



WATER CONSERVATION, REUSE and AUGMENTATION SUMMARY

■ CONSERVATION FORT HUACHUCA

Over the past decade, Fort Huachuca has aggressively pursued water conservation measures. Since 1989, the Fort's combined actions have reduced its net groundwater consumption by **71 percent**. This equates to approximately 2,272 acre feet of water per year. Fort Huachuca's conservation measures include:

- **Purchase of Conservation Easements**
Water Savings: 1,073 acre feet per year
- **Replacement of Industrial/Commercial Water Fixtures**
Water Savings: Approximately 84 acre feet per year
- **Infrastructure Repair/Replacement/ O&M**
Water Savings: Approximately 34.73 acre feet per year
- **Facility Climate Control**
Water Savings: Approximately 25.5 acre feet per year
- **Landscape Irrigation Restrictions**
Water Savings: Approximately 46.3 acre feet per year
- **Vehicle Washing Water Recycling, Etc.**
Water Savings: Approximately 8 acre feet per year
- **Waterwise and Energy Smart Program at Fort Huachuca**
Water Savings exceeding two acre feet per year

This program provides water conservation education to those who live or work on Fort Huachuca. The educational value of this program cannot be quantified. However, as part of the Waterwise Program, water conservation audits have been conducted at facilities on post since January 2004. These audits have resulted in the water savings indicated above. In addition, the Fort provides funding for other Upper San Pedro Partnership conservation programs.

CITY OF SIERRA VISTA

During the past year, groundwater pumping within the city limits decreased 70 acre feet despite a population increase of 2.3%. Groundwater pumping within the Upper San Pedro sub-basin decreased by approximately 50 acre feet. The City of Sierra Vista's water conservation programs include:

- **WATERtight Program: Replacement of High Water Use Plumbing Fixtures with Water Saving Devices.**
Water Savings 1999-2007: Approximately 45 acre feet (15 million gallons)
- **Water Conservation Code**
No Turf in New Government, Commercial & Industrial Development.
Turf Limitations for Residential Development.
Low Water Use Landscape Plants.
Covers Required for Swimming Pools.
Limitations on Landscape Water Features.
Low Flow Toilets, Showerheads, and Faucets Required.
Golf Course Landscape Restrictions.
- **Public Information Program**
- **Provides Funding for Upper San Pedro Partnership Programs.**
- **Received Governor's Pride in AZ Award for Water Conservation (2001).**



In 2006, the citywide gallons of water per capita (GPCD) consumed daily) was 145. This is one of the lowest consumption rates of any city in the southwest.

COCHISE COUNTY

Cochise County is the first county in the State of Arizona to pass a requirement that a subdivider must obtain a certification from the Arizona Department of Water Resources that the subject property has a continuous physical and legal availability of water for the next 100 years. The following are additional conservation measures that Cochise County has taken.

- **Sponsorship of Rural Well Monitoring Study**
- **Water Conservation Code**
No Turf in New Government, Commercial & Industrial Development.
Artificial Water Features Prohibited Unless Sole Source of Water is Harvested Rainwater.
Hot Water on Demand.
Gray Water Plumbing Required in New Residential Construction.
High Efficiency Washers Required in Commercial Laundry Facilities.
Low Water Use Landscape Plants.
Golf Course Landscape Restrictions.
Swimming Pool Covers Required.
- **Desert Hospitality Water Conservation Program**
- **Public Information Program**



- **Toilet Rebate Program: Replacement of High Water Use Toilets**
- **Provides Funding for Upper San Pedro Partnership Programs.**

CITY OF BISBEE

The City of Bisbee adopted a new comprehensive water code. This Code will conserve water through many conservation measures including landscaping requirements, restrictions on decorative water features, limitations on irrigated turf and plumbing standards. The City proclaimed the month of April as Water Awareness Month. It is also an active member of the Upper San Pedro Partnership.



TOWN OF HUACHUCA CITY

Similarly, the Town of Huachuca City adopted a water code that includes landscaping standards and plumbing standards. The town's commitment to water conservation is evident through its actions.

BUREAU OF LAND MANAGEMENT

In 2008, BLM conducted the Oxbow Burn, located near Boquillas Ranch. This prescribed burn reduced invasive mesquite on 650 acres near the San Pedro River. Based upon the calculations of an evapotranspiration model that was created by the ARS, USGS and BLM, this management effort will result in water savings of 285 acre feet in the next year. Water savings will continue in subsequent years but will gradually decrease as revegetation occurs.

THE NATURE CONSERVANCY/BUREAU OF LAND MANAGEMENT//DEPARTMENT OF DEFENSE



During the past year, The Nature Conservancy, the Bureau of Land Management and the Department of Defense collaborated to protect 4.61 miles of the Babocomari River and 1,410 acres of land. These partners secured conservation easements on the historic Babocomari Ranch along the Babocomari River. The Babocomari River has been identified by the US Geological Survey as one of the most important contributors to the San Pedro River. Consequently, these easements help preserve the San Pedro River by reducing the potential for additional groundwater pumping near one of its most important tributaries. The BLM provided funding to purchase one of the easements consisting of 674.6 acres. The Nature Conservancy brokered the transaction and provided bridge loans to Fort Huachuca, which over time, will reimburse The Nature Conservancy using funds from the Army Compatible Use Buffer program. The conservation easements will also help prevent encroachment that could restrict Fort Huachuca from accomplishing its vital missions. In previous years, The

Nature Conservancy has purchased easements along the San Pedro River. The Nature Conservancy also provides funding to the Upper San Pedro Partnership.

