

## A. Water Conservation

### *Introduction*

Ensuring an adequate water supply for any use is no longer only a matter of developing new sources. Conservation has become an essential part of the water supply equation. Over the last 10 years conservation has been shown to be a cost effective way to extend a given water supply. This issue discussion describes available conservation measures, current conservation activities in Nevada and in other states, and recommendations for addressing future needs. It is not the intent of this discussion to advocate conservation purely for the sake of conservation. Conservation should be recognized as one of many water resource management tools that should be considered when it makes sense in terms of economics and overall resource management.

### *Background*

Numerous case studies have shown that a good conservation program can reduce demand significantly. Conservation measures can be pursued by all water users regardless of the type of water system, i.e. municipal, irrigation, private home, commercial or industrial, etc. Following is a description of conservation measures available for municipal, agricultural and other water users.

### **Municipal Conservation**

Conservation is becoming an important tool to help public water systems manage water demands and infrastructure needs, especially in fast growing areas. The main incentive for municipal systems to implement conservation measures is economics. For instance, conservation can defer the need for investment in expanded water supplies and costly infrastructure such as water treatment systems. Less water used within a municipal water system means less wastewater that must be treated at the wastewater treatment plant, potentially saving some additional treatment and infrastructure costs. On the other hand, conservation may impact treatment process due to higher waste concentrations in the wastewater, and result in less water available for reuse of reclaimed water, less return flows back into stream systems, and less recharge of shallow aquifers, thereby potentially affecting other water users. Consideration needs to be given to all of these factors when developing a conservation program.

A comprehensive municipal water conservation program typically includes features such as: water system audits and leak detection, a public information and awareness program, utilization of increasing block billing, new ordinances, installation of low flow fixtures, landscape demonstration projects, use of drought tolerant plants, implementation of a xeriscape program, and installation of meters to help establish a baseline to evaluate the water conservation program and to provide a basis for billing. Many of these features can also be part of a conservation program for a private home, or commercial or industrial water system, depending on the specifics of each system. In addition, commercial and industrial systems may take advantage of other measures aimed at improving water

use efficiency as related to heating, cooling, sanitary, kitchen and processing needs.

### **Agricultural Conservation**

Agricultural support agencies such as the U.S. Natural Resources Conservation Service can frequently assist irrigators in analyzing their water management program and selecting the best management practices to implement. The Natural Resources Conservation Service offers financial, technical, and educational assistance to implement conservation practices. Using this help, farmers and ranchers can apply practices that reduce soil erosion, improve water quality, and enhance wetlands, grazing lands and wildlife habitat. Agricultural conservation measures typically include: laser leveling of fields, lining of ditches, use of soil moisture monitoring devices, conversion from flood to overhead or drip irrigation methods, selection of low water use crops, reusing water on-site and an analysis of water management practices on site.

Conservation can provide a number of financial benefits. With conservation, water users can stretch available supplies during drier periods; reduce groundwater pumping and power costs; and under a “credit for conservation” program, conservation can allow for the expansion of irrigated land, leasing or sale of saved water to another user or for instream flow purposes.

### **Conservation for Other Water Uses**

Opportunities for water conservation in industrial and commercial facilities include capturing steam condensate in boilers and HVAC (heating, ventilating and air conditioning) systems for reuse, eliminating single-pass cooling in cooling tower operations, using closed-loop systems for water-cooled equipment, and installing low-flow plumbing fixtures.

### ***Conservation in Nevada***

At this time, the State has no comprehensive program for promoting and encouraging conservation, or for assisting water use entities in developing water conservation strategies. However, in recent years the State has instituted some statutes and regulations encouraging conservation. Following is a discussion of existing conservation efforts within Nevada and some of the challenges being faced.

