate structures that accurately reflect the value of water and the costs of obtaining new water supplies have lower per capita water use and can stretch existing water supplies farther. These cities are able to avoid much of the cost, delay, and controversy that accompany large new water development projects. As a result, they're able to preserve the natural river systems that support habitat and the quality of life associated with outdoor experiences here in the West.

This paper offers a guide to the various pricing options that urban water managers and policymakers can use. It explains which options generate the strongest incentive for efficient water use and yield the fairest billing for consumers who place different levels of demand on water supply systems. It then compares a large sampling of current water rate structures in communities throughout New Mexico.

## ***What Is a Water Rate Structure?***

Like retailers of commodities such as electricity, municipal water utilities sell their product (treated water) to their customers, and charge the customers to cover the cost of the product plus the operation and maintenance of its supply and delivery system. Municipal water utilities set the prices for their retail water sales through their ***water rate structures***. If well designed, water rate structures communicate the true cost of water to the consumer. They also play an important role in setting price incentives that promote indoor and outdoor water conservation. Unfortunately, many water rate structures in New Mexico cities and towns do not yet effectively accomplish either of these objectives (see pages 9 to 16 for details).

Water rate structures are extremely important in promoting efficient water use, since water consumption levels are directly related to the price signals sent by rate structures. Many people assume that establishing a conservation price signal in a water rate structure translates to higher water bills for most customers. However, this is not necessarily the case. In fact, under well-designed structures, conserving households can actually save money. Innovative rate structures can promote efficient water use while maintaining an equitable and reasonable charge to customers. At the same time, well-designed rate structures can also provide the utility with a reliable revenue flow that covers its operation and maintenance costs.

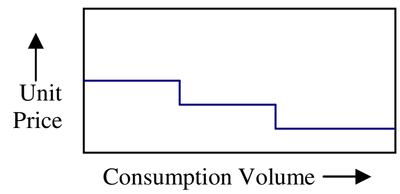
## ***What Are the Different Types of Water Rate Structures?***

Most water rate structures are made up of two charges. Both charges play a role in determining how effectively a water rate structure communicates an efficiency message to the customer.

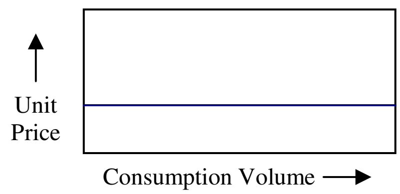
- ***Service charge*** = the fixed service fee per billing period, regardless of consumption level
- ***Consumption charge*** = the price for each unit of water consumed

With these two charges as a basis, the water supply industry uses four general types of water rate structures. However, many variations exist within these types. In addition, some cities and utilities apply hybrid rate structures that combine different components of the four basic types. The unit prices discussed here refer to the consumption charges for water sold to each customer, and do not reflect the service charges. These consumption charges, or ***marginal prices***, reflect the price for using the next measured amount of water, often set as dollars per 1,000 gallons or dollars per 100 cubic feet of water.[2]

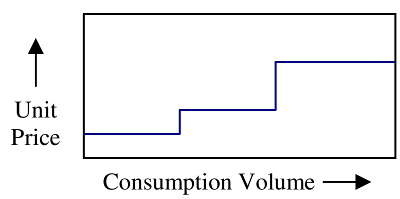
***Decreasing block rates:*** The unit price for water decreases as the volume consumed increases. The structure consists of a series of "price blocks," which are set quantities of water sold at a given unit price. The unit prices for each block decrease as the price block quantity increases.



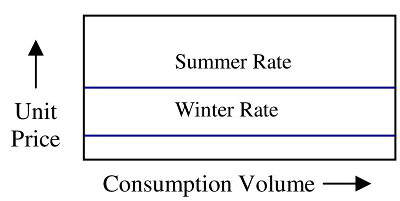

***Uniform rates:*** The unit price for water is constant, or flat, regardless of the amount of water consumed.




***Increasing block rates:*** The unit price for water increases as the volume consumed increases. This structure consists of a series of price blocks, where the unit prices for each block increase as the block volumes increase. Those who use low or average volumes of water will be charged a modest unit price; those using excessive volumes will pay higher unit prices. A variety of approaches can be applied to setting each block volume.




***Seasonal rates:*** The unit price for water is set to vary from season to season. Summer water rates are typically higher than winter rates in order to reflect the fact that water is more valuable, and costs more to provide, in the summer.




[2] Some smaller communities still use a flat consumption charge for all customers (i.e., not metered per unit of individual consumption), since individual metering systems are not adequate or in place.

## ***How Do Water Rate Structures Relate to Efficient Water Use and Conservation?***

**To promote efficiency, water rate structures must communicate the true cost of water.** Only if the price of water reflects the economic value of water will customers know whether it is "worth it" to conserve water. The true economic value of water includes: (1) the utility's operation and maintenance costs; (2) the costs to procure and develop additional water supplies to meet growing demands; and (3) the social and environmental "opportunity costs" of losing other benefits of the water in order to develop and consume the water (e.g., ecological and recreation values of river basins, local/community economies, values of river flows for diluting pollutants, etc.). Failing to integrate all of these social and environmental costs into a water rate structure is equivalent to subsidizing the cost of water. Furthermore, if the retail price of water is lower than its value, customers have an incentive to use too much of it.

Often a utility's "marginal" costs—the costs of meeting an increase in water demand with additional supplies—serve as a useful proxy for the value of water. If efficiency is a priority—and under conditions of limited water supply and increasing population, it should be—it is imperative that water rate structures send accurate signals about water's value. If a utility's rate structure accurately reflects its marginal costs, it should encourage efficiency. In other words, water use efficiency means saving water when doing so costs less than the value of the water saved. Although there are costs associated with saving or conserving water, these conservation costs are often lower than the total economic costs associated with developing and using water. Such factors usually include the cost of acquiring new water supplies, environmental costs, and socioeconomic costs, among others.

