

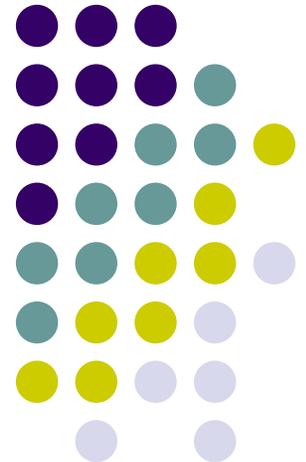
Low Impact Development LID and Flood Control

By Mitch Avalon

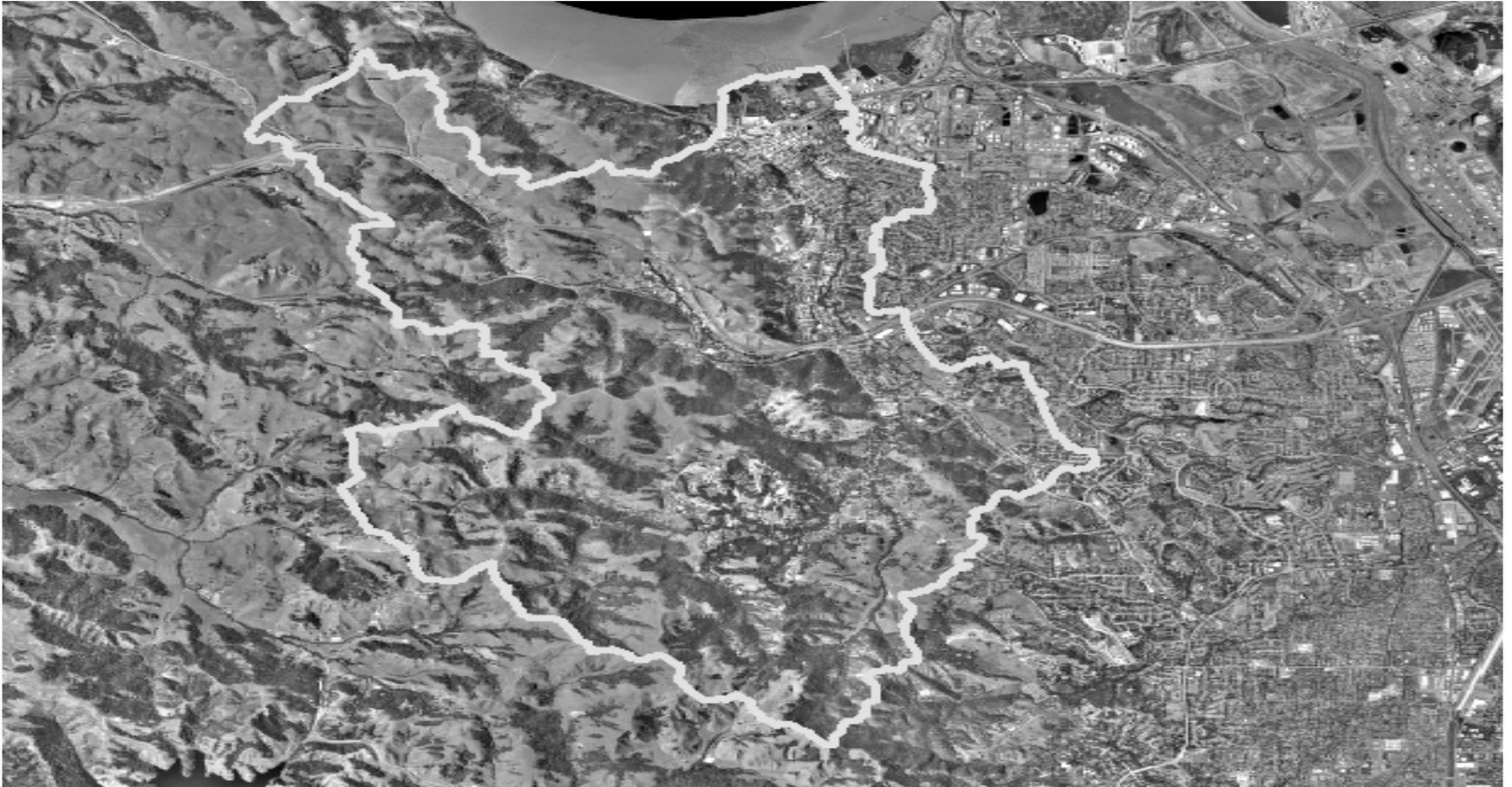
April 23, 2008



Contra Costa County
Flood Control
& Water Conservation District



I Live in a Watershed.....



Overview



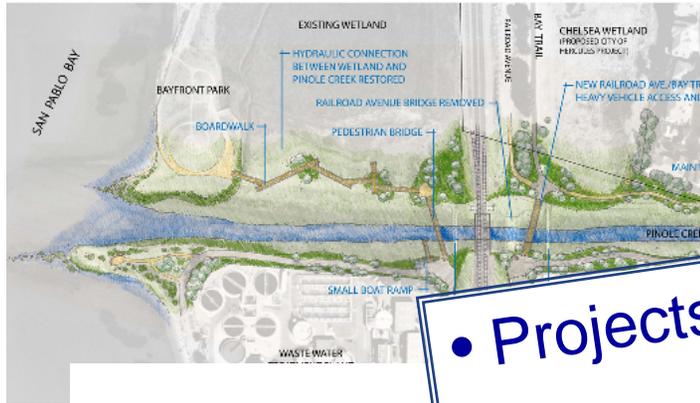
- Flood Control District
- Hydrologic Cycle
- The cause of flooding
- LID and the hydrological cycle
- LID in flooding context
- Basin Flooding vs. Stream Stability



**San Ramon Creek @ Brookdale Avenue
January 2006**



Contra Costa County Flood Control & Water Conservation District



- Projects
- Partnerships
- People





Who is the Flood Control District?

