

Leveraging Conservation: A Summary of Six Years of Work Under the REPI Grant Program

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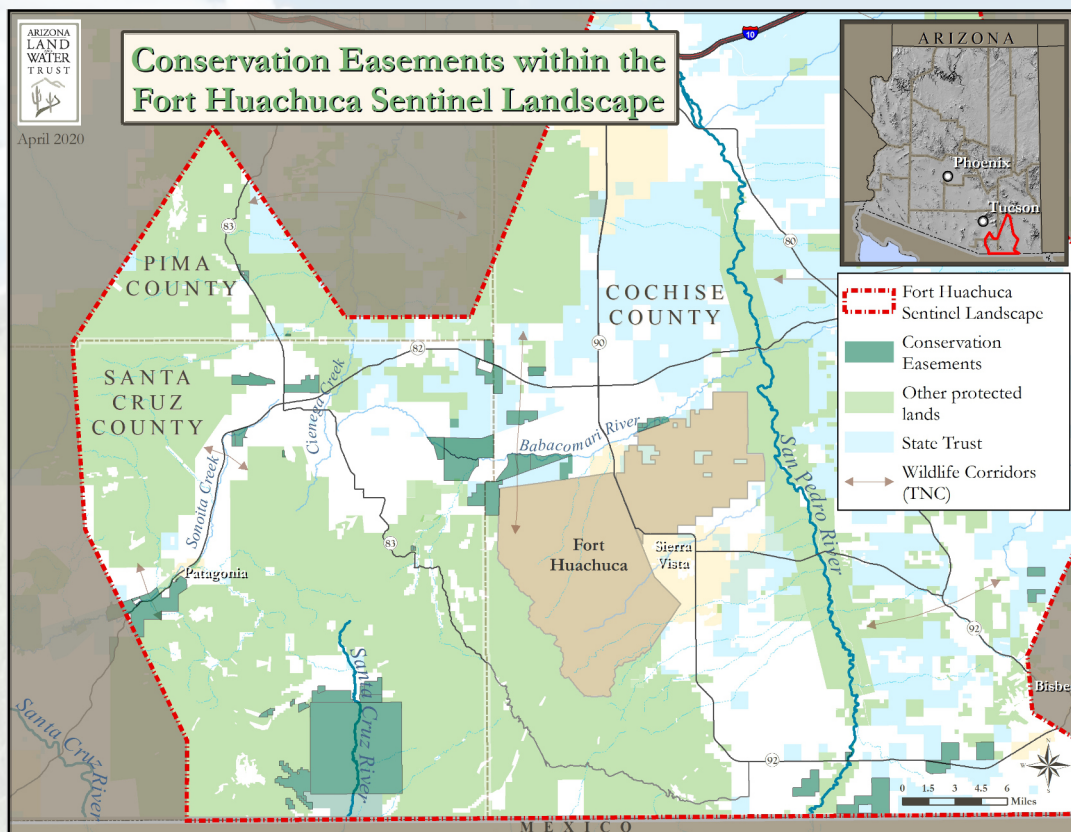
Purpose of REPI-Supported Work

Research, analyze, and propose strategies to leverage conservation easements to complement and/or enhance opportunities to reduce consumptive water use and restore streams within the Fort Huachuca Sentinel Landscape



Geographic Scope

The Trust's REPI supported work focused in the Fort Huachuca Sentinel Landscape in southern Arizona. Sentinel Landscapes are areas in which natural and working lands are well suited to protect defense facilities from land uses incompatible with the military's mission. **The primary watershed of the Fort Huachuca Sentinel Landscape is the Upper San Pedro River.** A portion of the Upper Santa Cruz also falls within the Landscape boundaries. The 4,000 square mile Upper San Pedro River Basin spans the international border between Arizona and Sonora, Mexico.



Arizona Land and Water Trust REPI Project Overview

Phase I Watershed Assessment	<ul style="list-style-type: none">● Initial scoping assessment of the San Pedro Watershed● Assessment of water uses and transaction approaches
Phase II Methodology Assessment	<ul style="list-style-type: none">● REPI framework● Environmental water transactions conceptual framework● Land and water strategies to shift the water balance
Phase III Project Assessment	<ul style="list-style-type: none">● Water rights assessment on local sub-watersheds● Research and analysis of restoration options● Private ranch water rights and water use assessments

Available Water Conservation Strategies

Water conservation strategies can be categorized by those that reduce consumptive use and those that do not (water management actions). Consumptive use of water is a critical driver of a watershed's overall water balance because it represents water that is removed from the watershed through evaporation or use by plants. As such, strategies that reduce consumptive use are powerful tools to address water supply. Water management actions can complement reductions in consumptive use to augment groundwater, support riparian and grassland habitat, and support stream flows.