**Innovative rate designs can promote efficient water use and still assure utility revenue stability.** Water utilities are confronted with the challenge of recovering supply costs with revenues from water sales. System maintenance, facility operation, and procuring and developing future supplies all contribute to the utility's costs. With the exception of tax-based subsidies in some districts, most of these costs are recovered via the water rate structure, tap fees, and other surcharges. Given this arrangement, utilities have an inherent disincentive to promote conservation, since utility revenues are driven by higher water sales. However, water rate structures can be designed in ways that yield relatively stable and sufficient revenue flows, while still promoting efficient water use. Examples of this "win-win" scenario exist throughout the Southwest.

## ***Which Types of Rate Structures Promote the Most Efficient Water Use?***

**The *increasing block rate structure* most effectively encourages efficient water use.** An increasing block rate structure is set up to charge higher unit prices to customers who use more water and charge lower unit prices to customers who use less. In other words, the unit prices reflect the strain or demand a customer places on the water supply system. This design is fundamentally fair; customers are charged on the basis of the costs they impose on the utility. Because high-volume users expedite the need for infrastructure upgrades and new supply procurement, these high-volume customers are more expensive for the utility to maintain. It would be unfair to pass the costs generated by these relatively few customers on to those who use more moderate amounts. Thus, if designed correctly, increasing block rate structures reward customers for conservation.

Increasing block rate structures can maximize efficiency if the block volumes are individually customized to the specific water needs of each customer—this is called a ***water budget rate structure***. Under this design, each customer is assigned a monthly allotment of water based on the customer's lot size, irrigable area, climate conditions, and household/building occupancy. In most cases, the monthly allotment, or budget, provides enough water for each customer to sustain normal indoor uses as well as actual landscape irrigation needs based on local evapo-transpiration rates. If the customer exceeds the monthly water budget, the excess water use is charged at notably higher unit prices (as with the standard increasing block rate structure). In essence, each account has its own water rate structure attached to it. As a result, efficient customers pay a lower unit rate, while inefficient customers pay a higher unit rate.

Maximum water budget allotment limits can be set to avoid excessive water allotments to large lot owners. One way to do this is to incrementally decrease the water allotment per square foot as the irrigable area of the lot increases. This helps minimize the inequity of allocating water based on wealth (measured via lot size ownership). It also encourages large lot owners to apply a more water-efficient design to a portion of their landscaped yard.

**The *seasonal rate structure* also provides a conservation price signal when moving from winter to summer.** This design charges a higher unit rate in summer, when outdoor and other discretionary water uses are the highest. Most often, this design applies a uniform rate structure that varies in price from season to season. Thus, on a day-to-day basis within a particular season, the seasonal rate structure does not provide a price incentive for conservation because the unit price is constant regardless of the amount of water consumption each month. An exception to this rule occurs when the seasonal rate changes incorporate increasing block rates (e.g., uniform winter rate and increasing block summer rates).

**The *uniform rate structure* and the *decreasing block rate structure* provide no price incentive for water conservation.** Although a customer's overall bill will increase as water consumption increases in both of these rate structures, the unit price for water remains constant or decreases, respectively. Thus, the consumer has little or no price incentive to conserve and, in the case of the decreasing block rate structure, the consumer actually has a price incentive to use more water. This can encourage waste.

## *What Other Factors Affect a Water Rate Structure Design?*

*Equity for the Customers*

**Rate structures need to charge customers equitably.** This is a challenge, given the wide variety of customers. To meet this challenge, utilities must provide fairly and reasonably priced water to all customer types (i.e., from small volume users to large volume users) and across all customer sectors (i.e., residential, commercial, industrial, etc.). Increasing block rate structures meet the criteria for fairness: they charge customers on the basis of the amount of water they consume and also ensure that all customers can afford to pay for water essential uses. This design is inherently fair and reasonable because customers are charged according to the strain they impose on the utility's water supply. An inclining block rate structure allows providers to supply water for essential use at a lower cost per unit of water. This not only provides an incentive to conserve, but also ensures lower income consumers are able to meet their basic water needs at an affordable cost and can eliminate the subsidy to the high-volume users.

*Revenue Stability for the Utility*

**Rate structures must be designed to ensure that the utility recovers its costs.** A rate structure that will not allow a utility to recover its operation and maintenance costs will require a subsidy to the utility, typically at the taxpayers' expense. This often occurs when the utility prices the water at or below its average cost of collecting, storing, treating, and delivering the water. Conversely, a utility generally is only allowed to raise revenues that do not exceed and are reasonably related to its ***cost of service***.

Therefore, setting fixed service charges and consumption charges must be coordinated with customer demand projections to generate a revenue flow consistent with utility costs, which include operation, maintenance, as well as conservation program costs.

## ***What Factors Can Weaken the Effectiveness of a Water Rate Structure?***

*High Fixed Service Charges*

**High fixed service charges can weaken the intended conservation effect of an increasing block rate structure.** Setting appropriate fixed service charges is as important as setting consumption charges. When compared to consumption charges, fixed service charges offer a much more consistent revenue stream for a utility to cover its operation and maintenance costs. As a result, water utilities often prefer to set higher fixed service charges. However, a high fixed service charge coupled with relatively low consumption charges can encourage wasteful consumption—much like a "pay by the plate" dinner buffet.

In combination, both the service charge and consumption charge directly affect the ***average price*** for the water. The average price, which is what consumers see reflected in their bills, is defined as the monthly service charge plus the total consumption charges, divided by the total consumption volume. The average price directly affects consumption patterns, because consumers typically respond to the bottom line on their bills. When fixed service charges are factored into an increasing block rate structure, a conflicting message can result. According to studies by the American Water Works Association Research Foundation, "fixed service charges can offset the conservation incentives of increasing marginal rates."[3] This phenomenon occurs when high fixed service charges are used along with small block price increases.

