Garden Designs to Protect Water Quality

Presentation to Going Native Garden Tour

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- *Santa Clara Basin Watershed Management Initiative Land Use Subgroup*

- *Santa Clara Valley Urban Runoff Pollution Prevention Program*
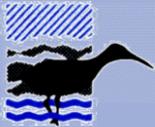
Overview of Presentation

- **Brief refresher:**

  - **Role of gardens in protecting water quality**

- **Directing runoff from roofs and pavement to landscaping:**

  - **Suitability and landscape size**

  - **Tips for directing roof runoff to landscaping**

  - **Tips for directing pavement runoff to landscaping**

  - **Swales and dry creeks**

Plant Selection Can Affect Water Quality

- **Selecting climate-adapted plants suitable for site conditions can reduce the need for:**
  - **Synthetic fertilizers, which can enter stormwater runoff and contribute excessive nutrients to receiving waters.**
  - **Synthetic pesticides and herbicides.**

Reducing Irrigation Makes a Difference

- **Reduce irrigation use by:**
  - **Selecting water-conserving plants.**
  - **Grouping plants by water needs (hydrozoning).**
  - **Installing a smart irrigation system.**

- **These practices will:**
  - **Conserve water.**
 - **Help avoid over-irrigation and reduce dry-season, non-stormwater flows to creeks.**

Product Selection Makes a Difference

- **Use compost instead of synthetic fertilizers.**
- **Attract beneficial insects.**
- **Avoid the use of synthetic pesticides and herbicides.**
  - **When unavoidable, choose the least-toxic alternative.**
- **More information is available at www.ourwaterourworld.org.**

Gardens Can Soak Up Runoff

- **Gardens can help reduce the amount of polluted runoff, and slow it down, which helps reduce erosion;**
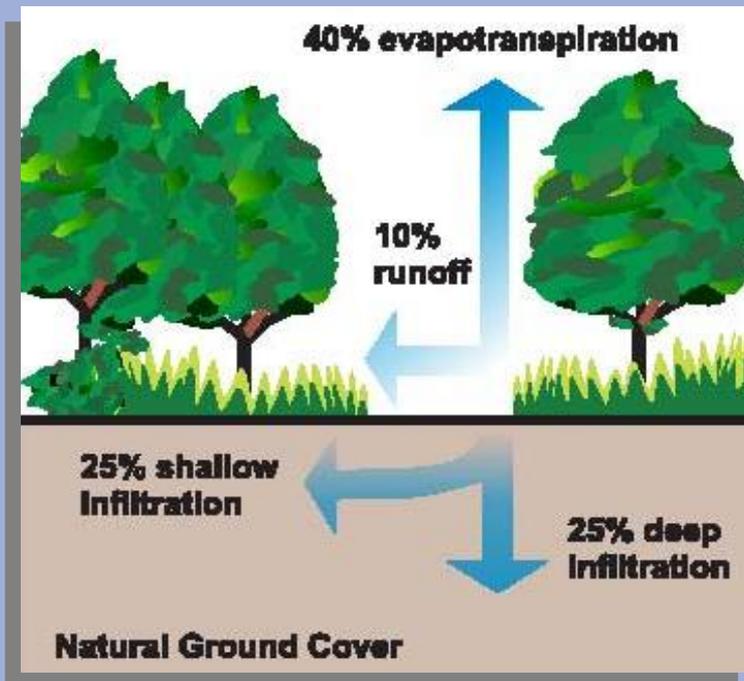
Pre-development
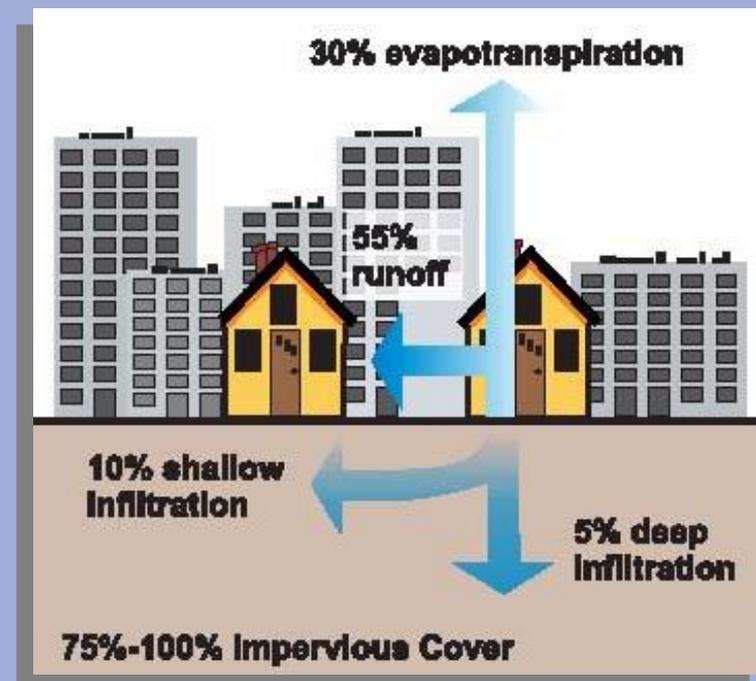
Intensive development