### **Water Law and Conservation**

State water law is based on the principle of beneficial use. A water user must show that the permitted water is being beneficially used in order to perfect the right through the issuance of a water

right certificate. Water rights can be lost through forfeiture or abandonment<sup>1</sup>. Certificated groundwater rights come under Nevada’s forfeiture statute. In most instances, the groundwater must be used at least once in every consecutive five year period in order to preserve the water right. If not, it may be lost through statutory forfeiture. Pre-statutory (pre-1913) rights to surface water are exempt from forfeiture, but may be subject to abandonment if clear and convincing evidence showing intent to abandon is presented. By statute any water right lost through forfeiture or abandonment returns to the public waters of the state and may be subject to re-appropriation by others. The water law regarding abandonment and forfeiture is subject to change due to evolving case law.

Cities, towns and municipalities are generally granted latitude in the speed with which they must show beneficial use. Municipalities and water companies are allowed to hold water rights in the permit stage for future growth, but eventually must put the water to beneficial use in order to perfect the right.

The beneficial use rule (“use it or lose it”) as it applies to perfected (certificated) water rights does not encourage conservation. Water users do not have an incentive to reduce water use as they must show continuous beneficial use in order to preserve their right to use the water in the future. However, other aspects of the water law support conservation (See discussion on “Credit for Conservation”). Also, a number of sections in NRS 533 and 534 do prohibit the wasting of water.

### **Credit for Conservation**

Water users have expressed a desire to obtain credit for water they save through conservation. With this credit, the water user could be allowed to use the saved water on additional lands or for additional homes, lease or sell the saved water, or dedicate the saved water to instream flows. The State Engineer has explained that this option is already available under existing water law. In fact, the State Engineer has approved applications allowing the use of existing water rights for expanded uses, as long as the expanded uses do not increase the total consumptive use, does not impact other water right holders, are not located in a fully-appropriated basin, and actual water savings can be demonstrated over time. Data shows that few water users have taken advantage of this option or even know it exists. It appears that either few are aware of the “credit for conservation” permitting process, the process is too cumbersome, water use data is not available to show actual savings, or the permitting process is not viewed as sufficiently beneficial to provide an incentive to conserve.

### **Conservation Plans**

In 1991, the Nevada State Legislature enacted a law requiring that each “supplier of water” for municipal, industrial or domestic purposes adopt a water conservation plan based on the climate and the living conditions in its service area by July 1, 1992. For publicly owned utilities, NRS 540.121

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<sup>1</sup>In the case of *In re Waters of Manse Spring*, 60 Nev. 280 (1940), the Court clarified the meaning of abandonment and forfeiture by stating “While, upon the one hand, abandonment is the relinquishment of the right by the owner with the intent to forsake and desert it, forfeiture, upon the other hand, is the involuntary or forced loss of the right, caused by the failure of the appropriator or owner to do or perform some act required by the statute...The element of intent, therefore, so necessary in the case of an abandonment, is not a necessary element in the case of forfeiture.”

through 540.151 was added to specify the contents of the plans and the process and timeframes to be followed. NRS 704.662 through 704.6624 was added to establish conservation plan requirements for those utilities regulated by the Public Service Commission (now the Public Utilities Commission). Water users located within Bureau of Reclamation projects (such as the Newlands Project, Southern Nevada Water Authority) are required to submit conservation plans to the Bureau. Issues relating to the conservation plan statutes include:

- Thus far, only about 100 out of 700 public water systems have approved conservation plans. However, those systems that do have approved plans serve about 95 percent of the total population served by public water systems. Under the Division of Water Planning's *Small Community Water System Grant Program*, approved conservation plans are required prior to the granting of any funds.
- There are no assurances that plans are actually being implemented or are effective as no ongoing reporting is required.
- There are no statutory requirements that plans be updated periodically to meet changing needs or new technological developments.
- The state has not funded the water conservation plan program. There are no specific staff to help water systems develop water conservation plans, to review the plans once they are submitted to the Division or to follow up with the water systems to ensure the plans are being implemented.
- Only municipal water systems are required to submit conservation plans to the State. These users account for only about 13 percent of the total water withdrawn in Nevada.