If the block price increases are too small and/or the fixed monthly service charges are too high, the average price curve often declines and eventually becomes uniform, or flat. From the perspective of the customer's pocketbook in this scenario, each additional unit of water purchased will more or less have a constant price attached to it, even if the block prices (marginal prices) are increasing. When this occurs, the consumer will not experience any noticeable conservation price incentive.[4]

*"Price Insensitivity" as a Result of Minimal Consumption Charge Increases*

**Increasing block rate structures can also be ineffective in promoting efficient water use if the block price increases are small.** This is especially true in districts with an abundance of low-density, residential or commercial development, particularly areas with large, irrigated lawns. An important economic concept known as ***price insensitivity*** explains this phenomenon. In this case, price insensitivity refers to situations where block price increases are too small or negligible relative to a customer's overall water bill and/or disposable income. As a result, the increasing block rates are hardly enough to encourage conservation or demand reduction for high-volume customers with large disposable incomes. For example, a $0.20 block increase (per 1,000 gallons) does not create the incentive for a high-volume residential user to be efficient with lawn irrigation practices. This hypothetical consumer would only pay

[3] Ari Michelsen, J. Thomas McGuckin, and Donna M. Stumpf, *Effectiveness of Residential Water Conservation Price and Nonprice Programs*, American Water Works Association Research Foundation (AWWARF), 1998, at 13.
[4] "A rate structure with increasing marginal prices while the average price is declining sends mixed signals to consumers about their economic incentives to conserve water. Rate structures with any service charges, and in particular relatively large service charges in relation to the per unit cost and total water bill, are apt to create these mixed price signal conditions," AWWARF at 13-14.

an additional $2.00 for using 10,000 more gallons in this block.[5] Addressing this problem is very important since a small number of high-volume users can easily use more water, and place more strain on the supply system, than a large number of low-volume users.

*Billing Frequency and Communication to Customer*

**Customers' response to water rates is also influenced by the billing cycle and the ability to track their use.** For example, bi-monthly billing cycles can be counter-productive to water conservation efforts. Customers interested in conservation or saving money adjust their home water use on an incremental basis, in response to the consumption reported in each billing statement. This practice is particularly common during the summer irrigation months, when urban water use peaks. With a bi-monthly billing cycle, the summer can be half over by the time customers are notified of their recent consumption quantities. This may preclude many customers from making more efficient water use decisions earlier in the summer during the high water-use months.

Customers are more likely to practice water conservation if they have easy access to their account information. Although billing statements typically summarize each household's water use during the previous month period, other opportunities could be made available on a more frequent basis. For example, as computerized utility accounting systems become more streamlined and modernized, it will be possible to provide real-time account access via the utility website. In-home, remote meter-monitoring technology is also becoming available. With these types of tools, customers will have the opportunity to monitor daily or weekly water use trends and adjust their use accordingly.

## ***How Can I Evaluate My City's Water Rate Structure?***

When analyzing water rate structures and billing policies, ask the following questions:

- Do the consumption charges, or marginal prices, send a conservation price signal that clearly demonstrates that water conservation yields lower water bills?
- Does a high monthly service charge decrease the customer's incentive to conserve?
- Are the consumption charge increases in an increasing block rate structure noticeable to all customers, or are high-volume water users unaffected by the modest block price increases?
- Do the water rates reflect the true value of water, incorporating system operation costs, social costs, environmental costs, as well as the costs for acquiring future supply sources?
- Does the billing frequency and statement summary enable the customer to effectively monitor water use and adjust conservation efforts accordingly?

As with most public affairs, local socioeconomic trends and variables must be considered when assessing appropriate water policy implementation. For example, an effective price structure in one community may be ineffective or regressive in another community, depending on the socioeconomic status and demographic makeup.

---

[5] The challenge that many water utilities face is setting block prices that will have a significant effect on customers that use large volumes and have high disposable incomes without creating an inequity, or regressive tax, on lower income brackets. An aggressive increasing block rate structure appears to be the most ideal tool for this socioeconomic conundrum. This design would charge substantially higher unit prices for high-volume use, while the low-volume use for basic needs would be charged at a much lower, more affordable rate.

## ***How Do Water Rate Structures Compare Across New Mexico?***

In May 2005, we gathered water rate data from the municipal water utilities in the seven largest cities of New Mexico. This sampling provides a good cross-section of New Mexico water providers, both in geographic distribution and community size. Although the variation in rate structures used across New Mexico can be seen as a rough indication of how each city prioritizes water conservation, each utility has a different water supply situation and different costs associated with these supplies. As a result, water prices and rate structures can be expected to vary somewhat regardless of each city's commitment to conservation. Table 1 lists the components of each rate structure, as implemented by these water providers in May 2005.

As shown in Table 1, four of the seven water providers in the analysis sample apply some form of an increasing block rate structure (Alamogordo, Albuquerque, Rio Rancho, and Santa Fe), with the remaining three using a uniform rate structure (Farmington, Las Cruces, and Roswell). A few years ago, increasing block rate structures were even less common in New Mexico. We can be encouraged by the fact that some New Mexico cities are taking steps towards promoting efficient water use through their rate structures. In these cases, water is charged at a higher unit rate as consumption volumes increase. Conceptually, the customers that place a higher strain on the supply system pay a higher unit rate for their water. Therefore, if the rate structure is designed effectively, customers receive a conservation price signal ... use less, and pay less per unit.[6]

However, this seven-city sampling reveals that most New Mexico cities have a lot of room for improvement in promoting efficient water use via their water rate structures. We also see significant variations in the design of the four increasing block rate structures, ranging from very weak to very progressive designs. The number of blocks (ranging from two to five), the block volume thresholds, and the block prices vary substantially in these cities. These design characteristics directly affect how the rate structure promotes efficient water use.