Why Design Landscaped Areas to Receive Runoff?

- **Soaking up rainfall runoff from building roofs and paved areas:**

  - **Helps reduce amounts of runoff that flow to creeks.**

  - **May reduce creek erosion.**

  - **Allows pollutants to be filtered out or broken down by the soil and plants.**

4 Brochures on Watershed-Friendly Designs

- **Brochures prepared by the Bay Area Stormwater Management Agencies Association:**

    - **Landscape Designs for Stormwater Management**

    - **Rain Gardens**

    - **Rain Barrels and Cisterns**

    - **Pervious Paving**

    - **http://mywatershedwatch.org/4residents.html** (Scroll to "Watershed Friendly Landscape Design".)

Site Conditions for Directing Runoff to Landscaping

- **Works best in well drained soil; consider amending soils with compost.**

- **Not suitable on steep slopes, which may be undermined by saturated soils.**

- **Avoid ponding around trees and plants that do not tolerate wet conditions.**

- **Direct runoff away from building foundations.**

Purissima Hills Water District

How Big Does the Landscaped Area Need to Be?

- **Recommended sizing:**

  - **Allow enough room for a sizing ratio of up to 2:1, impervious to pervious surface.**

  - **In other words, the roof or paved area is 2x the area of landscaping.**

2:1 Ratio of Roof to Landscaping
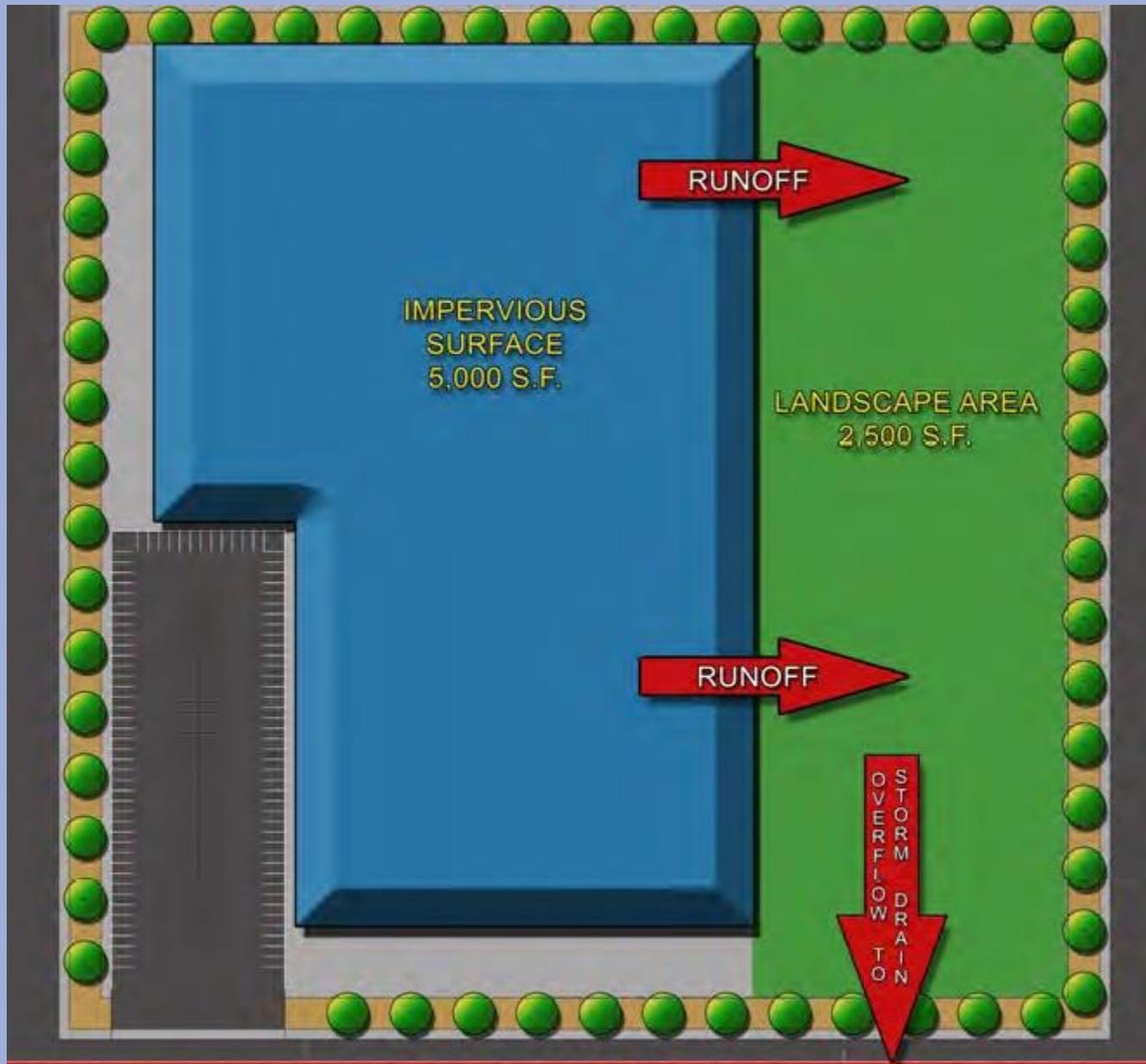
Avoid Flooding

- **To help avoid flooding, design the landscape, so that overflow drains to another landscaped area, or the storm drain.**

Donnelly Avenue Rain Garden, Burlingame

Getting Roof Runoff to Landscaping
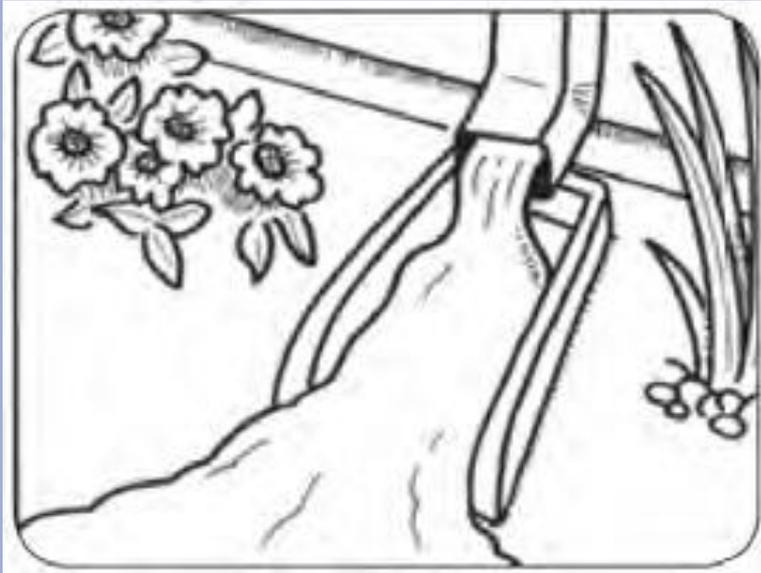
- **Splash block:**
  - **Prevents erosion where there are concentrated flows.**
  - **Conveys runoff away from building to avoid saturating soils around the foundation.**