### **Low Flow Plumbing Standards**

The Nevada Legislature passed Assembly Bill 359 in 1991 thereby imposing certain minimum standards for plumbing fixtures (toilets, showers, faucets and urinals) in new construction and expansions in residential, industrial, commercial and public buildings. Each county and city was required to include these requirements in its building code or to adopt these requirements by ordinance, and to prohibit by ordinance the sale and installation of any plumbing fixture which does not meet the minimum standards.

In 1992, the U.S. Congress passed the National Energy and Policy Conservation Act which set nationwide minimum flow standards for plumbing fixtures. Legislation was introduced in 1997 to repeal the uniform national plumbing efficiency standards established in the Act. National standards, in addition to state standards, are appropriate and necessary because:

- otherwise plumbing manufacturers would be faced with the production of dozens of different product line to meet the varying standards for each state; and
- it supports Nevada's plumbing standards by controlling the flow of non-complying products into Nevada.

## **Water Measurement**

Water use measurement is a key component to any conservation program. Meters and other measurement devices can be used as a tool to evaluate program effectiveness in terms of water use changes. In addition, meters can provide a basis for billing when used with a rate structure designed to promote conservation and discourage waste. Water use measurements are also needed for water users wishing to participate in a “credit for conservation” program.

A majority of the public water system withdrawals (in terms of volume) are metered, however not all deliveries to each service connection are metered. For example, only about 25 percent of residences in Reno/Sparks have water meters. Water meters were initially prohibited in the cities of Reno and Sparks by a 1919 statute (NRS 704.230). Since that time, gradual changes have occurred which: 1) require meters on all businesses (1977) and on all new homes built after 1988; and 2) allow meters on residences upon owner request and under certain conditions tied to the Negotiated Settlement (1990).

## **Water Reuse**

The reuse of treated wastewater effluent is becoming more common in Nevada. The U.S. Geological Survey estimated that in 1995 about 26,000 acre-feet of treated effluent was reused statewide. Current uses for treated effluent include landscape irrigation; agricultural irrigation; industrial uses such as cooling water and process water; supplies for wetlands; and construction water. By using treated effluent as a replacement source, more potable water is available for other uses with more stringent water quality requirements.

## **U.S. Bureau of Reclamation Conservation Plans**

The Reclamation Reform Act of 1982 requires each district, that has entered into a repayment contract or water service contract, to develop a water conservation plan. The plan is to contain definite goals, appropriate water conservation measures, and a time schedule for meeting the water conservation objectives. Districts, such as the Truckee-Carson Irrigation District and Pershing County Water Conservation District, are impacted by this requirement.

## **Summary**

Even though the State has no comprehensive program for promoting and encouraging conservation, many municipal water systems have taken the initiative to develop their own conservation programs and are reducing water use. For example, the rate of Municipal & Industrial (M&I) water use has declined in recent years primarily due to conservation efforts. Successful conservation programs during the 1990s lowered statewide M&I water use from 334 gallons per person per day (gpcd) in 1990 to 314 gpcd in 1995. Southern Nevada water purveyors have implemented a variety of conservation measures, such as: banning the creation of artificial lakes, adopting water waste ordinances, restricting lawn watering, establishing increasing block rates for billing purposes, establishing an active public education and outreach program, and pursuing the use of lower quality

water in lieu of potable supplies where feasible. As a result of these conservation efforts, Municipal & Industrial (M&I) water use in the Las Vegas Valley Water District has decreased from 358 gpcd (gallons per capita per day) in 1989 to 320 gpcd in 1997. Residential use in the District has decreased from 213 gpcd to 197 gpcd during the same period.

Nevada's agricultural community has also been implementing a variety of conservation measures throughout the State, particularly in the Walker River and Carson River basins, and the Lovelock area (Humboldt River basin). Through measures such as laser leveling of fields, sprinkler systems and reusing return flows, agricultural water users are improving their water use efficiency. As already discussed, irrigation conservation is motivated in part by economic incentives. However for some irrigation operations, conservation may not be economically justified if the irrigator's costs exceed the irrigator's expected benefits.

