

Water Authority conservation programme Nevada, USA

water scarcity impact

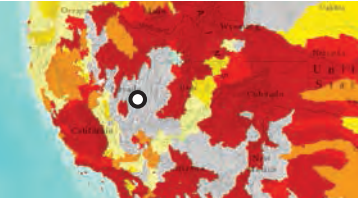
Reduced withdrawal	●
Reduced consumption	●
Improved water quality	●
Increased productivity	●
Net basin benefit	●

volumetric impact
51 926 000 m³/yr

programme cost
\$218 000 000

estimated unit cost of water
25 ¢/m³

Water Stress
Nevada, USA ●



Arid & low water use	Low (<10%)
Low to med (10-20%)	Med to high (20-40%)
High (40-80%)	Extremely high (>80%)
No data available	

Water Stress Map:
Gassert, F., M. Landis, M. Luck, P. Reig, and T. Shiao. 2013. "Aqueduct Global Maps 2.0."

Confidence level
● Low ● Medium ● High

Water Scarcity Impact Key
● Main ● Minor

Credits
We wish to acknowledge the input of Doug Bennett of the Southern Nevada Water Authority in the preparation of this case study.

Project Overview

The Las Vegas Valley is extremely arid and is classed as having a subtropical desert climate, with extremely high summer temperatures and high evapotranspiration. Since 2000 the valley has been suffering from a severe and ongoing drought. Most of the water used in the valley is withdrawn from the Colorado River via Lake Mead and then returned as treated effluent back to the Colorado River. The security of supply is dependent upon reducing per capita demand, in particular those arising from landscape irrigation and evaporative cooling which make up 60% of the total demand.

The Southern Nevada Water Authority (SNWA) subsequently instituted a raft of aggressive water conservation programmes from 2000 onwards that included monetary incentives, education and regulatory policies. Specifically, policy measures included new building codes, tiered water rates and restrictions on landscape irrigation.

Cumulatively, these measures have helped to reduce per capita daily use by 30% by 2011 and reduced water demand by 51 926 000m³/yr.

Key Elements

- \$218m in rebates for replacing grass turf with low water demand desert landscape, installation of pool covers and use of water efficient technologies.
- Restrictive Covenants preventing participating property owners from reinstalling grass.
- Local ordinances restricting landscape irrigation at various times of the year.
- Development ordinances restricting extent of grass in new developments.
- Tiered water rates to create incentives for reducing water use.
- Introduction of a certification programme for water efficient homes.

Key Outcomes

- 15km² of grassed landscape converted to water efficient desert landscapes, reducing landscape water use by 34 500 000m³/yr.
- 29 800 pool covers and 320 smart irrigation timers installed, reducing water use by 1 500 000m³/yr.
- 9 254 water efficient homes under WSH programme were constructed, reducing water use by 1 236 000m³/yr.
- 122 000 new homes with reduced outdoor water use, saving 14 700 000m³/yr.
- Water efficient technologies and fixtures installed in 132 projects, reducing indoor water use by 4 400 000m³/yr.



Nevada, USA

Intervention Features

- Revision of building regulations
- Subsidies for the purchase of water saving appliances in commercial premises
- Water tariff management
- Stakeholder engagement

Project Levers

The conservation efforts are primarily focused on the reduction of outdoor water use, which represents approximately 60% of the community's water use. The programme to reduce the outdoor use is based on a mix of monetary incentives and regulatory restrictions.

(1) Tiered water charges:

Tiered rates were introduced in 1992 and have been adjusted multiple times since then. These adjustments were primarily for revenue purposes, but also act as an incentive for residents and businesses to reduce their water use.

(2) Seasonal restrictions on outdoor water use:

Following droughts in 2002, ordinances were implemented which restricted outdoor water use. These seasonal water restrictions limit the number of days landscape can be irrigated. Golf courses were given water budgets with penalties of up to 9 times of upper tier water costs for compliance failure. These watering restrictions have now been made permanent.

(3) Landscape conversion rebate programme:

Residents and businesses are provided monetary incentives to replace their grassed landscape with more desert and drought adapted landscape that requires 75% less water demand than grass. Residents and businesses can claim rebate of \$21.50/m² for the first 140m², reducing to \$10.75/m² for areas beyond 140m², to a maximum of \$300 000 per property in any financial year.

(4) Pool covers rebate:

Pool cover rebate programme commenced in 2005 to reduce the evaporation of water from the swimming pools. Currently 22% of all homes in the Valley have an outdoor swimming pool.

(5) Outdoor water savings technologies rebate:

Rebates were also given for outdoor water saving. Technologies, such as smart irrigation timers with rain sensors. These smart controllers can save up to 15% of water used outside.

(6) Indoor water efficiency measures rebate:

More than 70% of all buildings in the region were built with efficient appliances and fixtures minimising indoor water use. The regional water agency offers residential retrofit kits for owners of older homes to increase their indoor water efficiency. Due to the nature of return flow credits, the reduction in indoor water uses is not as beneficial as the reduction in outdoor uses.

(7) Building codes and water efficient homes programme:

New building codes were implemented in 2003 that restricted the grassed areas on new residential and commercial properties. New commercial buildings are not permitted to have any turf area unless they can justify the reasons. New residential buildings are restricted from having grass on the front lawn and are only permitted to turf 50% of the area to the rear of properties.

