Tucson Stormwater Management:

Use It or Lose It

By Tim Murphy

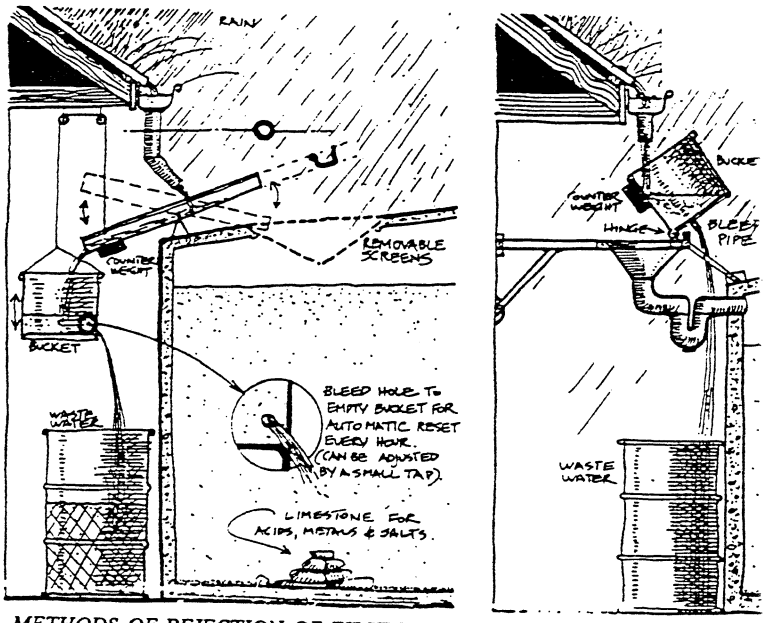
At a recent public meeting on Stormwater Management in Tucson the citizens were asked for their input regarding the community's needs, and, significantly, to consider how much we would be willing to spend for the creation of a storm water control system. More appropriately phrased, the question might have been: As a desert community, how can we afford to allow a precious resource, like rain water, to escape?

In the past, engineers for our city have relied on formulas and strategies developed in Europe where storm water is a problem due to a glut of precipitation. Strategies there have been to provide ever more efficient (quicker) runoff channels. Here, as in other desert communities, we must view precipitation as a resource. The consequences of a less farsighted perspective insure that our city will be a temporary feature on an increasingly desertified landscape. Perhaps we need models of appropriate and sustainable practice from more climatically similar regions, like arid Asia, Australia, and the Middle East.

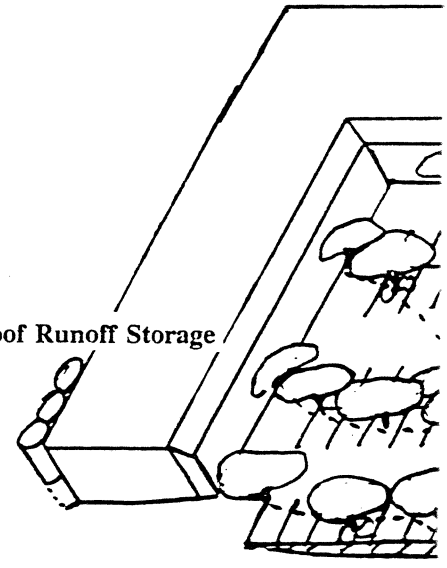
Until now our water has been provided by drawing on a finite aquifer through the use of finite, and fairly cheap, outside energy reserves. Our future as a desert community actually depends on our ability to make do with the renewable water resources that we are gifted with, and have, until now, largely wasted.

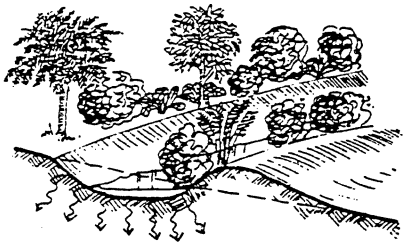
Tucson and its paved areas, schools, parks, shopping centers, and neighborhoods form a watershed, a collection of surfaces, rivulets, and tributaries joining to contribute their runoff to a larger whole. Often when we envision a watershed, we picture only the watercourses, and forget about the fabric of the landscape between. The least expensive, and most effective place to deal with runoff is in these upper reaches of our watershed: where the rain falls and before it begins to flow. Metal and tile roofs enable us to safely collect rain, the cleanest water available, and store it in relatively inexpensive*, above ground metal or ferroconcrete tanks (*compare the cost of 10,000 gallons of bottled, purified, drinking water to the cost of a tank of the same capacity). Such practices are mandatory in desert communities of Australia, where each house must have the capacity to safely store at least 10,000 Imperial Gallons of roof runoff. Elsewhere they are the only way to survive.

As inexpensive as above ground water storage is, it is possible to store 50 times as much water in soils for the same cost. Water stored in this manner can then be used to sustain a wide variety of drought tolerant, perennial trees and shrubs. This vegetation can help moderate the extremes of our climate, lessen our need for outside



METHODS OF REJECTION OF FIRST WATER FLOW OFF A ROOF. The f roof, and are rejected; these systems automatically reset when empty.





Swales on contour do not flow; they first stop and then infiltrate overland flow.

