

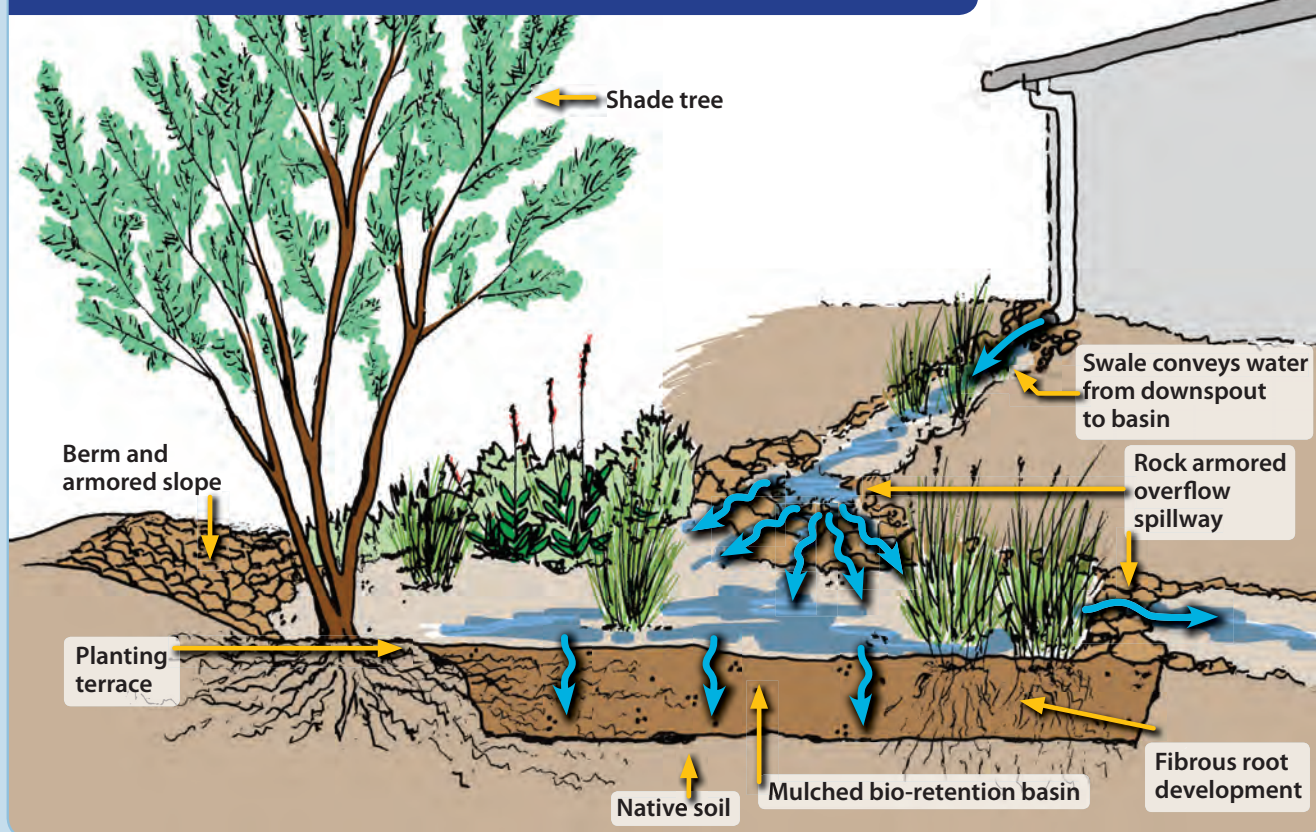
A Stormwater Action Plan for the Health of Sierra Vista and the San Pedro River

Watershed Management Group is working with the City of Sierra Vista to “fill the void” in the local water budget and enhance flow in the nearby San Pedro River. Taking what we’ve learned from our experiences working at homes, neighborhoods, and businesses, we applied Low Impact Development (LID) strategies across the Woodcutter Wash sub-watershed in Sierra Vista. Modeling the flow of stormwater produced at each site, and as it flows down to the San Pedro River, revealed that LID features (e.g. rain gardens) produce positive, tangible benefits when adopted on a broad scale.