- ❖ Special District of the State
- ❖ Formed in 1951
- ❖ Governed by County Board of Supervisors
- ❖ Staffed by County Public Works
- ❖ 32 Employees
- ❖ Countywide, including cities



**Alhambra Creek Flooding
Martinez 1950**

What Does the Flood Control District Do?



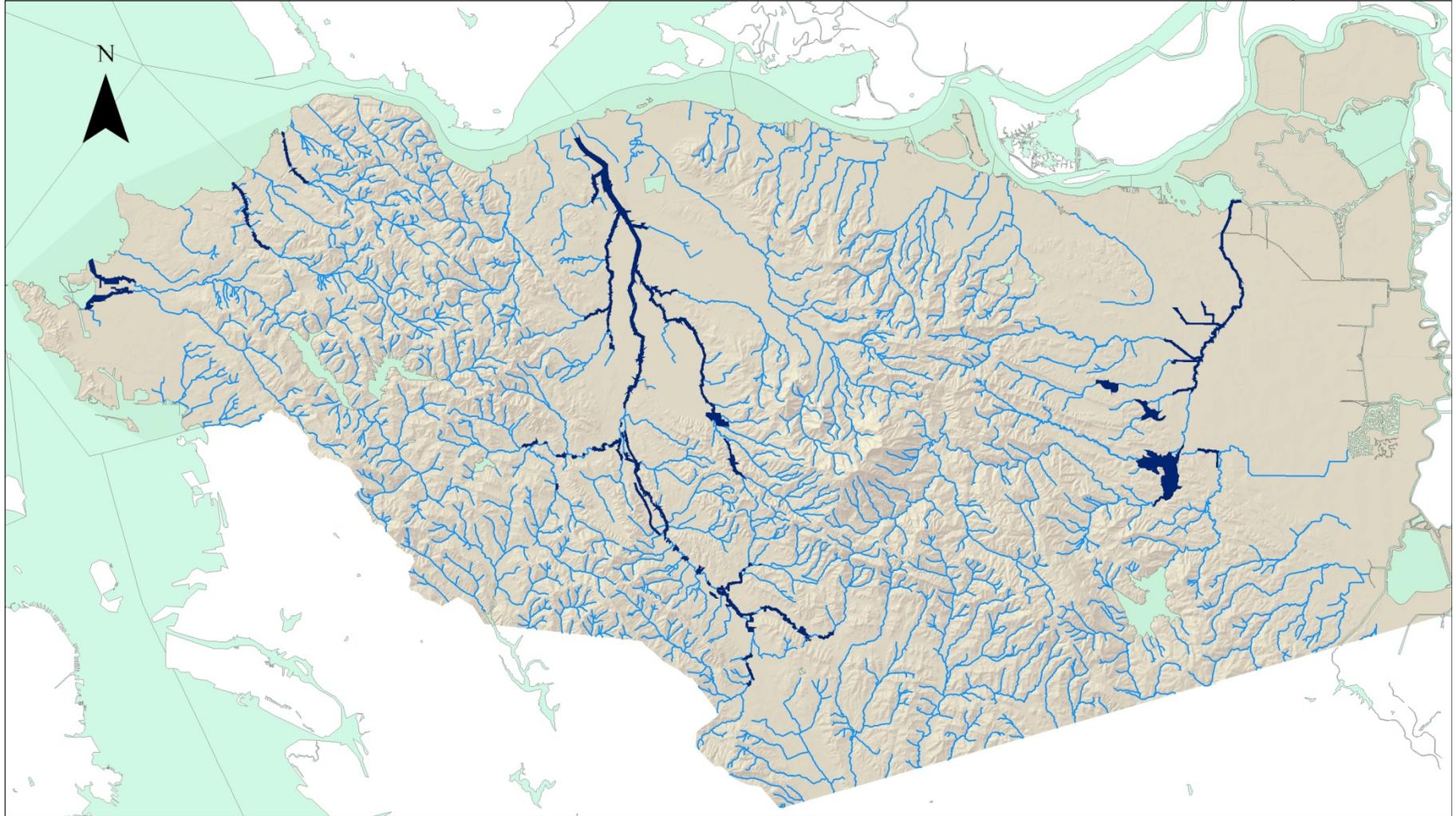
- ❖ Watershed Planning
- ❖ Adequate drainage for new development
- ❖ Maintain regional flood protection system
- ❖ Hydrology resource for the county