Getting Roof Runoff to Landscaping

- **Gravel area under gutterless roof:**
  - **Reduces erosion from sheet flows off of roof.**
  - **Must be designed to convey runoff away from building.**

Getting Roof Runoff to Landscaping

- **Rain Chain:**
  - **Enhances aesthetics.**
  - **Provide small area of hardscape below rain chain to prevent erosion at point of concentrated flow.**
  - **Must be installed to convey runoff away from building.**
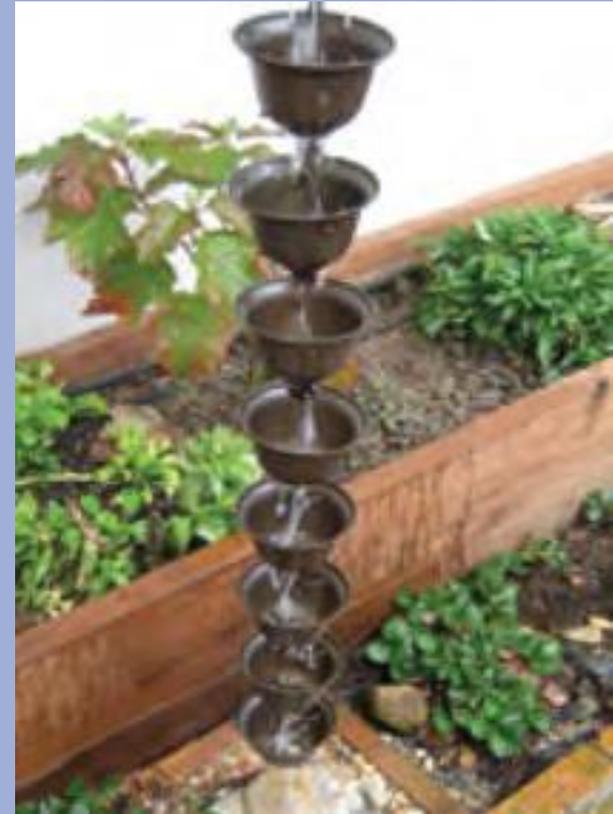
Getting Roof Runoff to Landscaping

- **Pop-up emitter:**
  - **Conveys runoff from roof underground to landscaped area.**
  - **Water pressure causes cap to lift up and release water.**
  - **Slows roof runoff.**
  - **Can be used to route runoff away from the building and under obstacles, such as walkways.**
  - **Standing water remains in pipe, unless perforations provided in pipe.**
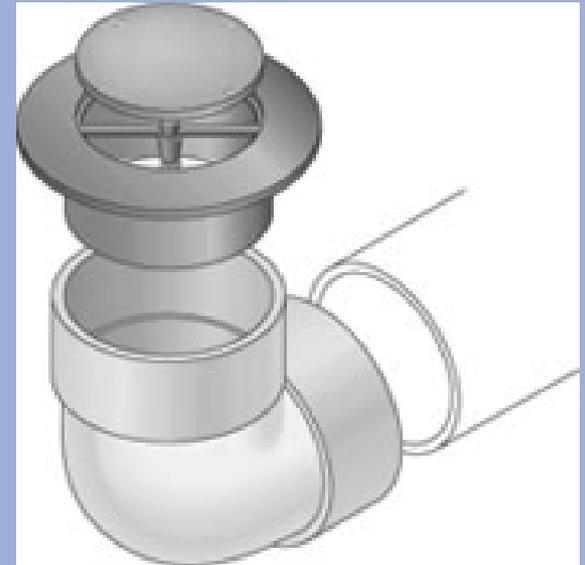
Getting Pavement Runoff to Landscaping

- **Install landscaping adjacent to the driveway or paved area.**

- **Grade the pavement to drain to landscaping.**

Getting Pavement Runoff to Landscaping

- **Landscaped areas must be below the pavement. Allow an elevation change of 4 to 6 inches, so that plants can grow.**

This installation did not provide sufficient grade change to allow for vegetation growth.