For example, the block price increases and volume thresholds in Santa Fe and Alamogordo send very strong conservation price signals to most customers. Whereas, in Rio Rancho, the two blocks and the relative modest block price increase between these blocks send a weak price signal for two reasons. First, customers who do not use more than 20,000 gallons per month receive no price signal in Las Cruces, as they pay the same unit rate for all use less than 20,000 gallons. This amounts to a large portion of the Las Cruces customer base. Secondly, for the customers who exceed 20,000 gallons of use, their unit rate only increases by $0.31 per 1,000 gallons. So, an additional 10,000 gallons of will only cost an additional $3.10 above the same volume of use in the previous block.

Also, given the issues raised in the previous section regarding marginal prices and average prices, take note of *both* the fixed service charge and the consumption charge for each municipal utility, and consider the potential effect of both of these charges on water consumption trends. Once again, high fixed service charges combined with minimal block price increases, can yield an ineffective increasing block rate structure (also see discussion of average price comparisons later in this section).

[6] Using Santa Fe as an example of an increasing block rate structure (during summer months), a customer pays $13.20 for the fixed monthly service charge, in addition to paying $4.09 per 1,000 gallons for the first 12,000 gallons used, $6.59 per 1,000 gal. for the next 8,000 gal. used (between 12,000 and 20,000 gal. total), and $9.09 per 1,000 gal. for any water use that exceeds 20,000 total gal.

## Table 1
## Water Rates for Residential Accounts in New Mexico Municipalities (5/8" - 3/4" Services), as of May 2005

| Municipality [Water Provider] | Rate Structure Type | Fixed Monthly Service Charge | Consumption Rate: Unit Rate per 1,000 Gallons of Water Consumed *(a) |
|---|---|---|---|
| **Alamogordo *(b)** (City of Alamogordo and U.S. Filter, Inc.) | Increasing Block Rate (five blocks) | $9.81 | $1.37 – up to 11,220 gal.<br>$2.07 – from 11,220 to 22,440 gal.<br>$3.30 – from 22,440 to 29,920 gal.<br>$5.22 – from 29,920 to 37,400 gal.<br>$7.91 – over 37,400 gal. |
| **Albuquerque *(c)** [City of Albuquerque Water Utility Dept.] | Seasonal and Increasing Block Rate (three blocks) | $11.41 | Nov.- March: $1.64<br>April- Oct.:<br>$1.85 - up to 300% of average use<br>$2.83 - 300% avg. use to 399% avg.<br>$3.82 - over 400% avg. use |
| **Farmington** [City of Farmington and Operations Management International, Inc.] | Uniform | $8.11 | $1.62 |
| **Las Cruces *(d)** [City of Las Cruces Utilities Dept.] | Uniform (with a 3,000 gal. subsistence block) | $6.82 | $0.88 – up to 3,000 gal.<br>$1.74 – over 3,000 gal. |
| **Rio Rancho** [City of Rio Rancho Utilities Dept.] | Increasing Block Rate (two blocks) | $8.30 | $2.32 – up to 20,000 gal.<br>$2.63 – over 20,000 gal. |
| **Roswell** [City of Roswell Water Dept.] | Uniform | $8.25 (includes 3,000 gal.) | $1.00 – over 3,000 gal. |
| **Santa Fe *(e)** (City of Santa Fe Water Division) | Seasonal and Increasing Block Rate (three blocks) | $13.20 | Nov. - April: $4.09<br>May - Oct.:<br>$4.09 – up to 12,000 gal.<br>$6.59 – from 12,000 to 20,000 gal.<br>$9.09 – over 20,000 gal. |

*Notes:*
(a) The listed consumption charges do not include the additional State Water Conservation Fee that goes to the State of New Mexico.
(b) The City of Alamogordo measures water use in 100 cubic feet increments, or CCF. 1 CCF = 748 gallons. To maintain consistency with the other listed cities in the survey, Alamogordo consumption charges and volumes have been converted to "per 1,000 gallons" and "gallons," respectively. The listed Alamogordo rates apply to "inside city" customers. U.S. Filter manages the water treatment and distribution, but pricing and billing are administered by the City of Alamogordo.
(c) The City of Albuquerque measures water use in 100 cubic feet increments, or CCF. 1 CCF = 748 gallons. To maintain consistency with the other listed cities in the survey, Albuquerque consumption charges and volumes have been converted to "per 1,000 gallons" and "gallons," respectively. Also note, Albuquerque's fixed service fee includes a base rate ($7.83), and a Strategy Implementation Fee ($3.58) totaling to $11.41 per residential account per month. The City of Albuquerque applies "Seasonal Surcharges" that result in a seasonal rate structure with increasing block rates during summer months. The 2005 average winter monthly use for most single family accounts was 5,236 gallons; this is charged at the "commodity" rate. The higher blocks are determined based on the average use with a surcharge of 1.5 times the commodity rate charged when consumption reaches 300% of average. Twice the commodity rate is charged when consumption reaches 400% of average. The consumption charge, which is based on water use volume, includes fees for facility rehabilitation, the Sustainable Water Supply Program, the Water Resource Management Program and the State Water Conservation Charge.
(d) Although the Las Cruces rate structure technically has two blocks (for use less than and greater than 3,000 gallons), it is classified as a uniform rate structure in this analysis since this low-use block is primarily intended to provide cheaper water for "subsistence" indoor use. This 3,000 gallon block does not serve as a conservation price signal for the vast majority of customers since they will likely use 3,000 gallons regardless of their conservation efforts.
(e) The City of Santa Fe applies "Seasonal Surcharges" that result in a seasonal rate structure with increasing block rates during summer months. More specifically, from November through April, water use is charged at $4.09 per 1,000 gallons (kgal). However, from May through October, the City applies the summer surcharges of $2.50/kgal for use over 12,000 gallons, and $5.00/kgal for use that exceeds 20,000 gallons. The end result is a summertime increasing block rate structure with three blocks. In addition, when in drought Stages II, III, or IV, the City charges an additional $15.00/kgal for use over 10,000 gallons, and $25.00/kgal for use over 20,000 gallons. At the time of the data collection for this report, Santa Fe was in a "Stage II" drought condition. However, to maintain a consistent comparison with other cities, Santa Fe's drought surcharges are not included in this comparative table.