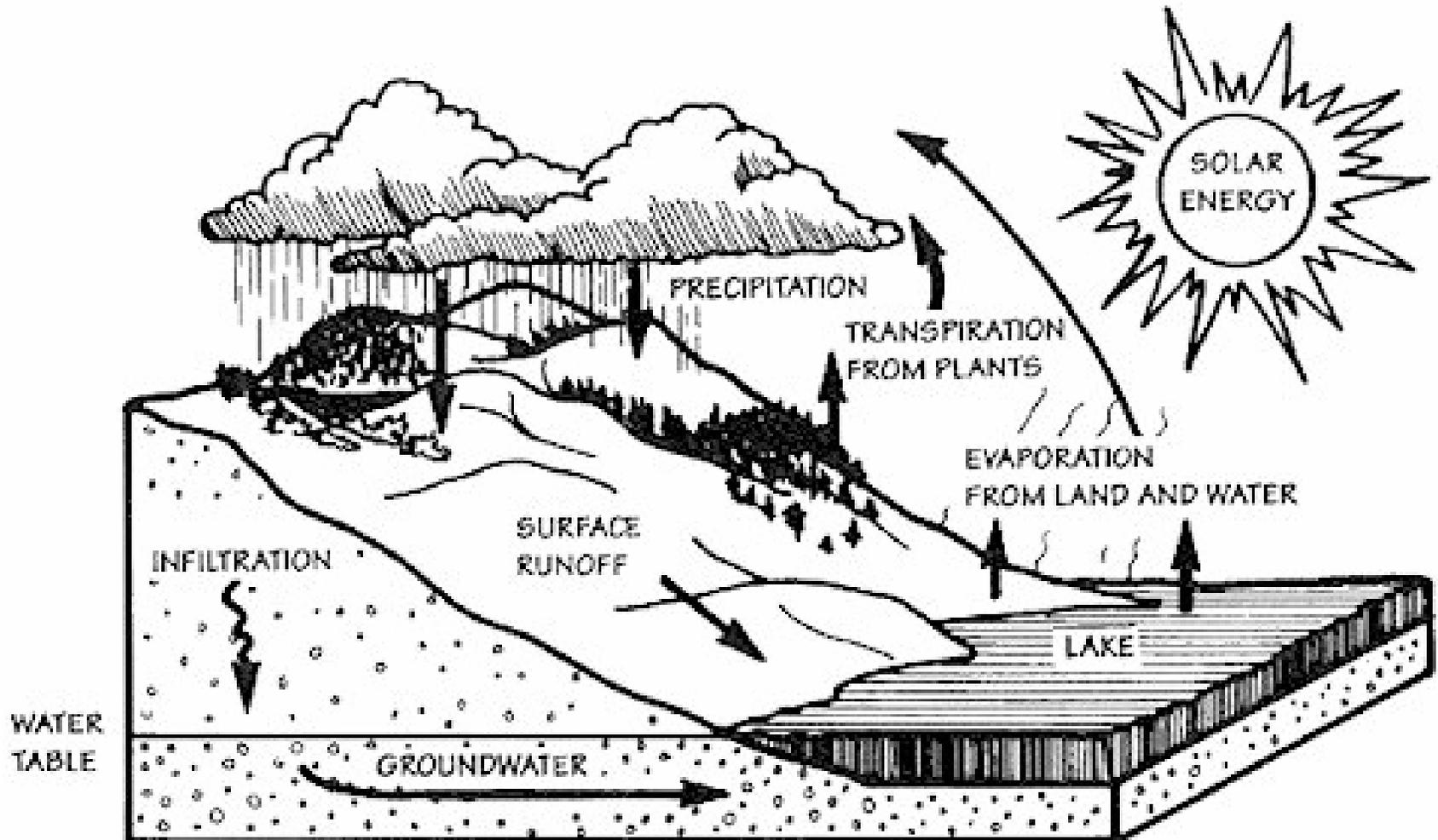
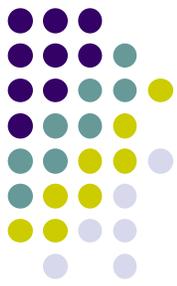
**Walnut Creek Flooding
Walnut Creek 1958**



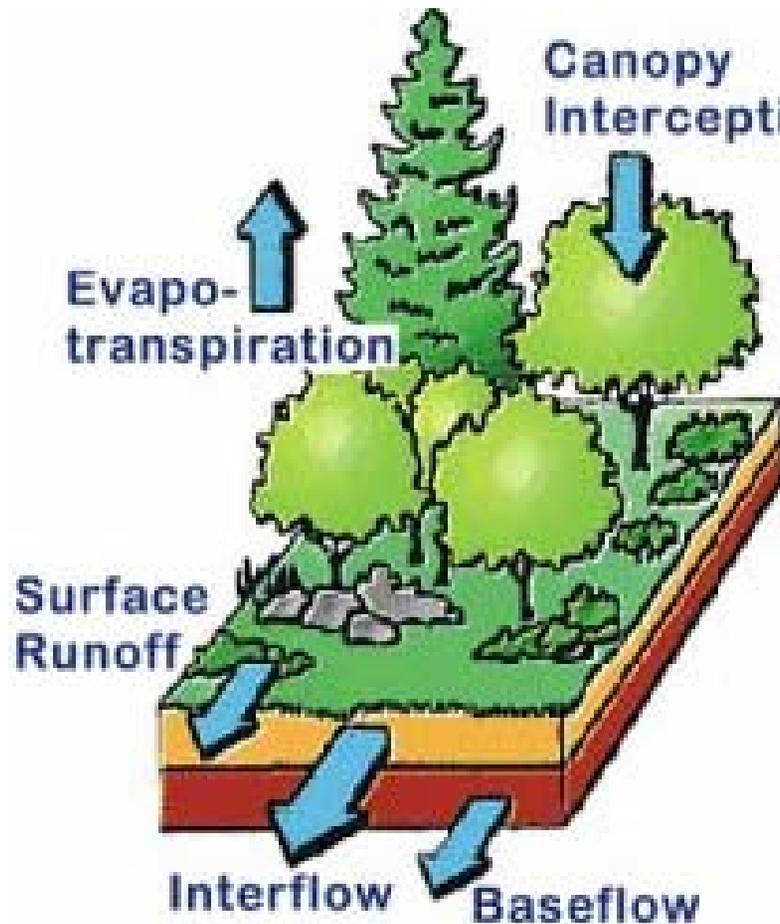
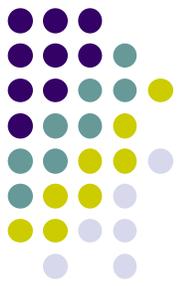
Contra Costa County Flood Control & Water Conservation District