### ***Conservation in Other States***

Many other states recognize conservation as an important mechanism for extending water supplies, reducing and delaying infrastructure needs, controlling supply overdrafts, providing additional water for other uses, and reducing return flows affecting water quality. Throughout the United States a variety of approaches for promoting conservation have been undertaken. Following is a brief description of conservation activities in a few other western states.

#### **Arizona**

The Arizona Groundwater Management Code establishes the legal framework for conserving water in Arizona's most populous management areas. To help achieve its goals, selected active management areas are required to implement management plans which, among other things, establish conservation requirements for municipal, agricultural and industrial water users.

As required by the Groundwater Management Code, municipal water providers in certain management areas are assigned a water use rate target (in gallons per person per day). Water use audits are regularly performed and if a target is not met, the Arizona Department of Water Resources sends out a notice of non-compliance and attempts to negotiate a settlement for the overusage of water. In general, agricultural and industrial water users are also required to meet conservation requirements as set forth in the management plans.

#### **California**

California's Urban Water Management Planning Act of 1983 required all municipal water users with more than 3,000 connections to submit a water conservation plan, and update the plan every 5 years. Another key urban conservation effort has been the development of accepted measures for achieving conservation, otherwise known as "Best Management Practices (BMPs)" Urban water agencies, environmental groups and State agencies have identified 16 BMPs. Approximately two-thirds of California's urban water suppliers signed a 1991 memorandum of understanding (MOU) by which they agreed to implement the 16 BMPs, although implementation of the BMPs is spotty.

Legislation enacted in 1990 (AB 3616) resulted in development of another MOU by which signatory irrigation districts and water agencies committed to adopt a number of mandatory and voluntary “Efficient Water Management Practices” analogous to the BMPs designed for urban water suppliers. As with the urban suppliers’ MOU, the agricultural MOU is not universally endorsed, and agricultural interests have questioned the practices aimed at enhancing planning and water measurement.

California has established a number of programs in support of agricultural conservation efforts. For example, they have established an Irrigation Management Information System to assist agricultural water users with irrigation scheduling. As part of this system, irrigators can access a number of computerized weather stations for climatological data and evapotranspiration. California has also established: 1) mobile labs to visit farmers and help them evaluate their water management efficiency; and 2) an irrigation training and research center, supported partially by training course fees.

### **Oregon**

In 1990, the Oregon Water Resources Commission and Department adopted a statewide policy on Conservation and Efficient Water Use. The policy identifies a wide range of strategies for encouraging conservation, including public information, incentives and regulation to enforce the statutory prohibition against waste. The policy also calls for the preparation of water management and conservation plans by major agricultural and municipal water suppliers. Later, the Commission adopted rules by which municipal water suppliers are required by permit conditions to complete conservation plans. In addition, irrigation districts are required under the law to prepare conservation plans prior to using certain water right transfer processes.

In 1987, Oregon began a program which allows a water user who conserves water to use a portion of the conserved water on additional lands, lease or sell the water, or dedicate the water to instream use. Initially, the program was not utilized because of the complexity of the application review process and water users’ concerns about the potential effects on their water rights. Since that time, the program has been restructured and is now being utilized by water users.

### **Issues**

The primary issues relating to conservation in Nevada are as follows:

1. At this time, the State has no comprehensive program for promoting and encouraging conservation throughout Nevada and for assisting water users in developing water conservation strategies.
2. Currently, state law requires municipal water suppliers to submit conservation plans, but provides little incentive for compliance. Also, there are no requirements that these plans be periodically updated or reviewed for effectiveness. Water users other than public suppliers are not required to submit conservation plans.