Interestingly, Santa Fe and Albuquerque use a seasonal rate structure and an increasing block rate structure in combination, with the increasing block rates only being applied during the irrigation season (i.e., summer months). The use of this combined rate structure adjusts to the changing cost or value of water throughout the year while still providing a price signal *within* the high demand months.

The three cities that apply uniform rate structures (Farmington, Las Cruces, and Roswell) do not send conservation price signals to their customers. In each of these cities, all customers pay the same unit price for water, regardless of how much they use. The only minor exception to this is Las Cruces, which employs an initial "subsistence block" that provides a small amount of water at a lower unit price to allow for absolutely essential indoor uses (e.g., bathing/showering, drinking, dishwashing, and toilet use). However, Las Cruces applies a uniform rate for all use beyond these essential needs.

Similarly, Roswell includes 3,000 gallons of subsistence water with its fixed monthly service charge. Therefore, all Roswell customers get 3,000 gallons of water with no consumption charge. This strategy does not promote efficient water use within these initial volumes. Instead, it provides an "automatic" water delivery for essential indoor uses for all customers. In most cases where this approach is used in other cities of the Southwest, the initial volume of water included with the service charge typically equates to the average monthly indoor water use per household (roughly 3,000 to 7,000 gallons).

In all four increasing block rate structures in the sample, the price blocks are set according to fixed consumption volumes that apply to all customers, regardless of a customer's lot size, household size, or previous water use patterns. None of the seven water providers with increasing block rates apply a ***"water budget"*** allotment design. With a water budget rate structure, individual block volumes would be established for each customer depending on that customer's particular use patterns or needs (which relates to lot size, vegetation evapo-transpiration rates, household occupancy, and other factors). If designed appropriately, New Mexico cities could attain a higher level of efficiency and equitability if they applied water budget concept to their rate structures. This rate structure design is more common in Colorado (e.g., Aurora, Centennial Water & Sanitation District, Inverness, Castle Pines, and Cottonwood). The City of Boulder, Colorado also recently approved a water budget rate structure for future implementation, and the City of Greeley is currently considering it.

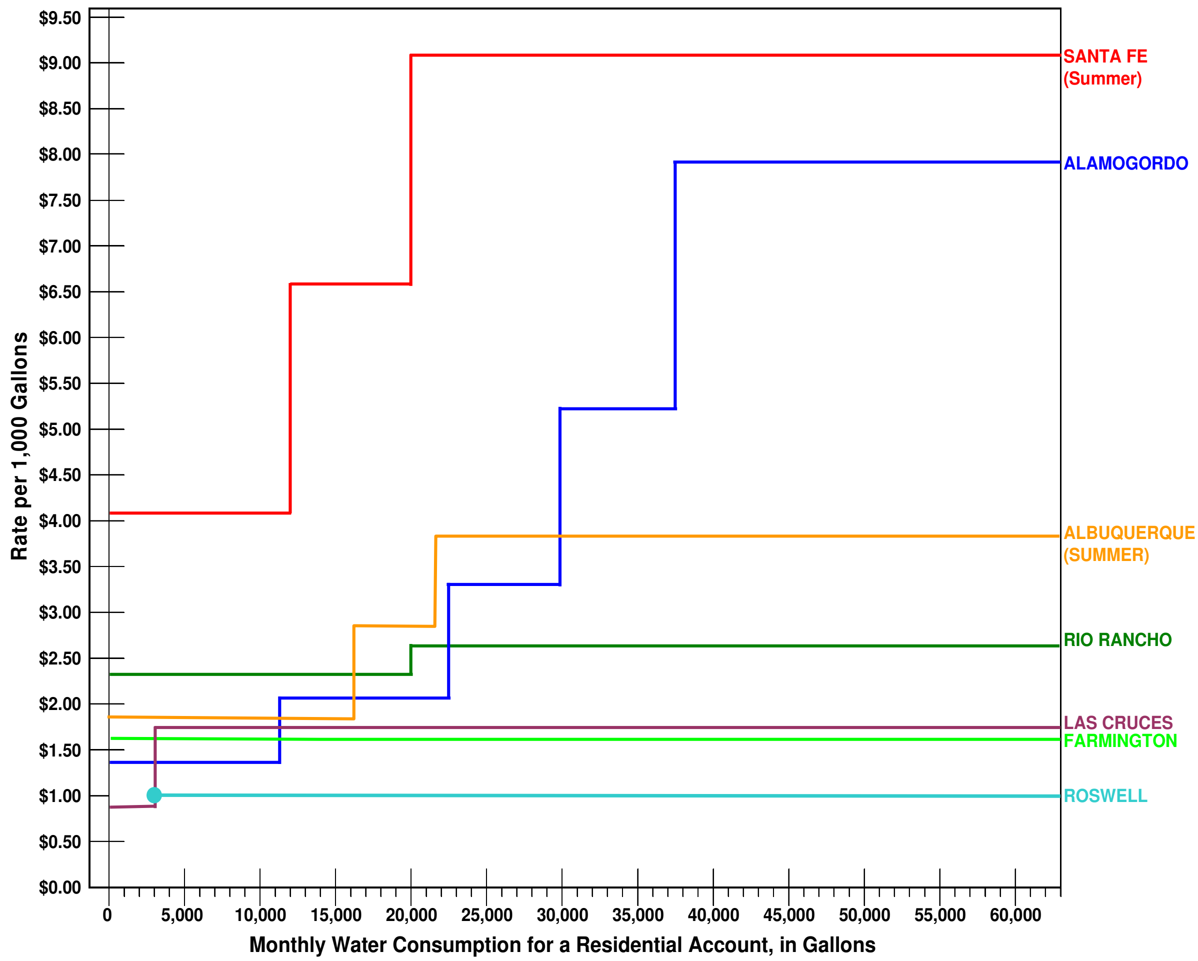
### *How Do the Marginal Prices for Water Compare? (Consumption Charges)*