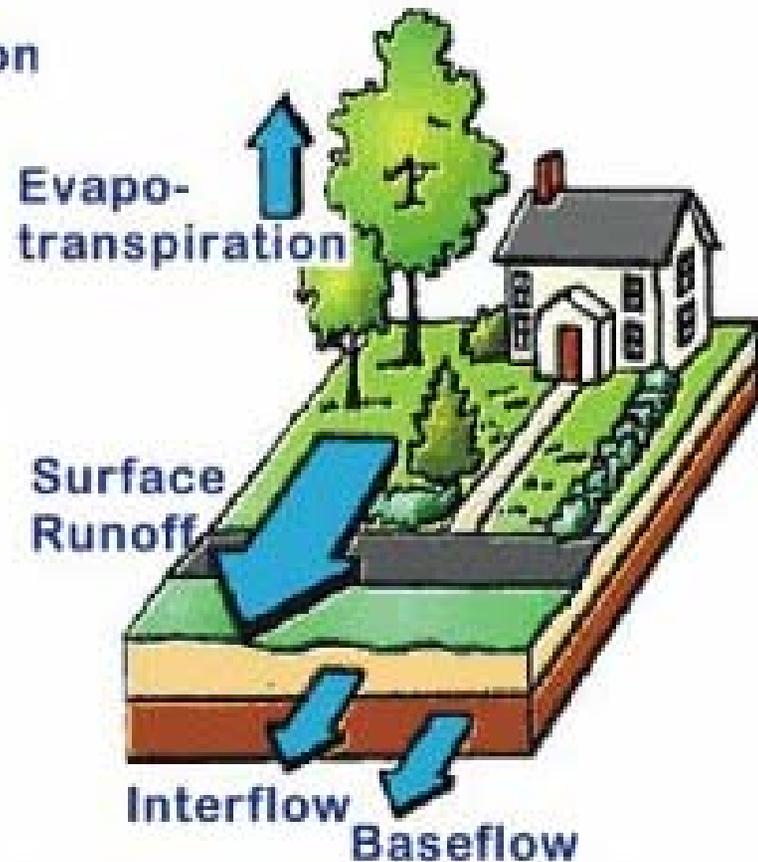
The Hydrologic Cycle



Local Hydrologic Cycle

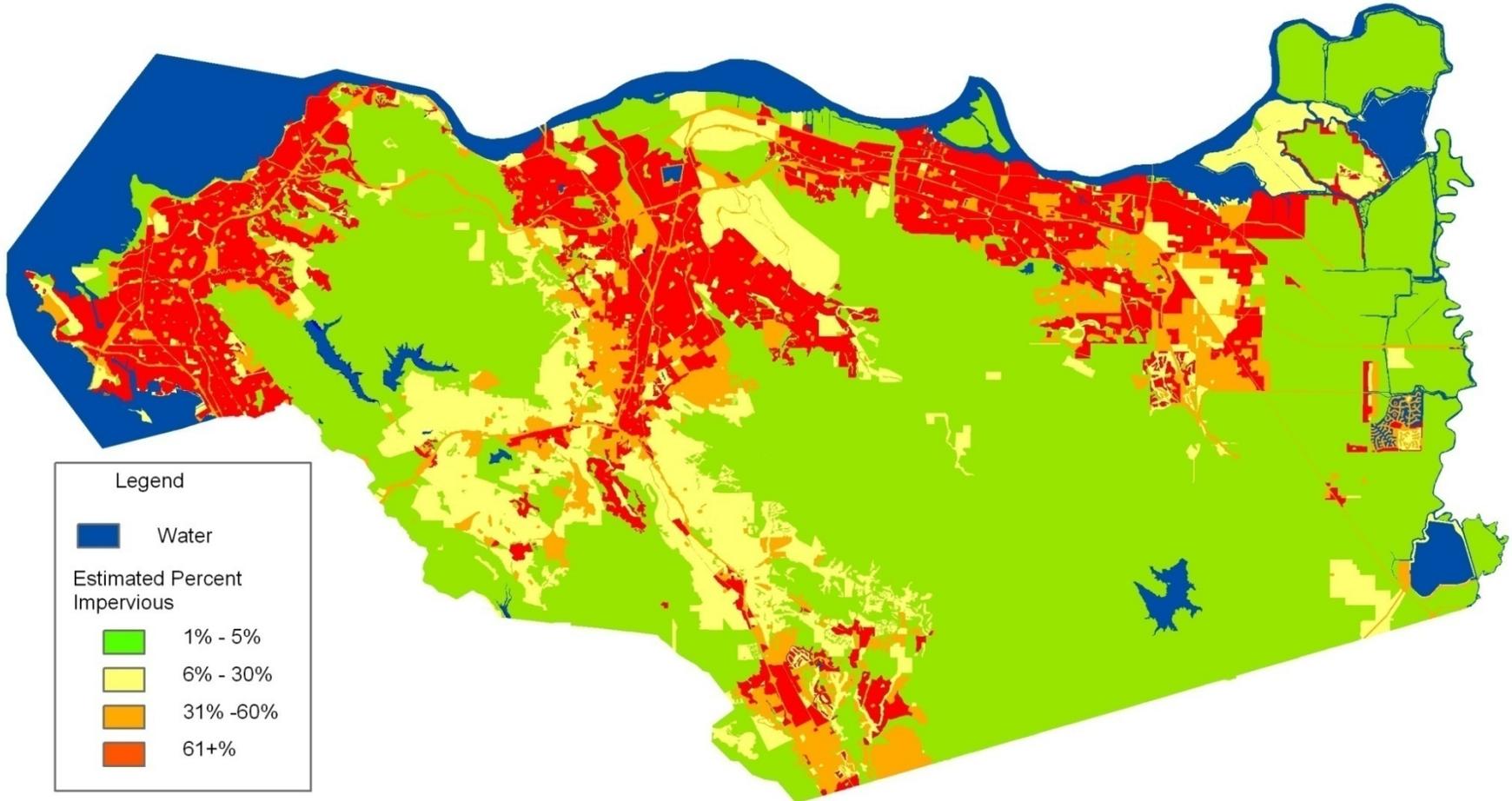


Before Construction



After Construction

The Impact of Impervious Surfaces





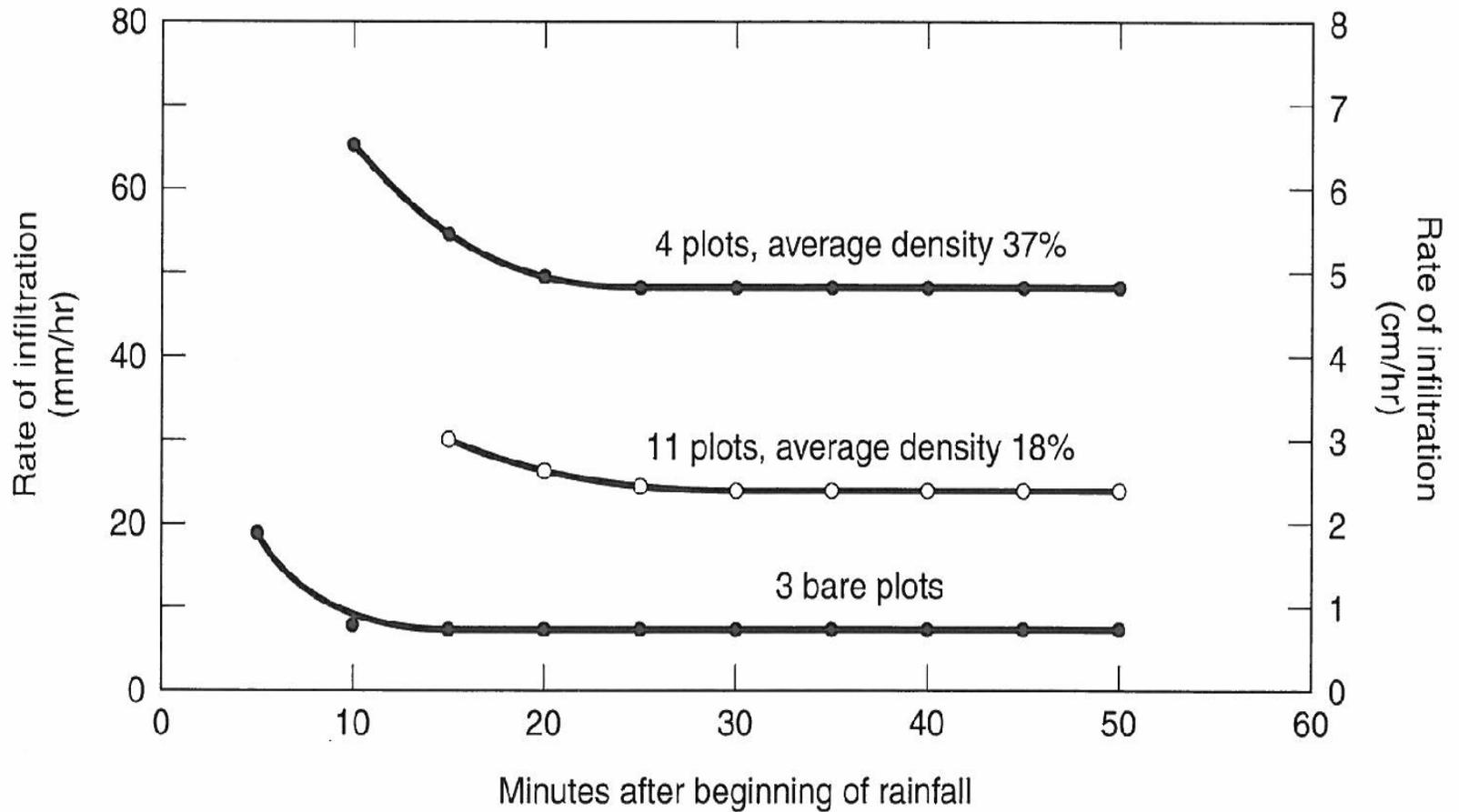
What Causes Flooding