For example, when just 10% of residential and commercial sites implement LID practices in their landscapes, the whole community reaps rewards. We know that these features create greener, cooler, and more beautiful neighborhoods. But our Sierra Vista data shows they can do this while producing **a net financial benefit in 8 to 9 years.**

Our models also show that water harvesting in the upper watershed does not reduce flows reaching the San Pedro River downstream. This means **rain gardens can capture rainwater to support landscapes (reducing or eliminating groundwater use for irrigation) without competing with downstream recharge opportunities that support year-round flow in the river.**

LOW IMPACT DEVELOPMENT REDUCES GROUNDWATER PUMPING



Organic mulch is applied to basins, 2 – 4 inches thick, to help infiltrate more water, reduce evaporation of soil moisture, and replenish nutrients in the soil. More information can be found in the Introduction to Low Impact Development of the main report.

What is Low Impact Development (LID)?

Low Impact Development practices consist of constructed features, such as rain gardens, that use living, natural systems of soils and plants to manage stormwater and improve watershed health. These features capture, clean, and infiltrate stormwater; support shade-producing trees to cool streets and buildings; and when located in a street, can help calm traffic. The City of Sierra Vista is already a leader in water conservation. By managing stormwater with LID practices, Sierra Vista has an opportunity to build upon its progressive water policies with an approach that enhances watershed health while boosting economic development.

How Can LID Help Sierra Vista?

When flooding occurs, this water typically evaporates without providing a direct benefit to landscapes or groundwater supplies. LID practices utilize this nuisance water to irrigate plants and infiltrate deep into the soil — both of which contribute to groundwater conservation and help ensure the long-term health of the San Pedro. Currently, Sierra Vista's stormwater and rainwater resources are under utilized. By harnessing these resources with LID, a net positive water balance can be achieved that improves the health of the river and watershed while driving responsible economic development. Sierra Vista can therefore enjoy long-term economic prosperity with appropriate investments in these critical infrastructure practices.

Low Impact Development Adds Economic Value To Communities

In addition to reducing floods, LID creates lush, shady green spaces that provide a variety of other benefits including:

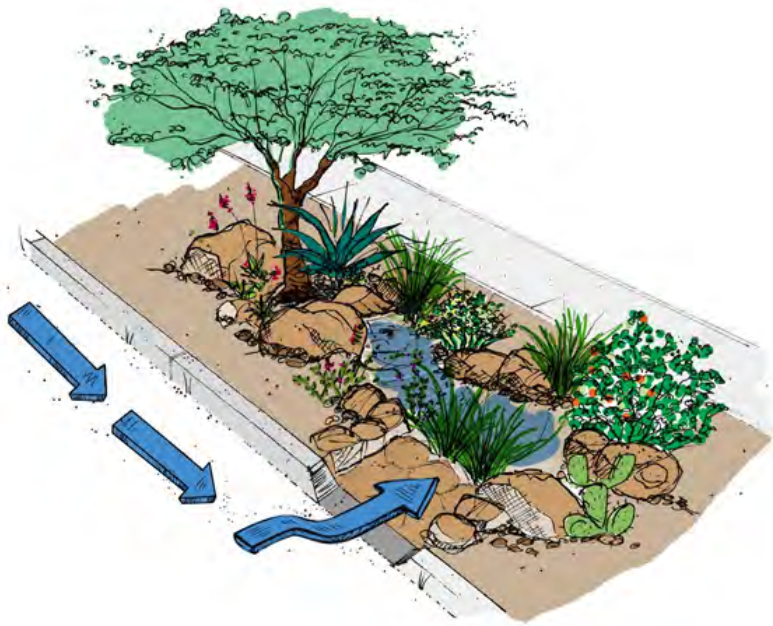
- » higher property values
- » lower energy costs for cooling
- » reduced street maintenance needs
- » calmer traffic
- » improved walkability and air quality
- » reduced irrigation costs and extractive groundwater use
- » filtration of stormwater that ends up in our creeks and washes

Adding up these benefits, WMG's study found that **rain gardens in Sierra Vista offer a strong return on investment, delivering \$3 – \$6 in community value for every dollar spent for retrofits.**

This results in a **payback period of less than eight years for retrofits.** For new development, the payback period is much shorter, as returns are higher with less investment. Rain gardens provide big financial and watershed benefits for the community!



Left: A raingarden retrofit near the Student Union of Cochise College's Sierra Vista Campus guides rainwater from the downspout through the landscape in a series of swales and basins. This feature helps to reduce nuisance flooding by infiltrating it into the soil to benefit the plants.



Above: A roadside retrofit similar to Ft. Huachuca's Christy Ave passes street stormwater through cuts in the curb into a landscaped swale. This feature filters stormwater pollutants, promotes infiltration, and eliminates the need for supplemental irrigation.