The consumption charges billed by a water utility relay the ***marginal price*** of the water, or the price for the next unit of water consumed. The analysis of the marginal price curves for the various water rate structures distinctly reveals the differences in efficiency incentives. The water providers in this analysis used different types of rate structures as of the spring of 2005, ranging from uniform rate structures to a variety of increasing block rate structures. Each of these pricing designs has a unique marginal price curve. Plotting all of these marginal price curves on one graph exposes the significant distinction in economic effect of each price structure. Figure 1 illustrates this effect. The following two marginal price curve characteristics are especially important to consider when viewing Figure 1:

- Differences in curves between the uniform and increasing block rate marginal price curves; and
- Significant variations in block prices and block volumes amongst the water providers that use increasing block rate structures.

The graph in Figure 1 plots the consumption charge (unit price) for varying volumes of water use. The graph reveals the wide range of marginal price curves for water customers in cities across New Mexico. In some cities, water is sold at relatively low, uniform unit prices with no conservation price signals. On the other end of the spectrum, cities such as Alamogordo and Santa Fe (summer only) have built in consumption charges that increase dramatically with use, resulting in effective conservation price signals.

**Figure 1**
**Marginal Price Curves (Consumption Charges) of Water Rate Structures in New Mexico, as of January, 2006**




*Notes*: (1) The Santa Fe marginal price curve does not include the drought surcharges.
(2) The Roswell marginal price curve begins with a "●" to indicate the initial volume of water that is included with the fixed monthly service charge.
(3) The price graph does not extend beyond 60,000 gallons per month since the vast majority of customers use less than this amount.
(4) Albuquerque's marginal price curve will apply in the summer of 2006 but was not in effect during the summer of 2005.

Farmington and Roswell

Water customers in these cities pay for their water via uniform rate structures. As shown in Figure 1, the marginal price lines for the rate structures in these cities are flat. No matter how much water customers use, they pay a constant unit rate for the water. As a result, high-volume use customers in these cities have no price incentive to conserve water. In addition, the water supply costs are distributed evenly across all customers, regardless if someone is a low-volume, conserving customer or a high-volume and/or wasteful customer.

Las Cruces

As noted earlier, the Las Cruces water rate structure is technically an increasing block structure with two blocks. But, since the first block is primarily intended as a low-price subsistence block (up to 3,000 gallons), this rate structure essentially functions as a uniform rate structure for most customers. Thus, the marginal price curve for Las Cruces in Figure 1 is flat beyond 3,000 gallon threshold. As in Farmington, and Roswell, most water customers in Las Cruces do not have a price incentive to conserve.

Alamogordo and Santa Fe

Figure 1 graphically reveals the noticeable price increases (or signals) that customers in Alamogordo and Santa Fe experience as their water use increases. The block prices increase by significant percentages when customers use higher and higher volumes of water. The amount and percentage increases of Alamogordo's and Santa Fe's rates send strong efficiency messages to customers. These rates are substantially higher than the rates of all other rate structures in the sampling.

As illustrated by Figure 1, the three most notable differences between the increasing block rate structures in Santa Fe and Alamogordo are:

(1) Santa Fe's unit prices increase to higher levels and at a faster rate (i.e., at lower volumes of use) than Alamogordo's prices (i.e., a steeper price curve);
(2) Alamogordo's overall five blocks provide a more gradual "stair step" to higher unit prices than Santa Fe's three blocks; and
(3) Alamogordo's third, fourth, and fifth blocks extend out to higher volumes than Santa Fe's third/final block, sending incremental price signals to customers that use over 22,440 gallons, 29,920 gallons, and 37,400 gallons, respectively. The increasing price signals end at 20,000 gallons of use in Santa Fe.

These differences between two effective increasing block rate structures demonstrate the different conservation pricing strategies that cities can employ to "reach" particular customer types. In some communities, a higher and steeper block rate structure may be necessary to aggressively promote efficient use for all customers, even at relatively low volumes. In other communities, only the higher-volume customers may be the primary target group for dramatically higher rates.

It also very important to note that steep increasing block rate structures can effectively promote efficient water use even if the block prices aren't as high as they are in Alamogordo or Santa Fe. In other words, the "shape" of the marginal price curve is just as important as the actual price amounts.

Albuquerque

The City of Albuquerque's rate structure sends a moderate conservation price signal to high volume residential users during the summer months; however, more than two-thirds of customers' use is below the 300% average winter use threshold and therefore receives no price signal from the surcharge at all. When consumption reaches 400% of average winter use; the cost per unit of water for the user is doubled, sending a stronger price signal to those who reach this level of use. The city of Albuquerque employs a rate structure that targets middle- to high- volume water users. However, they have only three tiers to their rate structure, and therefore a customer can use 25,000 gallons or 80,000 gallons and still pay the same price per unit of water. Adding in additional tiers for high volume users would send a more effective conservation price signal to the largest water users.