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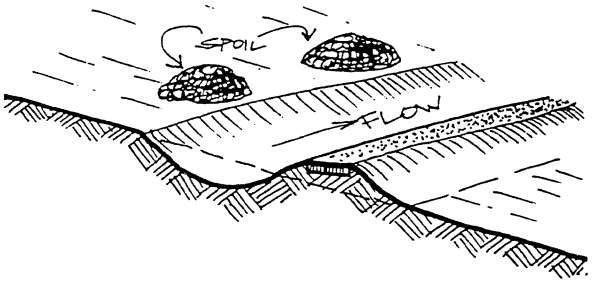

SPREADER BANK. Water flow is evenly spread, combating erosion, by carefully levelling the downhill bank.

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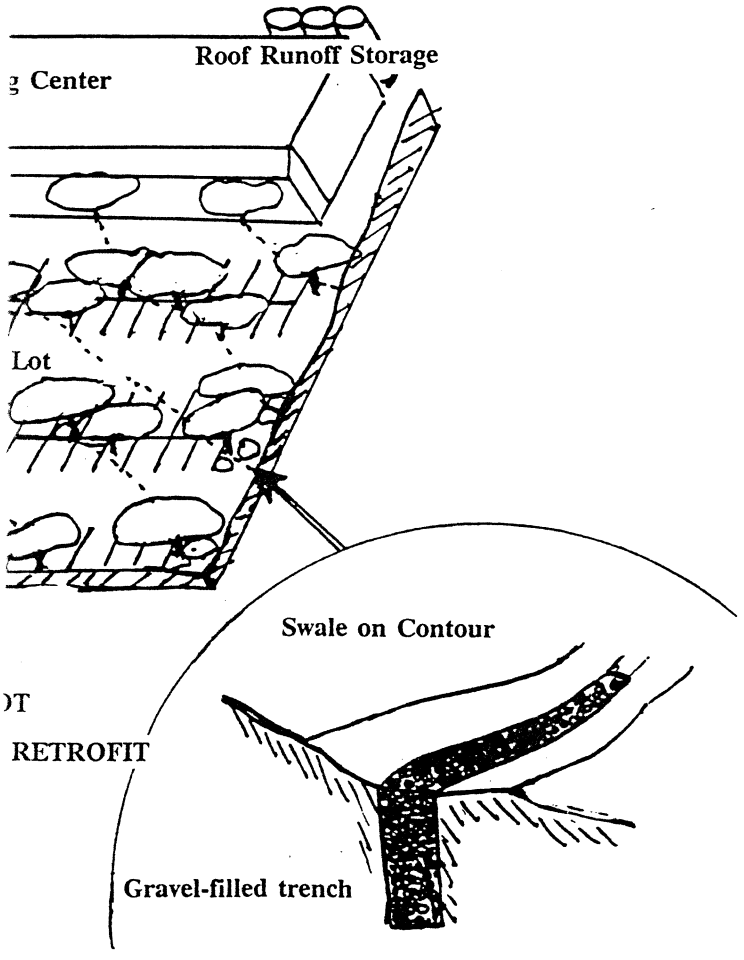

energy, and help feed us as well.

An excellent example of a community in this country that completely captures and utilizes 100% of its precipitation in this manner is the Village Homes Solar Development in Davis, California, with an annual rainfall of 18 inches. Village Homes accomplished this through design, and at modest expense, when contrasted to the cost of storm sewers and drainage channelization projects. This approach represents a sane and practical alternative for new development.

Costs to the city for retrofit designs for existing development can be deferred in part by: a) publicizing the economic and health benefits of tanks. b) sponsoring neighborhood workshops that demonstrate simple, practical, and cost-effective techniques and strategies to harvest rain water for the garden and landscape. c) offering incentives to home owners and businesses who allow zero runoff from their holdings. Such incentives could take the form of stormwater tax deferments. Measures like these would dramatically reduce the volume of water on our streets and the job of city engineers would be simplified.

Institutions and businesses, especially, are major contributors to our stormwater dilemma. Large paved areas prevent infusion and also create huge heat sinks that stress our vegetation, desiccate our soils, and increase energy use. Water harvesting systems that traverse the contours of parking lots and direct runoff to frequent infusion sites planted with deep rooted and heat tolerant trees could enable us to shade better than 60% of these surfaces, dramatically reducing these problems while providing a richer habitat for humans and wildlife alike. Runoff from large roof areas could be stored in above ground tanks to allow irrigation of these trees in periods of drought. Streets and alleys could also serve as water harvesting systems for their landscape and shade elements, affording similar benefits. As a desert community, Tucson must adopt a realistic and responsible policy for stormwater resources that reflects a long term perspective. It is not a sustainable practice in arid lands to support unbridled growth while depending on impure fossil water and highly salinated Colorado River water. Dealing with stormwater as a treasured resource instead of as a nuisance in our community can, in the short run, save us money, and enhance the quality of life.

The long term benefits include: a measure of security in an uncertain climatic future, significant cut-backs on pumped, treated water use, a gradual recharge of our groundwater reserves, and the evolution of a richer, healthier, more diverse habitat as a legacy to our descendants.

Ed: This proposal, plus additional references, was recently presented to the Citizen's Advisory Committee and the Technical Advisory Committee for Stormwater Management in Tucson.

The Sonoran Permaculture Association is looking for a business owner in Tucson who is willing to allow SPA to implement a water harvesting demonstration project in their parking lot. Anyone interested, please call SPA at 792-4106.