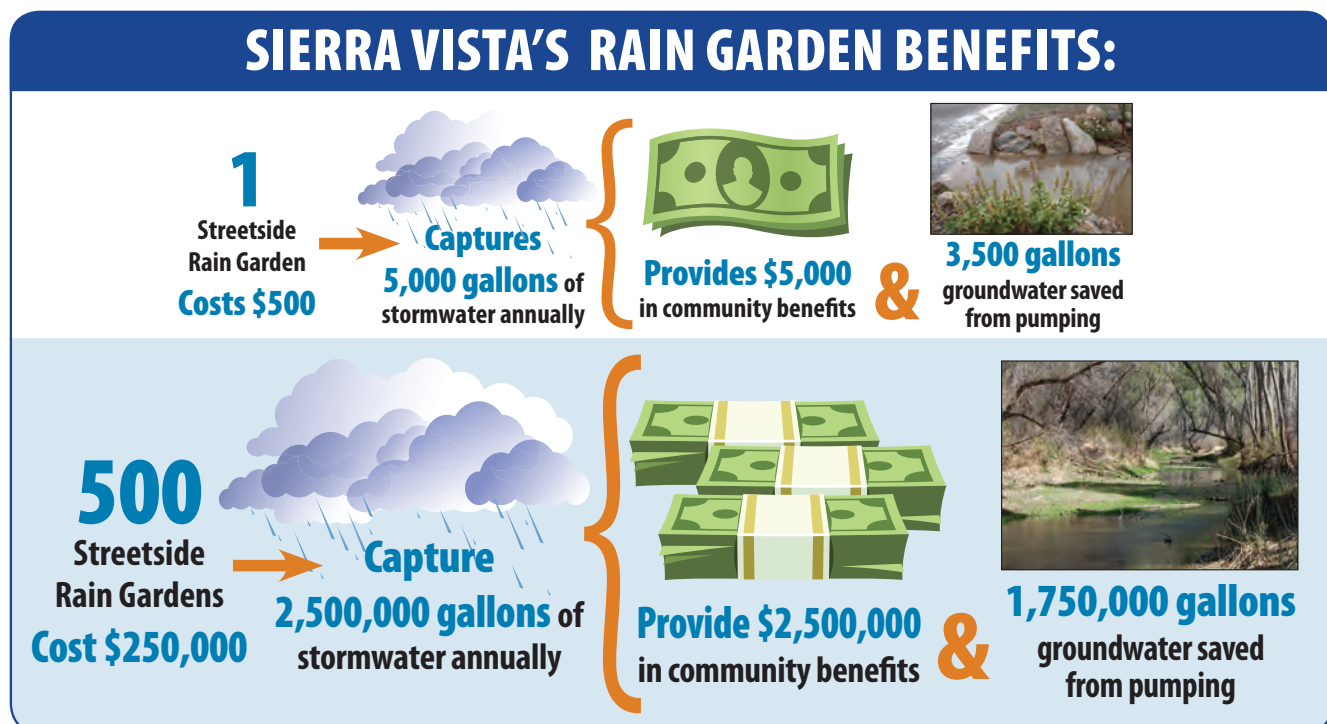
Enhancing Channel Recharge to Increase Groundwater Supplies

Under the current stormwater management scenario, excess stormwater flows from each residential and commercial site into nearby arroyos. This increased urban runoff results in greater flow volume and velocity, which degrades arroyos and often compromises critical urban infrastructure features.

WMG's study evaluated the potential to restore natural flow dynamics in a channel to enhance groundwater recharge and reduce channel maintenance costs. By working with natural channel design principles these goals can be achieved across the region. At the same time, the restored channels support improved wildlife habitat and community greenways, which help cool and beautify the city.

Utilizing natural channel design principles therefore provides a greater return on investment, saving money on maintenance while advancing aesthetic and ecological values. When combined with LID practices, these principles play an important role in a holistic stormwater management plan that improves community health while recharging depleted groundwater resources—a win-win for both the community and the San Pedro River.

Below: Our calculations are based on a 40 sq ft rain garden with 1 – 2 native trees, organic mulch, native shrubs, and bunch grasses—totaling an average cost of \$500.



Cost benefit details can be found in the LID makes cents section of the main report as well as Appendix C.