Rio Rancho

Unlike Alamogordo and Santa Fe, the rate structure in Rio Rancho does not effectively send a conservation price signal to customers. Although Rio Ranch applies an increasing block rate structure by definition, as designed, this rate structure in effect functions as a uniform rate structure to the high-volume customers who place the highest burden on the water supply. The modest $0.31 unit price increase (from $2.32 to $2.63) that customers experience when they exceed 20,000 gallons is relatively insignificant to customers who are accustomed to using (and paying for) large volumes of water. Figure 1 sheds light on this. When compared to the marginal price curves in Alamogordo and Santa Fe, the block price increase in Rio Rancho appears very modest, if not negligible.

Equally important, the principle of "price insensitivity" applies to Rio Rancho's rate structure. For example, a customer that uses 20,000 gallons of water should have a water bill that reaches $54.70 per month ($8.30 for the fixed monthly service charge and $46.40 for the consumption charge, billed at $2.32 per 1,000 gallons). Now, suppose the customer chooses to use up to 30,000 gallons in a particular month. The minimal $0.31 unit price increase to $2.63 per 1,000 gallons under Rio Rancho's block rate structure only charges this customer an additional $3.10 for the next 10,000 gallons of use (beyond what he/she would pay at the previous block price of $2.32). So, instead of having a water bill of $77.90 (assuming a uniform rate of $2.32 per 1,000 gallons for all water), this customer has a water bill of $81.00 under Rio Rancho's increasing block rate structure. For high-volume customers that can afford monthly water bills in this range, the few extra dollars triggered by Rio Rancho's increasing block rate can be considered financially negligible. As a result, these customers do not have an adequate price incentive to be efficient with their use.

*How Do the Average Prices for Water Compare? (Consumption Charges + Fixed Service Charges)*

Generally, water customers respond to the overall water bill, which is reflected in the ***average price***. The average price of water is the fixed service charge (fixed price) plus the consumption charge (marginal price(s) multiplied by consumption volume), divided by the total consumption volume. Therefore, both the fixed service charge and the consumption charges combine to determine the resulting conservation price signal sent to customers.

$$\textbf{\textit{Average Price}} = \frac{\text{Fixed Service Charge + (Consumption Volume x Marginal Price(s))}}{\text{Consumption Volume}}$$

To maintain a noticeable price signal for the consumer, the average price needs to rise as consumption volume increases. If the average price curve is relatively flat or declines as the consumption volume increases, there is little price incentive to conserve water, as the unit price for water remains relatively constant no matter how much water the customer uses.

Figure 2 illustrates a small sampling of average price curves in five cities with rather different rate structures and displays how the average price for water can be significantly affected by an overall rate structure. The distinct differences in these five average price curves should be noted, with the general trends applied to rate structures in other cities.

As shown in Figure 2, Alamogordo's and Santa Fe's average price curves ascend very quickly when a customer uses more than 22,000 gallons and 12,000 gallons, respectively. Customers that exceed these use levels receive a strong price signal as their consumption increases—the more they use, the higher the average price per unit. The steepness of Alamogordo's and Santa Fe's increasing block rate structures (as shown if Fig.1) is responsible for this trend.

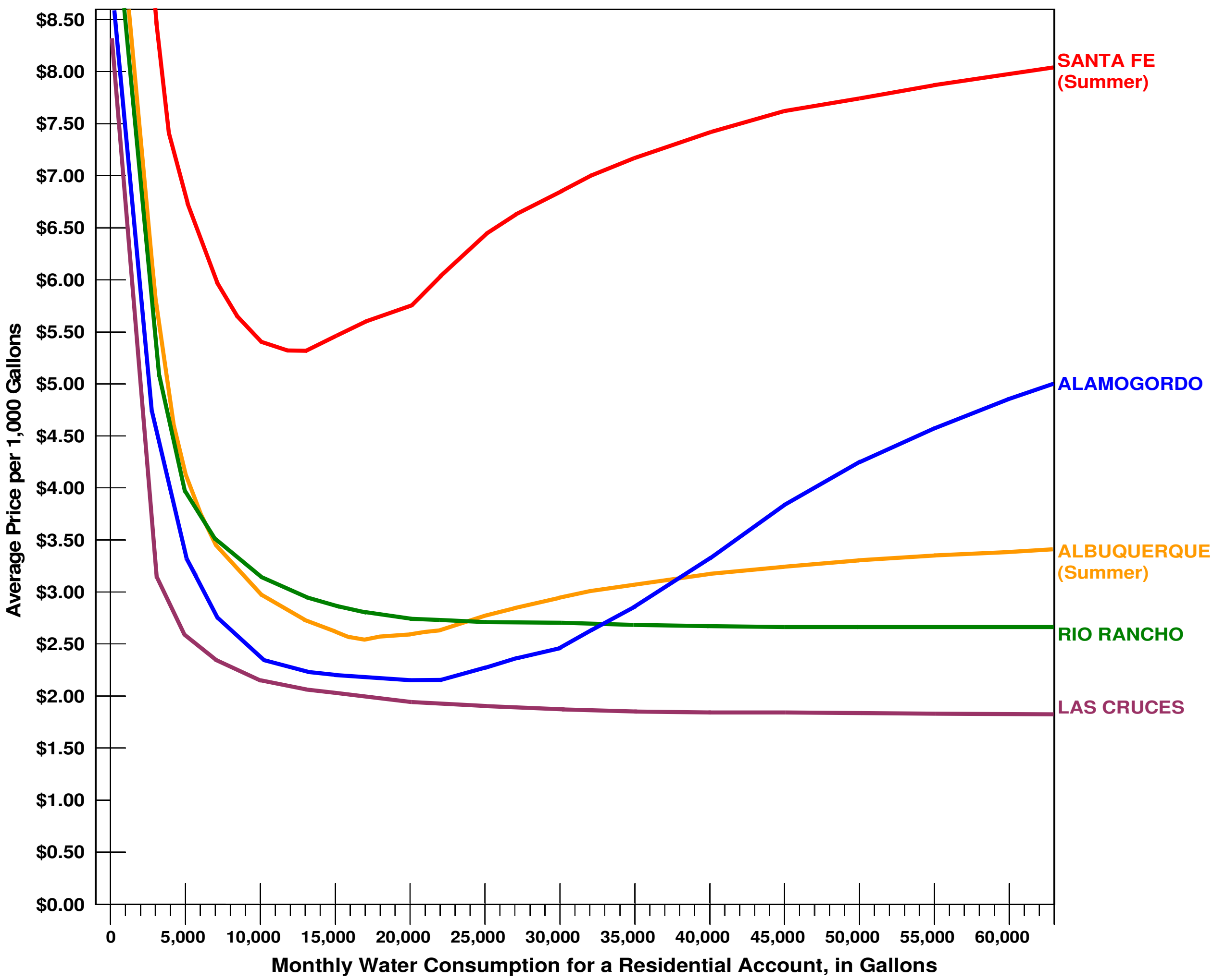
Customers in Albuquerque also receive a price signal that indicates the more they use, the higher the average price per unit. However, the lack of additional tiers at higher volumes does not provide a strong incentive for efficiency among high volume users.

