

Conservation

Element 9



INTRODUCTION

The City of Sierra Vista acknowledges how important it is to conserve the natural resources in this area. The American Water Works Association (AWWA) states that *“Conservation hinges upon an action; that is, a program in which people can participate or a regulation with which they can comply. Effective conservation outreach efforts focus on bridging the chasm between thought and action to induce behaviors such as participating in an incentive program or complying with regulations.”* To assist residents with conservation, the City coordinates and cooperates with outside agencies specifically tasked by their mission with the long-term conservation (and protection) of groundwater, soils, energy, forests, habitat, wildlife, and night skies. When possible, the City will continue educating and offering incentive programs for conservation efforts.

BACKGROUND

Groundwater Conservation

The Conservation Element addresses water conservation, which is a prime concern for the City. For additional information pertaining to water and the watershed, please refer to the Water Resources, Element 8.

Conserving water reduces the amount of water drawn from the aquifer. (Reduced pumping reduces energy required to pump water and also decreases the need for additional wastewater infrastructure.) The City does not own any of the water companies that supply domestic water to residents, so many of the known conservation techniques used in the water industry are not options for the City.

The City of Sierra Vista maintains a dedicated webpage for educating the public on water and conserving water; it is a one-stop shop for “all things water.”

The City Council’s 2011 Strategic Leadership Plan included a goal to establish a policy encouraging water and energy conservation in new development. Consequently, in 2013 the City Council adopted Development Code language that requires all new residential developments to incorporate the Environmental Protection Agency (EPA) WaterSense

provisions. Complying with WaterSense provisions requires all newly built residences (post-adoption date) be capable of WaterSense certification, should the homeowner seek to obtain the required inspection and certification. Provisions of WaterSense include efficient delivery of hot water and the use of pressure-reducing valves as well as requiring that all water fixtures be WaterSense labeled. The City is proud that the EPA recognized Sierra Vista as the first *known* city of its size in the country to implement WaterSense provisions. The City Council's biennial Strategic Leadership Plans should continue to include provisions for establishing both internal and external water-use reduction goals. In fact, the first three City Council's Strategic Leadership Plans had water conservation goals, and the City met all the goals identified in the Plans.

The City amended the Development Code in 2013, encouraging all commercial developments to use water harvesting to detention basin area requirements, potentially gaining the developer more developable land and conserving groundwater. The City also encourages rainwater harvesting for its new projects and the City is considering retrofitting existing buildings.

The City also requires all developers to landscape their projects with drought-tolerant, low-water-use plantings. There is an official drought-tolerant, low-water-use Plant List on the City's webpage.



The City is a co-founder of the Upper San Pedro Partnership (USPP). The USPP is a consortium of agencies and organizations working together to meet the long-term water needs of the Sierra Vista

Subwatershed by achieving a sustainable yield of the regional aquifer. The purpose of the Partnership is to coordinate and cooperate in the identification, prioritization, and implementation of comprehensive policies and projects to assist in meeting water needs in the Sierra Vista Subwatershed of the Upper San Pedro River Basin.

The City is also a founding member of *Water Wise*, a University of Arizona Cooperative Extension program. *Water Wise* is a publicly/privately-funded water-conservation education program that the City continues to support. *Water Wise* conducts numerous water conservation educational programs for the community on a broad range of topics including indoor and outdoor conservation tips, graywater, rainscapes, landscaping, water conservation awareness campaign, rainwater harvesting efforts, and on-site water audits for homeowners and commercial buildings. *Water Wise* also serves as a resource for the City.

The *Water Wise* program includes a *Water Wise* Youth program that works exclusively with area schools providing teachers with water curriculum as well as classroom presentations. *Water Wise* also works with Fort Huachuca providing them with the *Water Wise*/Energy Smart educational conservation program.

In 2009 *Water Wise* worked with the City and community volunteers to install the first rainwater collection system on a City building—the Nancy J. Brua Animal Care Center—setting into motion the City’s dedication to install rainwater collection systems on new City facilities where possible.

The Cochise Water Project (TCWP), established in 2012, is a first-of-its-kind, non-governmental 501.c.3 effort dedicated solely to reducing groundwater use in the Sierra Vista subwatershed; the TCWP operation is funded by grants. In 2013, the City of Sierra Vista asked TCWP to manage the City’s rebate programs, thereby expanding the rebate opportunities for City residents and businesses through shared funding. Additionally, the City’s building inspectors participated in the “green plumber” training offered in 2013 and the City has a senior staff member elected to the Board of Directors.