3. The current law of “use it or lose it” does not encourage conservation. However, existing statutes prohibit the waste of water, and provide the basis for a “credit for conservation” program.
4. State law provides few requirements and no specific incentives to conserve.
5. There have been attempts to appeal the federal minimum flow standards for plumbing fixtures. Repealing the federal standards could adversely affect Nevada’s conservation efforts.

### ***Recommendations***

The following recommendations are offered as measures for improving conservation efforts in Nevada. In developing these recommendations, it was assumed that conservation would remain primarily a voluntary activity for water suppliers and users, with the State providing assistance and incentives. It is not the intent of these recommendations to advocate conservation purely for the sake of conservation. Conservation should be recognized as one of many water resource management tools that should be considered when it makes sense in terms of economics and overall resource management.

1. The State should add staff to the Division of Water Planning to provide technical, educational and financial assistance with water conservation. Duties of this staff could include:
  - a. review water conservation plans and provide technical assistance;
  - b. distribute grants;
  - c. prepare conservation plans for state facilities;
  - d. prepare and/or evaluate water audits for state facilities;
  - e. assemble a repository of water conservation information for distribution;
  - f. develop conservation education materials and provide educational seminars; and
  - g. compile a list of recommended best management practices for use in Nevada.
2. All municipal water suppliers are now required to implement conservation plans. It is recommended that the following steps be taken to improve this program:
  - a. require municipal water systems over a certain population threshold to periodically update their conservation plans, and establish ongoing reporting requirements;
  - b. require municipal water systems over a certain population threshold to adopt, implement and update their water conservation plans prior to receiving any state grants or loans or State Revolving Funds (Safe Drinking Water Act);
  - c. require municipal water systems over a certain population threshold to adopt, implement and update their water conservation plans prior to the State Engineer’s approval of a water right application or transfer request; and
  - d. add staff to assist municipal water systems with developing their conservation plans and encourage compliance with conservation plan requirements.

3. On a trial basis, the State should require additional groups of water users (such as irrigators, and self-supplied commercial and industrial users) above a certain water use threshold to prepare water conservation plans. A cooperative agreement with other agencies could be set up to assist in developing and reviewing the plans.
4. The Department of Conservation and Natural Resources should develop a more formal “credit for conservation” program in order to encourage more conservation throughout Nevada. This program would be voluntary. Water use measurement and enforcement would be essential for such a program to be successful.
5. The State, in cooperation with Cooperative Extension and Natural Resources Conservation Service, should assist agricultural users in implementing conservation measures through the following mechanisms: develop an irrigation management information system with weather stations in selected basins to provide real time evapotranspiration data for irrigation scheduling; establish mobile laboratories to visit farmers to help them evaluate their water management efficiency; and establish an irrigation training and research center.
6. If state government is to promote conservation throughout Nevada, it must lead by example and assist the various state agencies in becoming more efficient. The State Legislature and the Governor should promote statewide water conservation by:
  - a. incorporating water conservation policy goals into all appropriate activities and programs of state government
  - b. directing agencies responsible for constructing, leasing or maintaining state facilities and property to use water conserving plumbing fixture and devices, water efficient landscape practices and other programs to maximize water conservation
  - c. providing appropriate funding to affected state agencies to retrofit existing state facilities with water conserving devices.
7. The State should establish a fund to help pay for water conservation projects to demonstrate the benefits of water efficiency measures and provide an incentive for conservation/
8. The State should encourage public supply systems to meter water deliveries. Refer to the “Water Use and Estimation” issue discussion for additional information on water use measurement in Nevada.
9. The State should encourage effluent reuse and greywater use where feasible.
10. The State should initiate a water measurement program for all water users to install water measurement devices, or implement water use estimation techniques (based upon power use, etc.) for certain users over a threshold use amount and for certain basins. Funding support would be a necessary component. Refer to the “Water Use and Estimation” issue discussion for additional information on water use measurement in Nevada.

11. The State should continue to support existing state and federal minimum flow standards for plumbing fixtures.

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