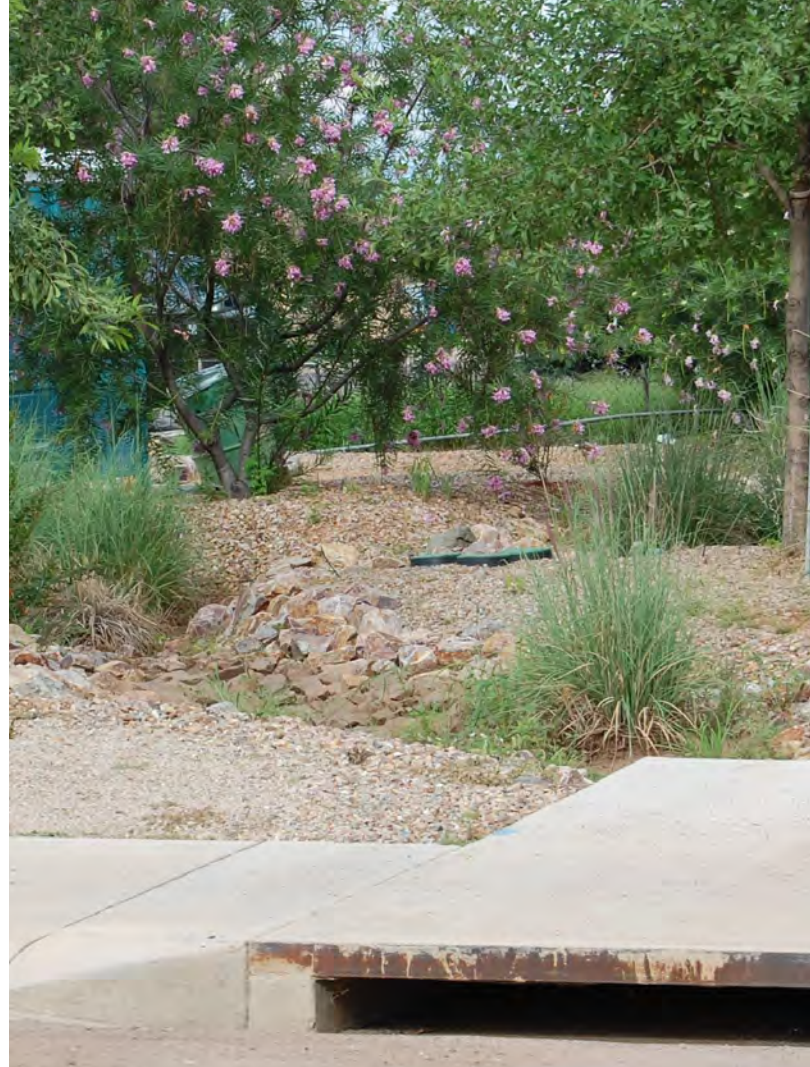
Next Steps for Action!

Through our collaborations with the City of Sierra Vista and other local partners, we have identified a flexible approach that meets community needs, aids economic growth, and achieves a net-positive water balance. This helps restore the aquifer and sustains the health of the San Pedro River.

WMG is working with the City of Sierra Vista to:

1. **Incorporate LID practices into the City Development Code** to ensure efficient use of available stormwater resources;
2. **Promote implementation of LID projects through retrofits and redevelopment projects** to continue to refine best practices, further conserve groundwater, and enhance aquifer recharge where appropriate;
3. **Identify channel areas with greater permeability to locate restoration features** that slow flows, stabilize channel grades, and promote recharge and vegetative establishment;
4. **Foster watershed-scale planning** and integrated stormwater management to prioritize LID project development and assess funding needs; and
5. **Develop sustainable financing for LID** implementation to further conserve groundwater and enhance recharge where appropriate.

Funding and incentives for Low Impact Development projects are of critical importance for Sierra Vista and the surrounding region. It is clear that the community benefits from LID justify the investment. WMG is exploring a variety of mechanisms with key stakeholders to expand the use of LID and help create more vibrant, healthy, and prosperous communities in Sierra Vista and beyond.



Above/Below: A stormwater inlet retrofit directs stormwater into McFadden Park. The rain garden constructed within the park collects, filters, and infiltrates the stormwater for the benefit of the trees and plants. It may also promote water to slowly seep down to recharge the groundwater aquifer.

The Stormwater Action Plan was prepared for the City of Sierra Vista by Watershed Management Group and funded by the Walton Family Foundation. The full report can be downloaded at watershedmg.org in the Resource Library section. For more information contact Catlow Shipek, catlow@watershedmg.org.