Conversely, Las Cruces' uniform rate structure (and flat marginal price) results in an average price curve that sends no conservation price signal. As consumption increases, the average price for the water decreases in Las Cruces. The customers in these cities have no price incentive to be efficient.

Rio Rancho's average price curve behaves in a very similar fashion to Las Cruces' even though Rio Rancho applies an increasing block rate structure. Due to its negligible block price increase (as described in the previous section), Rio Rancho's average price curve indicates that the rate structure offers little incentive for efficiency. The average price for water decreases as volumes increase.

Since Farmington and Roswell also employ uniform rate structures, the shape of the average price curves for these two cities (not shown in Figure 2) would look rather similar to those of Albuquerque, Las Cruces, and Rio Rancho, although the price points would be slightly different.

**Figure 2**
**Average Price Curves (Fixed Service Fees plus Consumption Charges) of Water Rate Structures in New Mexico, as of January 2006**




*Note*: (1) The Santa Fe marginal price curve does not include drought surcharges.
(2) The price graph does not extend beyond 60,000 gallons per month since the vast majority of customers use less than this amount.

## ***Conclusion***

Water is sold to customers under a wide variety of rate structures from city-to-city. Because water rate structures communicate the value of water to the customers, they can provide a great incentive to improve efficiency of water use.

No amount of talking about conservation is as effective as properly structured rates. But the benefits of a good rate structure are undercut when the state or federal government subsidizes water projects, removing information about the real costs of a project. Federal and state funding makes sense when it provides goods that individuals cannot purchase, such as national defense, or public lands. Research into water problems is a legitimate investment. But, if the government throws money at the water problem, it undercuts citizens in their ability to undertake sound water planning and respond appropriately to shortages. Put another way, if water in a particular city or village is made inexpensive by an outside subsidy, it will send the wrong signal to the people who live there about the true cost of water and distort decision-making about water-related matters.

*A Current Snapshot of Rate Structures in New Mexico Cities*

This seven-city comparative analysis reveals the disparity in the way New Mexico water utilities charge for the water they sell and, thus, how they communicate the value of water to their customers. Although some New Mexico cities have taken dramatic steps in recent years to promote efficiency via water rate structures, many more still have a lot of room for improvement. In many cities, customers who use excessive amounts of water pay disproportionately low unit prices for their water. Large-volume customers place the highest strain on the water supply and on New Mexico's rivers and aquifers, and are thereby accelerating the need for additional water supply and storage. Most of these water development needs come with large price tags and impacts, which, in the end, are paid for by *all* New Mexicans.

Rate structure inequity and inefficiency are most evident in the cities that apply uniform rate structures. Uniform rate structures do not send a conservation message and do not encourage efficient use.

Although increasing block rates can be used to promote efficient water use, as demonstrated by Alamogordo and Santa Fe, some cities in New Mexico and the Southwest that apply increasing block rates are not effectively sending a conservation message through their rates. In most of these cases, the block price increases are too minimal to persuade most high-volume customers to use water more efficiently and/or reduce their demand. In other cities with increasing block rates, the volumes of each block are set in ways that allow significant levels of inefficient use before price incentives are triggered.

*Steps for the Future*

Our analysis and research indicates that a more effective approach to maximizing efficiency via New Mexico's municipal water rate structures is to: (1) impose increasing block rates with sharp increases in rates for excessive amounts of water use, while not increasing rates for lower levels of use; and (2) setting block volume thresholds at consumption levels that capture inefficient use by more customers. This approach will give New Mexico cities more effective rate structures, since the "staircase effect" of rates would be notably steeper and more evident. As a result, water utilities in New Mexico cities and towns would be encouraging their customers to use water more efficiently.

A large number of water utilities in New Mexico and throughout the West have already moved towards increasing block rate structures in recent years. Many cities that have turned to more aggressive increasing block rates are benefiting from noted decreases in per capita consumption. As a result, these cities may be able to avoid or delay much of the cost and controversy that accompany new water development and diversion projects. In turn, these communities are helping preserve the natural river systems and aquifers that support our quality of life here in the West.

Droughts may come and go, but New Mexico will always be situated in a semi-arid or arid desert, with its water "lifeline" being a finite resource. With population growth compounding the demand, New Mexicans have no choice but to face the challenge and become more efficient in the ways they use water. More effective increasing block rate structures are an important step in the right direction.

**For reports and information on water use efficiency and our important water resources, please contact:**

**Western Resource Advocates**
2260 Baseline Road, Suite 200
Boulder, CO 80302
(303) 444-1188
www.westernresourceadvocates.org