The TCWP looks for new water-efficiency technology it can offer to residents. In 2013, TCWP offered rebates for toilets, rainwater-harvesting tanks, and demand controlled pump systems. Additionally a “green plumber” 32-hour certification course was offered to, and well attended by, local plumbers

TCWP installed several highly visible and large rainwater harvesting systems at the City’s Police Department, Joyce Clark Middle School, Cochise College, PDS Country Club, and the Boys and Girls Club. In 2014, the City and TCWP planned a joint venture to partner together and install ground moisture sensors in the parks and ball fields to assist in watering these facilities.



McFadden Park LID Project

In 2012, the City began working with the Watershed Management Group (WMG), a non-profit 510.c.3 group that “offers an adaptive, collaborative approach to developing sustainable solutions wherever they work.” WMG works on rainwater and stormwater harvesting, green infrastructure, watershed assessments and planning, community-based conservation, and project administration and evaluation. As of 2013, the City worked with WMG to develop

McFadden Park's low-impact development (LID), a LID project along E. Fry Blvd. at N. 1st Street, and, in conjunction with TCWP, the Police Department's rainwater-harvesting tank. The City continues to work with WMG on locating projects and training.

When constructed, the proposed Tribute Water Reclamation facility will enable (and required by agreement) the pumping of treated effluent to irrigate the PDS Country Club Golf Course and the Tribute Master Planned Community's common areas (parks, rights-of-way, and commercial areas). The treatment plant will also be able to inject the remaining treated effluent water into the aquifer.

LID (green infrastructure) projects use stormwater as a resource to enhance landscaping and off-set irrigation demand.

The City has a tiered (depending on severity) drought response plan. However, there are important distinctions between permanent conservation measures and drought response. AWWA states, *"drought response is a temporary measure, often enacted during periods of severe resource challenges for a relatively short time, whereas permanent conservation represents a fundamental long-term shift in behaviors. First and foremost, given the natural inclination of the public to rally in times of crises, people are generally more accepting of short-term measures than permanent changes."*

It is also important that the City continue to work with the private water companies in the area as they seek to add technology advances in their systems.

Soils Conservation

Erosion is a natural geological process; however, development activities, such as land grading, can increase erosion. Conserving soil is mitigating excessive erosion and preventing it from becoming toxic (polluted). While this portion of the Element does not address flooding and stormwater, it is necessary to say that erosion causes excessive sediment in stormwater. The flood waters and sediment pick up pollutants (chemicals and debris) along the way, and the polluted sediment is deposited into the drainageways, ditches, and washes, which in turn contributes to the potential for increased flooding and the potential for depositing the polluted sediment along downstream areas.

In 2002, the State of Arizona designated Sierra Vista as a Municipal Separate Storm Sewage System (MS4) community. This designation mandated that the City adopt an ordinance, which was completed in October 2008, requiring developers of construction sites to prevent soil erosion from leaving the site by installing erosion control and sediment measures. Another part of the MS4 is educating the contractors and homeowners on *good housekeeping* - keeping pollutants off the ground and out of the soils. The ordinance requires that City Staff inspect all

construction sites for MS4 violations. Finally, a new phase of the MS4 requires inspections and testing of water leaving industrial sites.

The City, in conjunction with the Southeastern Arizona Contractors' Association (SACA), hosted several MS4 training classes for the Contractors.

The City has also created MS4 protection handouts for the residents; the handouts educate the homeowners on how to keep pollutants out of the drainageways, ditches, and washes. These handouts are available at various events, locations, and on the City's "all about water" webpage.

When possible, the City no longer requires larger undeveloped sites to be mowed because the vegetation growth slows water flowing across the land.

The City, in 2013, adopted a Wash Maintenance Plan which specifies when and which washes are maintained and the extent of that maintenance. Vegetation left in washes aids in preventing excessive erosion.

Energy Conservation

Achieving energy conservation is as simple as using less energy or replacing energy from non-renewable sources with energy created by renewable sources, such as solar.

Remembering that *"conservation hinges upon an action; that is, a program in which people can participate or a regulation with which they can comply (AWWA),"* the City has instituted many programs to save energy

and to educate the public on energy use. Given ongoing concerns regarding climate change, it is prudent for the City to do its part to conserve energy.