Watershed Restoration
(Ex.: Forest management to increase soil water retention)

Municipal Conservation
(Ex.: Install low-flow fixtures)

Streambed Restoration
(Ex.: In-stream structures to increase infiltration)

On-Farm Efficiencies
(Ex.: Increased irrigation/diversion efficiency)

Water-Use Agreements
(Ex.: Water right lease)

Water Management Actions

Consumptive Water Use Reductions

Water Transaction Strategy Assessment

Four specific water transaction strategies, outlined in the table below, are assessed for applicability within the Fort Huachuca Sentinel Landscape. These strategies then form the basis for examining project opportunities on specific properties.

Category	Strategy	Overview
Reducing Consumptive Use	Water Right Leases*	Temporary transfer of an existing water right to another use (including environmental) through a legal/ administrative process (*not currently available in Arizona)
	Water Right Transfers*	Permanent transfer of an existing water right to another use (including environmental) through a legal/ administrative process (*not currently available in Arizona)
Mix of Consumptive Use and Water Management Inefficiency Reduction	Water Use Agreements	Includes a range of projects types that do not involve formal legal/ administrative processes and are instead accomplished through private contracting (for example, diversion reduction agreements, switching to lower water use crops, temporary fallowing)
Reducing Water Management Inefficiencies	Conserved Water Dedications	Includes a range of projects that increase efficiency of water diversion, delivery, transmission and/or use and subsequent dedication of “conserved” water to another use (including environmental) through a legal/ administrative process where available

Watershed Assessment and Project Analysis

The third phase of the REPI project focused on watershed and project assessment and analysis. The Trust deployed a variety of different analyses, starting at the high level watershed-scale and then focusing on property-specific water rights and water use analysis.

- **Watershed-scale water use characterization**
 - In-depth research into types and amounts of water use, ground vs. surface water uses, exempt wells, etc., within a target watershed
- **Flow enhancement opportunity assessment**
 - Based on watershed characteristics, assess the range of possible water transaction projects that could be implemented to enhance flows in target reaches of the watershed
 - Investigate non-transaction opportunities such as upland and riparian projects to increase groundwater infiltration and instream projects to increase infiltration through the streambed
- **In-depth water rights analyses of specific properties**
 - Water right and water use review, water and well infrastructure inventory, exempt well and reservoir research
 - Analysis of aerial photos and other information on current and past water uses
 - Landowner interviews about crop patterns, and current and past water use practices
 - Land use and land ownership analyses of the subject and surrounding properties including grazing rights

Highlighted Project Outcomes

Locate Strategic Check Dam Opportunities on Trust Properties:

Local research by the USGS and University of Arizona is encouraging about the potential for check dams to have a positive hydrologic impact on desert streams in the Sentinel Landscape. Collaborating with partner organizations, check dams may be the best opportunity for the Trust to add a water quantity benefit to their already robust portfolio of land conservation projects in the Sentinel Landscape.



Follow the Gila River Adjudication and Track Instream Flow Applications:

Instream flow protection applications in the Babocomari Watershed and Upper Sonoita Creek and Cienega Creek watershed, if approved, could further limit additional surface water right withdrawals and potentially future uses of connected groundwater.

Explore the Development of a Groundwater Mitigation Program: A program could be designed to reduce impacts of (mitigate) current and/or future groundwater pumping in the watershed, or be designed to encourage the use of groundwater in specific areas of the watershed. By incentivizing development in existing residential areas, rather than in more rural areas of the watershed, a groundwater mitigation program could help protect important air space for the Fort's training activities while protecting the sustainability of important groundwater resources.

Pursue Opportunities to Work with Irrigated Agriculture on the Middle San Pedro River:

The largest concentration of irrigated agriculture in the watershed is located on the middle San Pedro River, downstream of Fort Huachuca and near the northern boundary of the Sentinel Landscape. Aerial imagery shows that there is a significant amount of irrigation occurring in this area on both sides of the San Pedro River and there may be opportunities to work with irrigators to decrease water use or become more efficient, strategies that could positively impact stream flow in this reach of the San Pedro River.