The water efficient homes certification program (Water Smart Homes) was started in 2005 to showcase the best practice in indoor and outdoor water use. These water efficient homes use 27% less water in comparison to a house with similar plot size constructed in 1990s.

(8) Education and public outreach:

The implications of the drought were used to further the public's understanding that long-term changes were necessary to sustain a vibrant future economy and community. Various public outreach programmes were initiated to educate the public on how to reduce their water use, and to inform them about the various rebate programmes. The Springs Preserve Education Centre provides additional opportunity to educate and inform the general public about water use efficiency and its benefits to the environment.

Water Authority conservation programme

Nevada, USA

Outcomes and Challenges

Landscape irrigation accounts for the majority of the outdoor water use within the Valley. Restrictions on grassed landscape and outdoor water use were easily accepted by the public, possibly due to recognition that non-functional grassed landscapes were not consistent with the natural local desert environment.

The landscape conversion rebate programme helped to convert 15km² of grassed landscape to water efficient desert landscape, reducing outdoor water demand by 34 500 000m³/year and saving 224 477 000m³ since 2000.

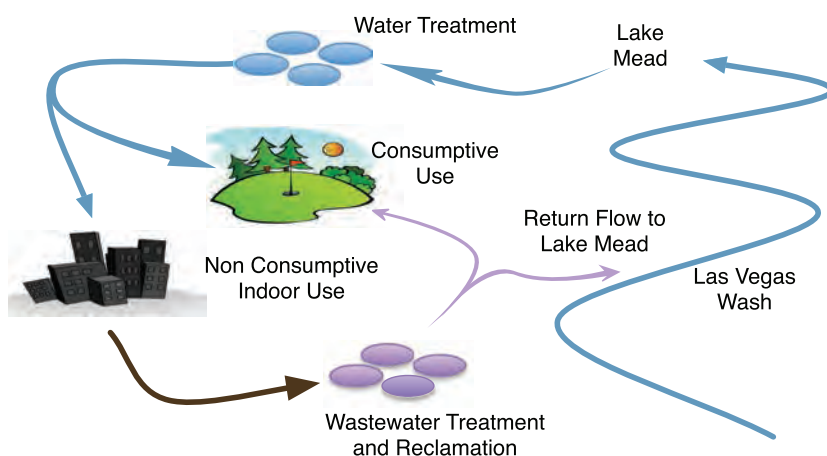
Over 29 800 rebates were issued for pool covers at a cost of \$1.7m and 320 rebates given for smart irrigation timers at a cost of \$449 000. The reduction in water demand has been estimated at 1 500 000m³/yr, with cumulative reduction in losses since 2006 estimated at more than 6 545 000m³.

The indoor water efficiency programme was targeted at businesses and \$2.8m were given in rebates for 132 projects. These measures have reduced water use by 4 400 000m³/yr providing valuable savings in treatment and transmission, and are important measure in sustainable water management.

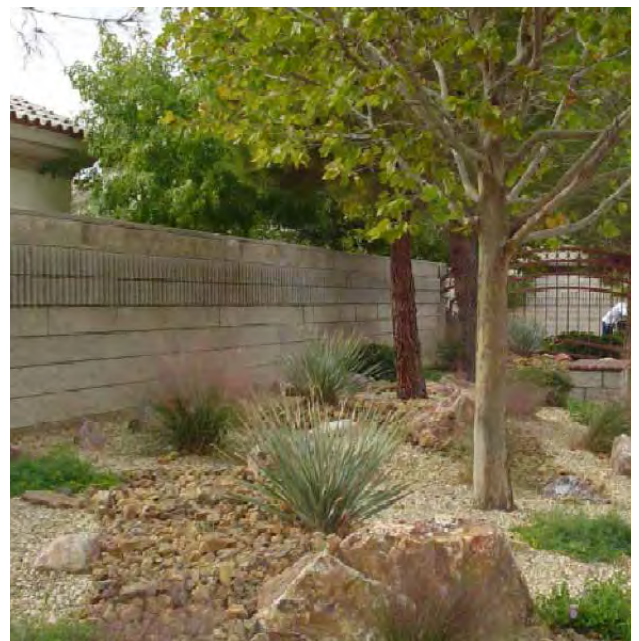
In comparison to homes constructed prior to the 2003 buildings codes, the 9 200 water efficient homes constructed since 2005 have helped to curb water demand by 1 226 000m³/yr, and the 122 000 homes constructed under the 2003 building codes have helped to reduce water demand by 14 700 000m³/yr.

The combination of regulatory restrictions and financial incentives has helped to reduce water demand by 51 926 000m³/year, and has helped to reduce per capita water use by 30% since the inception of these programmes.

The biggest challenge encountered in the early stages involved gaining community support for some of the symbolic water use restrictions, such as ornamental water features and car washes. Although the overall water demand of these uses was small, the restrictions were used to convey the message about severity of the drought.



Above: The Las Vegas Valley water supply (© Arup)



"The water conservation efforts were very successful and the overall water consumption in the Valley has reduced significantly since 2000."

Above: Drought adaptive landscape (© SNWA)