The City chose, in 2012, to incentivize solar panel installation by reducing residential solar building permits to \$25 and reducing the commercial permit by 50 percent.

One program to address energy conservation was a 2009 Energy Efficiency Block Grant that the City used for the following projects:

- (1) Installing eight solar streetlights in west Sierra Vista where there was insufficient street lighting.
- (2) Retrofitting fire station hot water heaters with solar. The grant also paid for replacing several of the fire station hot water heaters with higher efficiency rated hot water heaters
- (3) Replacing two older and inefficient HVAC units at Oscar Yrun Community Center (OYCC) with Energy Star and American Society of Heating and Air Conditioning Engineers (ASHAE) compliant HVAC (Heating, Ventilation, and Air Conditioning) units
- (4) Supplementing the hot water heater and boiler with solar at the Animal Care Center

(5) Funding weatherization for homes in Sierra Vista (administered through the Housing Authority of Cochise County)

The Department of Public Works completed a Traffic Efficiency study in 2013. The study outlines options for using alternative transportation in lieu of the current, predominately single-occupancy vehicle mode of transportation. Sierra Vista has a multi-modal system that encourages bicycling, walking, and riding the bus. The City also, in partnership with ADOT, created a Safe Bicycle and Pedestrian Routes Plan and Map (for additional information on transportation and the pathway system, please see Element 3, Transportation and Circulation and Element 10, Parks and Recreation).

One of the Public Works strategic objectives is to conduct an energy efficiency analysis of City facilities and develop a plan by the end of 2014 to reduce energy use and utility costs, which includes upgrading the HVAC systems in many of its buildings. The City continues to look at new technology for additional energy savings.

As noted in the above Groundwater Conservation subsection, code changes such as requiring demand-controlled hot water recirculation systems (one of two options with the other being energy-neutral) reduces energy costs for residents compared to previous recirculation systems. Additionally, the reduction in the use of water lowers the cost to pump the water from the aquifer.

Habitat and Wildlife Conservation

The City's wash system and its watershed are important because they provide a healthy habitat, community aesthetics, and allow wildlife retention and plant diversity.

The upper watersheds leading into the City are located on relatively undeveloped portions of Fort Huachuca and therefore are protected from development. Strategies that encourage protection of significant portions of washes running through the City will further aid in protecting the integrity of the watersheds.

Emerging Trends



Farmers Market Produce



In 2013, the City began allowing the local farmers markets to use Veterans Memorial Park, making the farmers markets more shopper-friendly than the former sites. Farmers markets are the most common direct-to-consumer market also known as a *local food system*, which is a recent movement to distribute food grown (or raised) and harvested close to consumers' homes. The reduction in distribution miles conserves energy.

Protecting the night sky is important to the astronomy industry in southern Arizona and Sierra Vista. For example, the Patterson Observatory at the University of Arizona South is a designated NASA Space Place and the San Pedro River crossing (between Sierra Vista and Tombstone) is a designated Dark-Sky site. In 2008, the City Council adopted a new outdoor light pollution code that helps reduce energy costs by requiring that lighting be concentrated in the areas where it is most needed. In 2014, City Council identified the potential need for additional code changes to restrict sign brightness.

GOALS AND STRATEGIES

Goal 9-1 **Protect and conserve natural resources**

The City protects and conserves natural resources in a number of ways. As it relates to water, the City provides funding to the University of Arizona Cooperative Extension's Water Wise Program which offers many water conservation services to include children's water conservation education. The City also requires drought tolerant, low water plants for new commercial developments. Secondly, the City supports solar energy by exempting the fees for solar building permits. Finally, the City helps to promote the "eat local" movement by supporting both farmer's markets, located in Veteran's Memorial Park and Soldier's Creek Park, and community gardens.

Strategies

1. Provide regular and ongoing public education programs on conservation techniques and resource value.
2. Promote the local use of renewable energy sources.
3. Support using alternative fuels in City equipment and vehicles.

4. Support the “eat local” movement by facilitating the existence and growth of local markets (farmers markets, food cooperatives, and community gardens).
5. Work with the US Department of Agriculture (USDA) on the eradication of invasive weed species.
6. Promote the use of native vegetation in landscaping, especially drought-tolerant plants.
7. Mitigate development impacts on wildlife corridors through good subdivision design.
8. Consider and adopt, if feasible, strategies that could mitigate the effects of climate change, as well as adaptation strategies, as they may pertain to the City.
9. Stay current on conservation technology and incorporate it in Codes and projects.
10. Use Best Management Practices (BMPs) designed by the Environmental Protection Agency (EPA) and other agencies to prevent erosion.

