

Garden Designs to Protect Water Quality

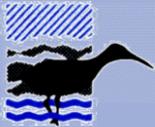
Presentation to Going Native Garden Tour

April 5, 2014

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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.



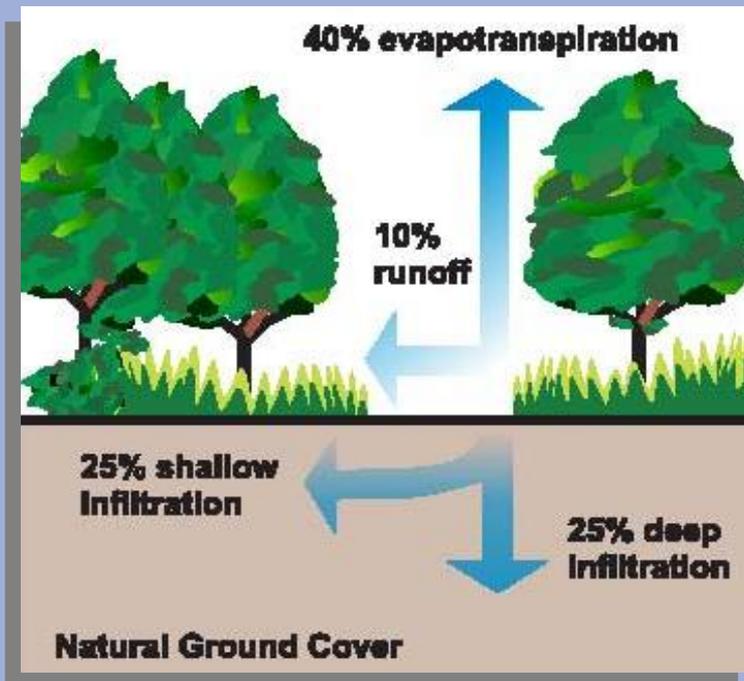
Product Selection Makes a Difference

- 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.

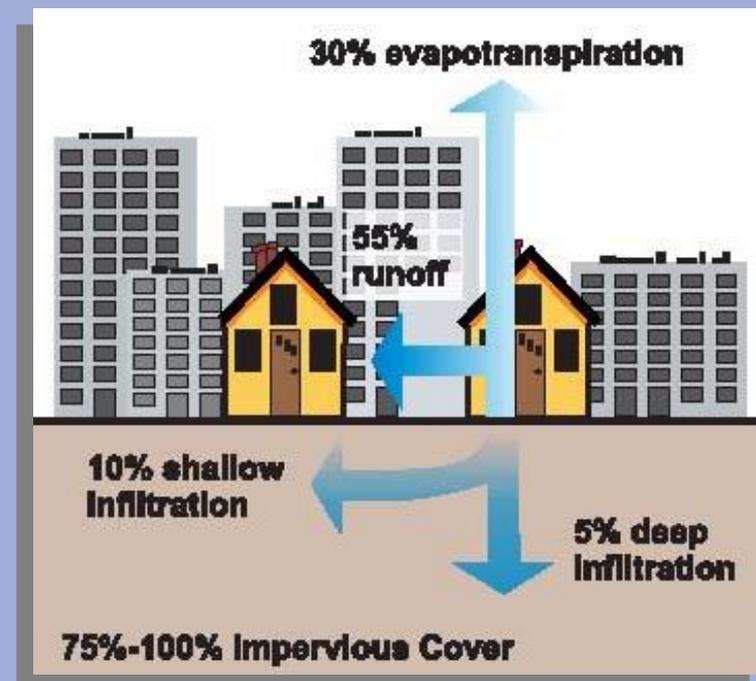


Gardens Can Soak Up Runoff

- 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”.)

LANDSCAPE DESIGNS FOR STORMWATER MANAGEMENT

Stormwater Control for Small Projects



Dry creek infiltrates and conveys runoff.

Designing landscaped areas to soak up rainfall runoff from building roofs and paved areas helps protect water quality in local creeks and waterways. These landscape designs reduce polluted runoff and help prevent creek erosion.

As the runoff flows over vegetation and soil in the landscaped area, the water percolates into the ground and pollutants are filtered out or broken down by the soil and plants.

This fact sheet shows how you can design your landscape to absorb runoff from impervious surfaces, such as roofs, patios, driveways, and sidewalks, with landscape designs that can be very attractive.

If you are interested in capturing and storing water for irrigation use, see the Rain Barrel fact sheet in this series.

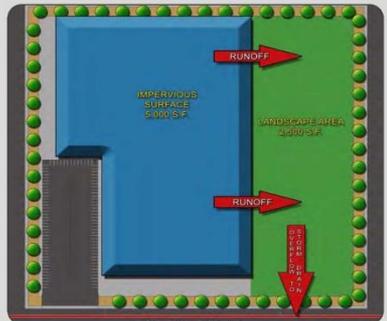
Can My Project Manage Stormwater in the Landscape?

Directing stormwater runoff to the landscape is suitable for sites with the following conditions:

- Roofs, driveways, parking areas, patios, and walkways that can drain to an existing landscape, or an area that may be converted to landscape.
- Areas of landscape with a slope of 5% or less are preferred; check with the municipality regarding requirements for steeper sites.
- Works best in well-drained soil; soil amendments may be used in areas with poor drainage.
- Landscaped areas that total at least 1/2 the size of the impervious area draining to it.
- Direct runoff away from building foundations.
- Runoff should not create ponding around trees and plants that won't tolerate wet conditions.

How Do I Size My Landscape?