# Getting Pavement Runoff to Landscaping

- **Install cobbles or rocks where runoff enters the landscape to reduce erosion.**

Swales and Dry Creeks

Narrow, linear depressions designed to capture and convey water. Swales imitate a natural creek's ability to slow, infiltrate, and filter stormwater.
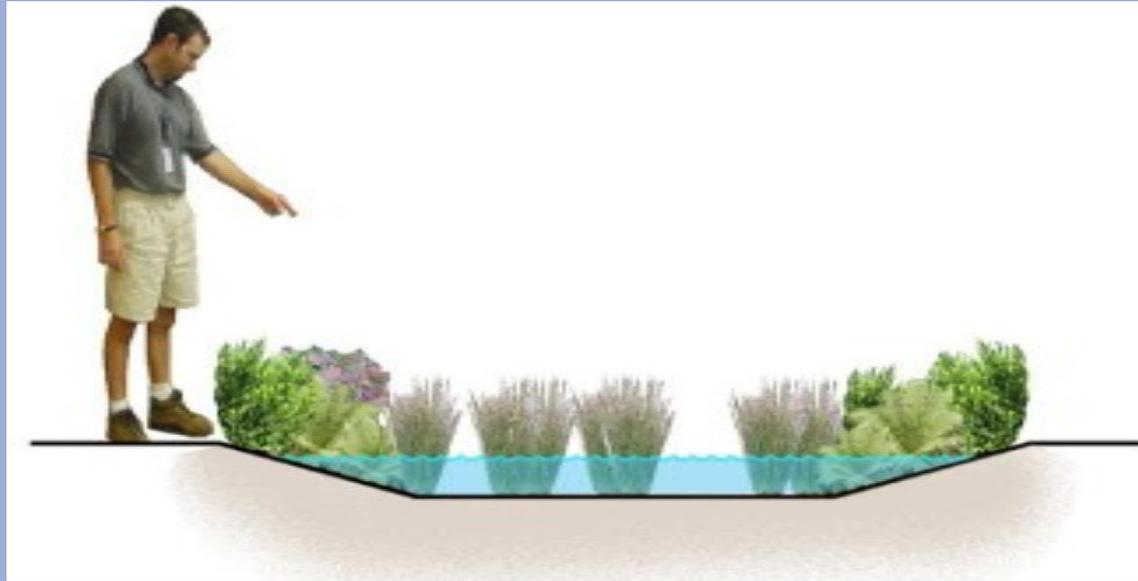
Cross-section of swale
(Credit: San Mateo Countywide Water Pollution Prevention Program)

Swales and Dry Creeks

- **Excavate a narrow linear depression that slopes down to provide a flow path for runoff.**

- **The path length (10 to 15 feet or more) should meander to slow water and prevent erosion.**

- **Use plants from creek and river ecosystems to help reduce erosion and increase evaporation of runoff.**

Dry creek infiltrates and conveys runoff.

Swales and Dry Creeks

- **In ponding areas, consider using mulches that resist floating, such as "aged mulch," a.k.a. composted mulch.**

Purissima Hills Water District Demonstration Garden (photo credit: Stephanie Morris)

Swales and Dry Creeks

- The end of the swale requires an outlet for **high flows** (another landscaped area or a storm drain).

- Municipal staff can help identify an appropriate outlet.

Photo Credit: Ed Boscacci, BKF Engineers

Thank You!
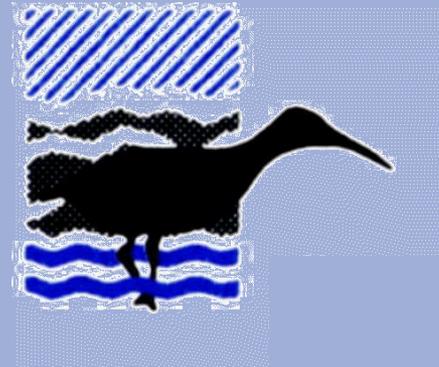
For More Information…

- Managing home and garden pests: ourwaterourworld.org

- Watershed-friendly site designs: mywatershedwatch.org/4residents.html

- Greywater/Rainwater Info: greywateraction.org

- Bay-Friendly Landscaping: bayfriendlycoalition.org

- Contact: Peter Schultze-Allen, Senior Scientist

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