Goal 9-2 Develop effective water management policy for City government

The City has adopted many water conservation ordinances since 1994. Water conservation measures required internal to new buildings includes, the installation of low-flow fixtures, insulated and reduced pressure plumbing fixtures, installation of EnergyStar appliances, and the installation of water redistribution systems in new residential (hot-water recirculation pumps, manifolds) homes. Conservation measures required external to buildings include the planting of drought tolerant/low water plants and water harvesting for commercial sites, water recycling standards for car washes, prohibitions on water misters and limitations on water features for commercial sites, and prohibitions and limitations on the planting of grass.

- Strategies**
1. Assess City programs and projects to determine the degree to which they can benefit from conservation, rainwater, and stormwater harvesting.

2. Evaluate all City projects and facilities and implement all feasible water mitigation programs.
3. Continuously quantify the amount of water mitigated by City-initiated programs.
4. Establish a City government internal municipal water-use reduction goal.
5. Coordinate and facilitate Citywide water management plans, strategies, and necessary code changes to assist Fort Huachuca in achieving its mitigation objectives

Goal 9-3 Reduce water pumping from the aquifer

The City has adopted many water conservation ordinances since 1994. Water conservation measures required internal to new buildings includes, the installation of low-flow fixtures, insulated and reduced pressure plumbing fixtures, installation of EnergyStar appliances, and the installation of water redistribution systems in new residential (hot-water recirculation pumps, manifolds) homes. Conservation measures required external to buildings include the planting of drought tolerant/low water plants and water harvesting for commercial sites, water recycling standards for car washes, prohibitions on water misters and limitations on water features for commercial sites, and prohibitions and limitations on the planting of grass.

The City created a matrix and compared the water conservation measures in the Development Code to other jurisdictions. What was discovered was that Sierra's Vista's water conservation code was more comprehensive and included many additional water conservation standards than the other Arizona jurisdictions that were compared. For example, excepting Cochise County, no other jurisdiction requires that commercial car washes recycle 75 percent of their water.

These code requirements along with the water conservation measures of the developers have reduced water usage in the City. Between a twenty-year period dating back to 2000, water usage has reduced from 7,633 acre feet to 6,814 acre feet. Although there have been increases and decreases throughout the years, generally water usage is trending downward.

The City also manages a Toilet Rebate Program, which provides monetary rebates to homeowners that purchase a toilet that meets the Environmental Protection Agency's Water Sense standards.

- Strategies**
1. Adopt new water demand mitigation ordinances.
 2. Seek additional ways to mitigate water use of future development.
 3. Continue funding existing and proposed retrofit and rebate programs.
 4. Evaluate alternatives to groundwater use for sports fields and parks.
 5. Establish a Citywide gallons-per-capita-per-day (GPCD) water-use reduction goal.
 6. Find creative ways to expand the use of water conservation and water harvesting in new and existing developments.
 7. Ensure that the Tribute Water Reclamation Facility is constructed and operational as early as feasible, given legal agreements and demand constraints.
 8. Consider alternatives to the use of water for dust control on construction sites.

Goal 9-4 Augment existing water supplies

The Environmental Operations Park (EOP) is the largest recharge entity in the County. However, additional projects in the County have been constructed to help with aquifer recharge.

The City of Sierra Vista, Cochise County, Fort Huachuca, City of Bisbee, and the Nature Conservancy have formed the Cochise Conservation and Recharge Network. This Network implements and designs projects that are designed to increase groundwater recharge and protect groundwater resources in the most strategic places. There are currently 8 projects along the San Pedro River that are either functional or are in the design and planning stages. The scope of the projects range from municipal recharge projects to regional detention basins. A list of all the projects can be found on this website:

<https://storymaps.arcgis.com/stories/5110541947c54842958ad560ecdb334f>

- Strategies**
1. Evaluate the feasibility of developing large-scale rainwater harvesting storage and utilization systems in new commercial development.

2. Develop regional detention basins in locations where infiltration is most effective as identified in published studies.
3. Ensure that treated effluent is used in a manner that most effectively benefits the aquifer.