- Rainfall vs Runoff
- Storm intensity (100 year storm)
- Antecedent Conditions

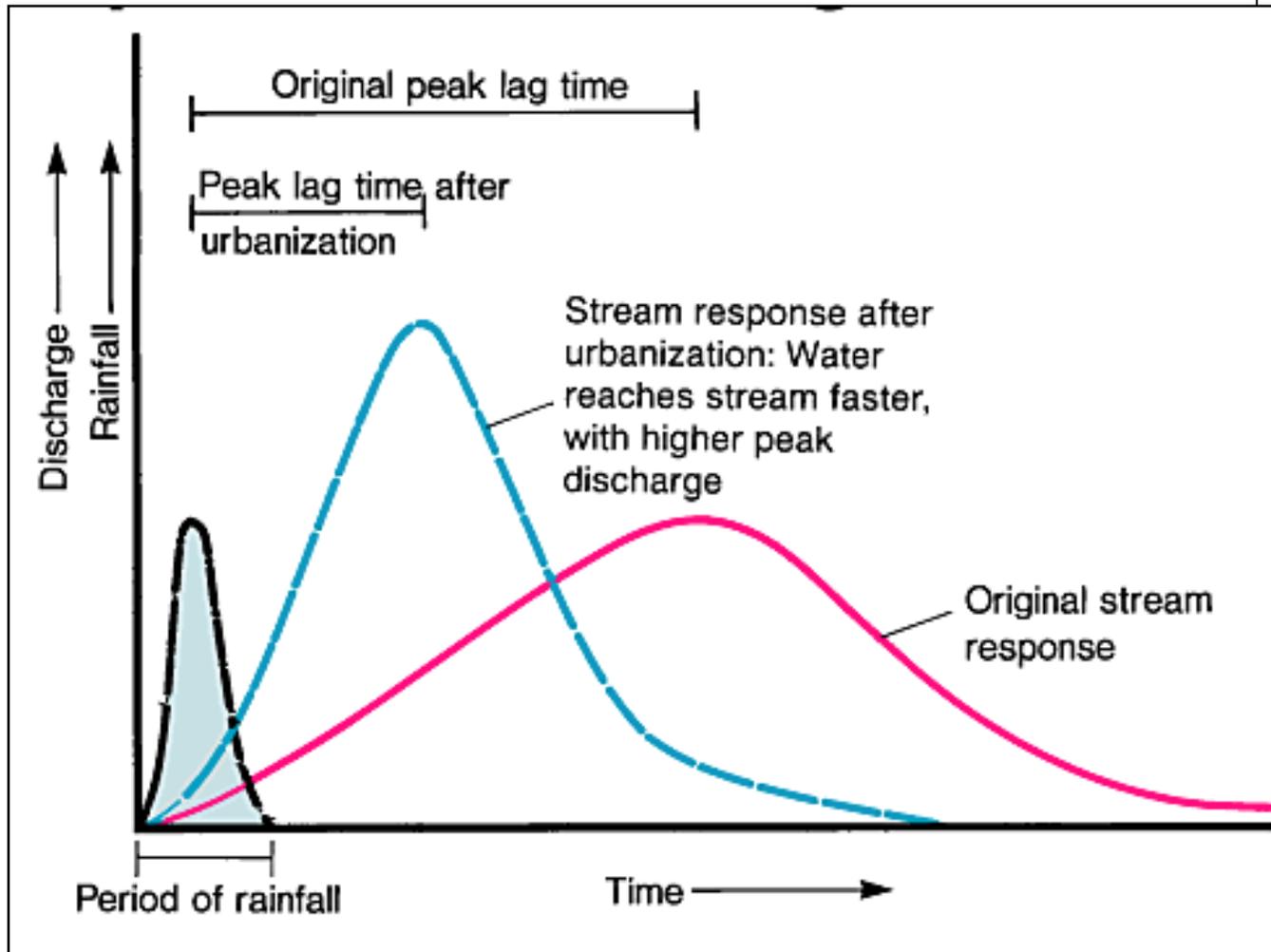


1997 Downtown Martinez New Years Flood

Infiltration Rates (from Luna Leopold)



The Flood Hydrograph



Effects of Urbanization

Flood Forecasting

Contra Costa County Forecasting Model: 7-5-3-2 Flood



Downtown Walnut Creek - 1958

Antecedent Conditions



Conditions preceding a storm. Characterizes watershed wetness before a storm.



- Flooding is more likely to happen when the soil is already wet.