[THE NATURE CONSERVANCY/ARIZONA GAME & FISH and U.S. FISH & WILDLIFE SERVICE](#)



The Nature
Conservancy 
Protecting nature. Preserving life.™



In November 2008, The Nature Conservancy and the Arizona Game and Fish Department with support by the U.S. Fish and Wildlife Service purchased 122 acres of land just north of the Mexico/U.S. border that is proximate to the San Pedro River. The Arizona Game & Fish Department noted that the type of habitat found on this property supports among the highest known nesting bird density of any habitat in North America. The property was purchased by a U.S. Fish & Wildlife Service grant and from funding given to The Nature Conservancy from the Doris Duke Charitable Foundation.

■ **REUSE**

[FORT HUACHUCA](#)

■ [East Range Recharge Facility](#)

Fort Huachuca has been treating effluent at its effluent recharge facility since 2001. This facility recharges over 400 acre feet of water annually into the regional aquifer. The facility's total recharge capacity is 1000 acre feet annually. Fort Huachuca is presently collaborating with the Town of Huachuca City in the Fort Huachuca-Huachuca City Effluent Transfer Project. Upon completion, this project will enable the transfer of sewage from Huachuca City to the Fort's Recharge Facility. This win-win project will provide Huachuca City with a safe and efficient wastewater system and will allow the Fort Huachuca facility to operate closer to its capacity.

■ [Enhanced Stormwater Recharge](#)

Fort Huachuca's Graveyard Gulch detention basin was built entirely for the dual purposes of enhancing recharge and reducing erosion. This facility detains stormwater runoff from an urbanized watershed within the City of Sierra Vista. Fort Huachuca has additional detention basins planned. The combined water savings of these detention basins will be approximately 639 acre feet per year.

In addition, Fort Huachuca has created stormwater management standards that integrate passive rainwater harvesting into site design. Rainwater harvesting can prevent excessive runoff that might decrease water quality downstream. Fort Huachuca initiated a pilot dry well project that directs rooftop runoff to the subsurface. This project is being used to evaluate the effectiveness of drywells to enhance stormwater recharge on site. Fort Huachuca expects to recharge 2 acre feet of water annually from this pilot project.

CITY OF SIERRA VISTA

■ **Environmental Operations Park**

The Environmental Operations Park is a Water Reclamation and Effluent Recharge Facility that annually recharges approximately 2,000 acre feet of treated effluent into the regional aquifer. From 2002 to the present the EOP has recharged almost 11,000 acre feet of water. This equates to over 3.5 billion gallons of water. This facility is the result of the collaborative efforts of the City of Sierra Vista, the Bureau of Reclamation, the Arizona Department of Water Resources and the Arizona Department of Environmental Quality. It is a critical component of managing the Upper San Pedro Subwatershed and sustaining base flows to the San Pedro River.



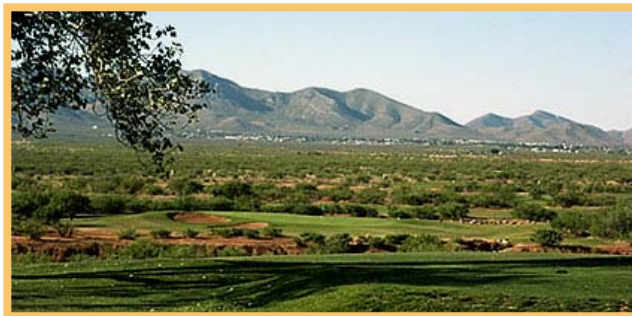
■ **Enhanced Stormwater Recharge**

The City of Sierra Vista saves 298 acre feet of water annually with stormwater detention basins.

CITY OF BISBEE

■ **Bisbee-Turquoise Valley Reuse Project**

The City of Bisbee's treated effluent will be used to water the Turquoise Valley Golf Course in the Bisbee/Naco area. Presently, the golf course uses groundwater for irrigation and water features. This significant project will decrease groundwater use by approximately 530 acre feet annually. The annual reduction of over 500 acre feet of groundwater pumping near the San Pedro Riparian National Conservation Area is an important water management measure to help maintain base flows in the San Pedro River.



■ **WATER AUGMENTATION**

In June 2007, the Bureau of Reclamation published an Appraisal Report entitled "Augmentation Alternatives for the Sierra Vista Sub-watershed, Arizona." The purpose of the appraisal study was to identify structural ways to augment the water supply in the Sierra Vista Sub-watershed. The Appraisal Study's Problem Statement is as follows: Water levels in parts of the regional aquifer of the Sierra Vista Sub-watershed are declining, with the potential to impact the hydrologic conditions of the San Pedro Riparian National Conservation Area. A set of water augmentation solutions is needed that would add approximately 10,000 acre feet a year (afy) by 2011 and 26,000 afy by 2050, to negate a portion of the 38,500 afy total demand projected by 2050. Water augmentation would supplement

existing and future recharge, reuse, conservation and other water resource management solutions implemented in the Sub-watershed.

As a result of the Appraisal Study's recommendations, the USPP is seeking the approval of legislation that will enable the Bureau of Reclamation to study the feasibility of three alternative means of augmenting the existing water supply.

■ **ASSOCIATED RESEARCH and MONITORING**

The successful projects highlighted in this summary could not have occurred without the science-based research and monitoring activities conducted by the U. S. Geologic Survey (USGS), the Agricultural Research Service (ARS) and the Bureau of Land Management (BLM). The USGS monitors the hydrology of the San Pedro River, the conditions of the regional aquifer of the Sierra Vista Sub-watershed and prepares the annual report to Congress. ARS provides research, hydrologic modeling and monitoring, specialized field experimental campaigns, basin characterization and associated reporting. BLM monitors surface and groundwater at selected sites within the San Pedro Riparian National Conservation Area including the area along the international border with Mexico.