Goal 9-5 Establish effective partnerships with other public and private entities to advance water conservation

As stated previously, the City of Sierra Vista, Cochise County, Fort Huachuca, City of Bisbee, and the Nature Conservancy have formed the Cochise Conservation and Recharge Network. This Network implements and designs projects that are designed to increase groundwater recharge and protect groundwater resources in the most strategic places. A list of all the projects can be found on this website:

<https://storymaps.arcgis.com/stories/5110541947c54842958ad560ecdb334f>

The USPP consists of citizens and local water experts that function as technical advisors to determine the most effective ways to recharge the aquifer. The City continues to be an active member of the Upper San Pedro Partnership.

The City provides funding to the local University of Arizona Cooperative Extension's WaterWise program which is the local water conservation advocacy group. WaterWise provides a variety of public services, including xeriscaping and rainwater harvesting consultation, children's water conservation education, and free workshops and lectures concerning practical water conservation activities.

The City Council authorized a Memorandum of Understanding in support of the Bureau of Land Management Resource Management Plan. The Plan is an agreement between the BLM, Cochise County, Fort Huachuca, and the City which reaffirms their commitment to water and ecological conservation on the San Pedro River and Sierra Vista subwatershed area.

Strategies

1. Support private water conservation organizations.
2. Collaborate with private water companies in their conservation efforts.
3. Foster public/private partnerships to expand water conservation and water harvesting.

4. Collaborate with Cochise County in the effective use of conservation measures enacted through joint and cooperative planning efforts.
5. Manage water resources in concert with state and federal agencies, private non-profit entities, and developers in a manner that conserves water.

Goal 9-6 Provide educational programs and materials

As previously stated, the City provides funding to the local University of Arizona Cooperative Extension's WaterWise program which is the local water conservation advocacy group. WaterWise provides a variety of public services, including xeriscaping and rainwater harvesting consultation, children's water conservation education, and free workshops and lectures concerning practical water conservation activities.

Strategies

1. Write, publish, and distribute educational materials concerning water conservation.
2. Seek partnership opportunities with other agencies, non-profit organizations and others involved in the promotion of water conservation education.
3. Hold workshops, tours, and provide education on water harvesting and low-impact development (green infrastructure) techniques.
4. Seek federal, state, and private funding to develop water programs on a variety of topics including water conservation, water harvesting, and stormwater management.
5. Seek federal, state, and private funding and support for the expansion of conservation education programs.

Goal 9-7 Mitigate development impact on areas designated as wildlife corridors and sensitive vegetation

As previously stated, the Wash and Drainageway Maintenance Policy strive to maintain the natural vegetation and habitat of the washes. In addition, there is specific language that addresses wildlife habitat protection. For example, the policy, "provides guidelines for maintenance that will provide a good balance between keeping washes and drainage ways flowing while also protecting wildlife habitat that is located along the banks of washes."

Strategies

1. Evaluate the Wash Maintenance Policy to ensure that minimal impacts to the washes and drainageways are occurring.
2. Consider the environmental benefits of washes when updating the Surface Water Plan.
3. Consider habitat issues when developing land.
4. Maintain buffers between areas dominated by human activity and core areas of habitat.
5. When developing land, consider wildlife movement patterns through the area.
6. Balance recreational activities with the habitat needs of wildlife.
7. Consider the influence that the combined effect of all environmental elements has on the overall health of the watershed.

STATE LAW REQUIREMENTS

Arizona Revised Statutes, Section 9-461.05 E 1

1. *A conservation element for the conservation, development and utilization of natural resources, including forests, soils, rivers and other waters, harbors, fisheries, wildlife, minerals and other natural resources. The conservation element may also cover:*
 - (a) *The reclamation of land.*
 - (b) *Flood control.*
 - (c) *Prevention and control of the pollution of streams and other waters.*
 - (d) *Regulation of the use of land in stream channels and other areas required for the accomplishment of the conservation plan.*
 - (e) *Prevention, control and correction of the erosion of soils, beaches and shores.*
 - (f) *Protection of watersheds.*

ATTACHMENTS

None

REFERENCES

The following references used in this element are City approved documents.

- Surface Water Plan, 1988, Departments of Community Development and Public Works

- 208 Water Quality Management Plan, 1996, Amended 2009, Department of Public Works
- Chapter 95 of City Code; Stormwater Pollution and Prevention