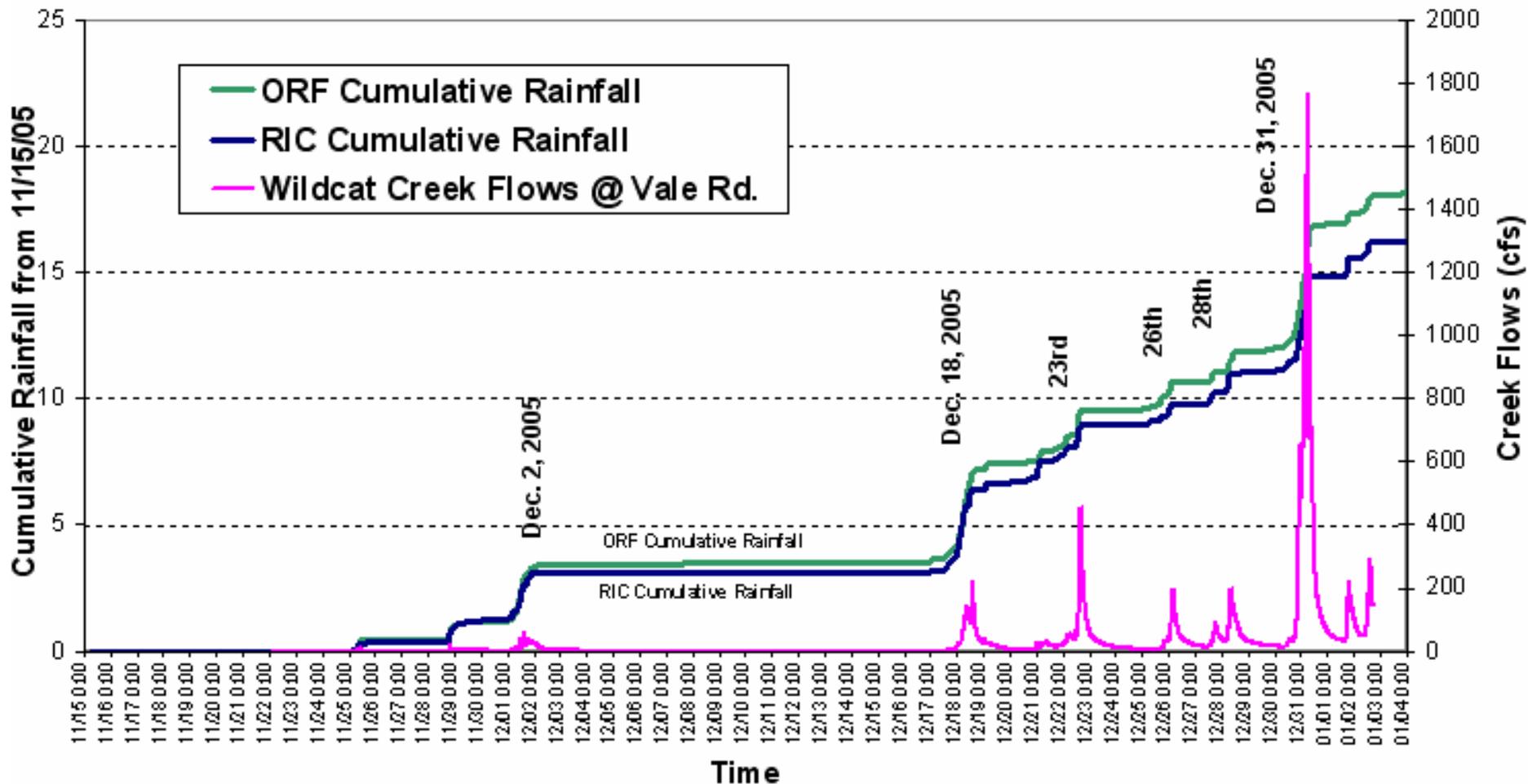
Sponge Model



The wetter the sponge, the more water runs off



Antecedent Conditions Leading up to the December 31, 2005 Storm



Historical Antecedent Conditions that have preceded flooding in Contra Costa County



- 7" of rain for the season starting on July 1.
- 5" of rain in the last 30 days.
- 3" of rain in the last 7 days.



Alhambra and Masonic Street, Martinez

7 Year
5 Month
3 Week

- 7" of rain for the season starting on July 1.
- 5" of rain in the last 30 days.
- 3" of rain in the last 7 days.
- National Weather Service forecast of two (2) inches of rainfall in the next 24 hours



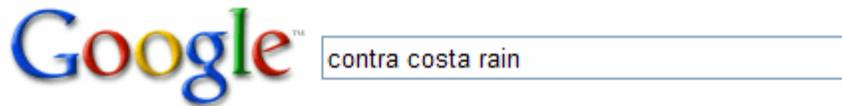
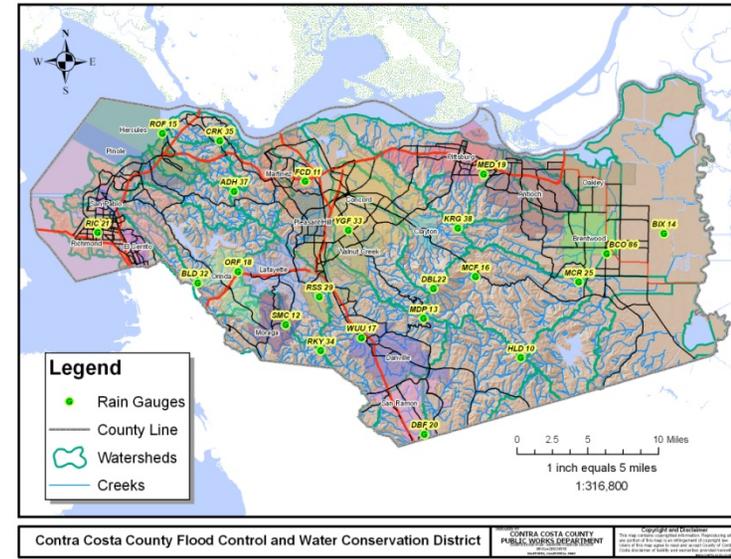
Center Ave over Grayson Ck
Pacheco



