# Arroyo Assessment & Dynamics

#### Key factors in how Arroyos Function

by Rich Schrader of River Source for



Santa Fe WATERSHED ASSOCIATION

#### Adopt-an-Arroyo Program Goals

- Engage volunteers/stewards in assessing and surveying arroyos for problem areas
- Build capacity of stewards to take part in creating solution, including developing a plan of action
- Involve stewards in implementing simple measures to correct problems



## Why are arroyos important?

- Provide drainage to prevent property damage
- Provide wildlife habitat and corridors for movement of animals



- Offer recreational opportunities
- Create areas for increasing aquifer recharge

### Arroyo Assessment – additional resources

Go to Santa Fe Watershed Assn



Webpage (http://www.santafewatershed.org/survey123/

- Download the Survey 123 App for Digital version
- Get updated versions of the Assessment (a work in progress)
- Check out Arroyo Dynamics and floods on Youtube
- Who owns the arroyo?

## Arroyo Dynamics & Characteristics

- What is the main job of an arroyo?
- Sediment & water balance Lane's balance
- 4 geomorphic dimensions of an arroyo
- What is shear stress and why should I care?
- The often unrealized potential of Santa Fe arroyos groundwater recharge & habitat

## Main job of an arroyo

## Move mountains to the sea

"Silt Happens" -- geologist saying







Lane's Balance

Arroyo will incise or aggrade depending on water flow, sediment load, and slope

#### Arroyo meandering & features (plan view)



Thick black line show the boundary of active channels Point bars occur across from pools Riffles occur at the cross overs between bends

#### **Cross-section of an Arroyo**



#### Degraded vs. Healthy Floodplain



### Longitudinal profile of an arroyo



The Sistan River as an example



## Will the real thalweg please stand up (Bill Zeedyk)?

The dry bed of an arroyo sits at a higher elevation than when it is flowing in a storm event

#### Effects of Floodplain on Shear Stress



Shear stress defines the stability of the channel

= amount friction the water has on the bed and bank of the channel

High Shear stress usually means an incising arroyo channel

#### Why healthy arroyos = aquifer recharge

Groundwater flows õõ through point bar IDE Streamflow enters bank in pool Groundwater exits bank at next run

#### Evolution of incised channels a possible sequence



### **Reasons for Channel Incision**

- Urbanization impervious surfaces
- Concentration of flow from culverts
- Vegetation removal such over grazing, construction
- Channel changes such as wagon roads and gravel mining
- Upstream dams starving the channel of sediment

## Upcoming on Wednesday

- Conduct arroyo assessment near Frenchies Field
- Use Survey 123 on your own device
- Restoration techniques 101
  simple and more complex methods
- Resources -



## Get Your Arroyo Stewadship On!

2300 W. Alameda on Wednesday



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#### Resources

- Bill Zeedyk and Van Clothier, Let the Water Do the Work (2009)
- Craig Sponholz and Avery Anderson, Erosion Control Field Guide (2010)
- David Rosgen, *Applied River Morphology* (1996)
- <u>http://www.santafewatershed.org/survey123/</u>
- Also thanks to Earth Analytic! Wetherbee Dorshow

#### Scan this to get the link