Tools to Use

Flood Control District
Rain Gauge web page.

<http://www.co.contra-costa.ca.us/depart/pw/content/Hydrology.html>



Web

[\[PDF\] Approximate Return Periods for FCD Rain Gauges Dec](#)

File Format: PDF/Adobe Acrobat - [View as HTML](#)

Rain Gauge Locations. Legend. Rain Gauges. County Line. Creeks. Wat in Contra Costa County operated by private or public entities have ...

www.co.contra-costa.ca.us/.../Dec%2031%20Storm%20Final%20Rpt/Ra2012-31-05%20Storm.pdf - [Similar pages](#) - [Note this](#)

[CCC Flood Control District- Hydrology](#)

These values are estimates based on several historic flooding even When these conditions are met, at any rain gauge, flooding may ..

www.co.contra-costa.ca.us/depart/pw/content/Hydrology.html - 33 Cashed - [Similar pages](#) - [Note this](#)

Google

“Contra Costa Rain”

or

“Contra Costa Rain Gauge



LID and the Hydrologic Cycle

- Soil Infiltration
 - Porosity
 - Permeability
 - Soil Structure
 - Vegetation
- Watershed Recovery Time
- Time of Concentration



San Ramon Creek @ Livorna Rd, Alamo

January 2006

Regional Drainage vs Local Drainage



- Local Design: 10 year
- Regional Design: 100 yr
- Pipe Sizing and LID
- LID Offsets
 - Global Warming
 - Flashy Storms
 - Length of Hydrological Data



Grayson Creek Channel - 1957

System Function and LID



- Floodplain Development
- Basin Storage
- Stream Stability



Murderers Creek, El Rancho Drive,
Pleasant Hill, 1952

Sustainable Watershed

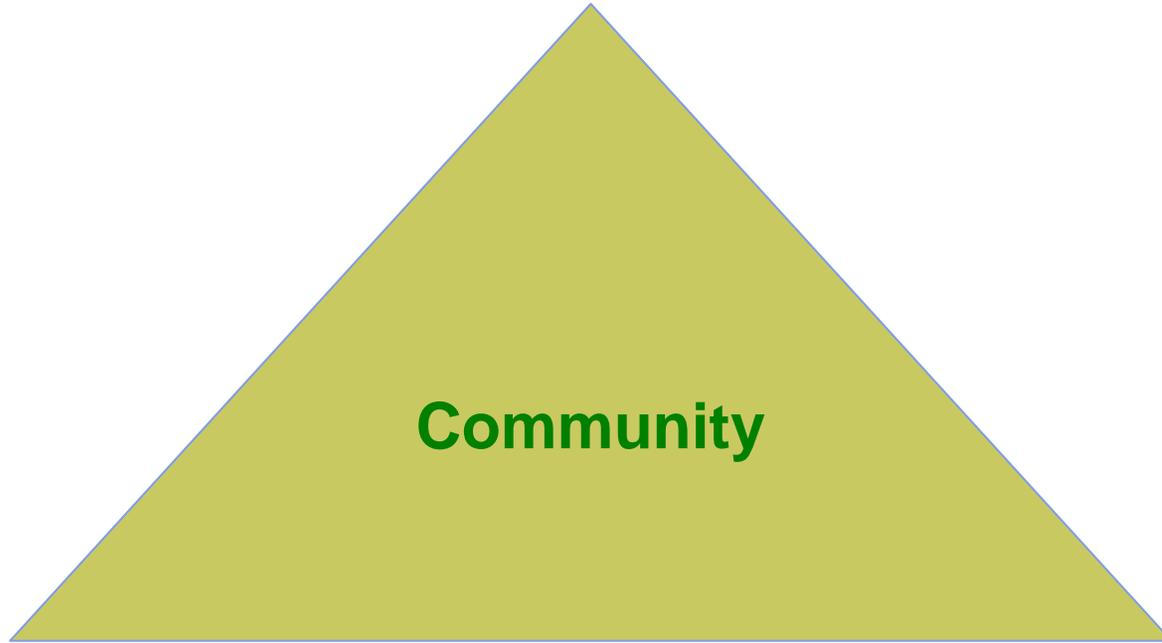


**Creek Stability/Function
(Geomorphology)**

Community

**Water Quality/Quantity
(Hydrology)**

**Habitat
(Ecology)**



The Future



- Watershed Based Approach
- Stream Goals
- Second Generation Conversion
- 50 Year Plan



Remember you live in a Watershed too.....