The landscaped area should be 50% of the size of the contributing impervious surface. For example (see below), to manage runoff from a 5,000 square foot roof or paved surface, you should have 2,500 square feet of landscaping.



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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.



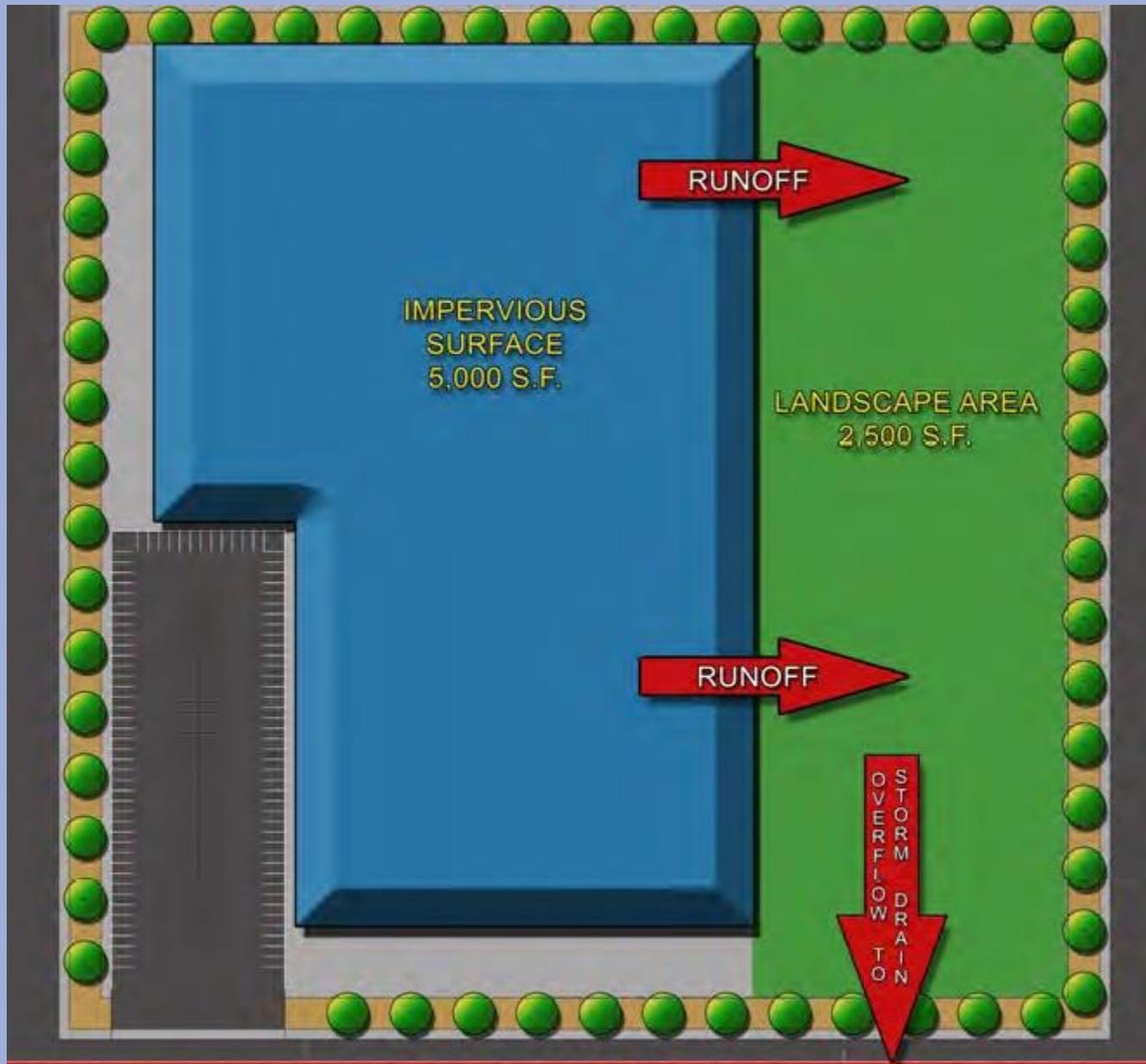
Purissima Hills Water District

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



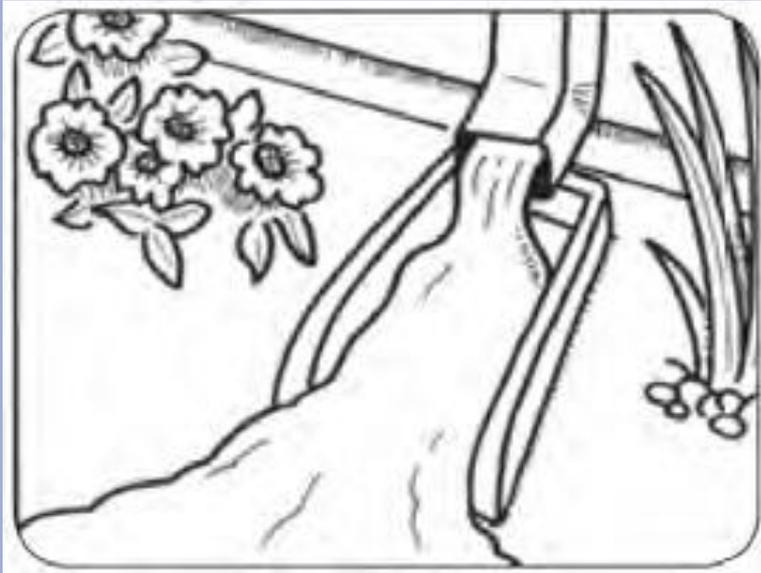
Avoid Flooding

- 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.

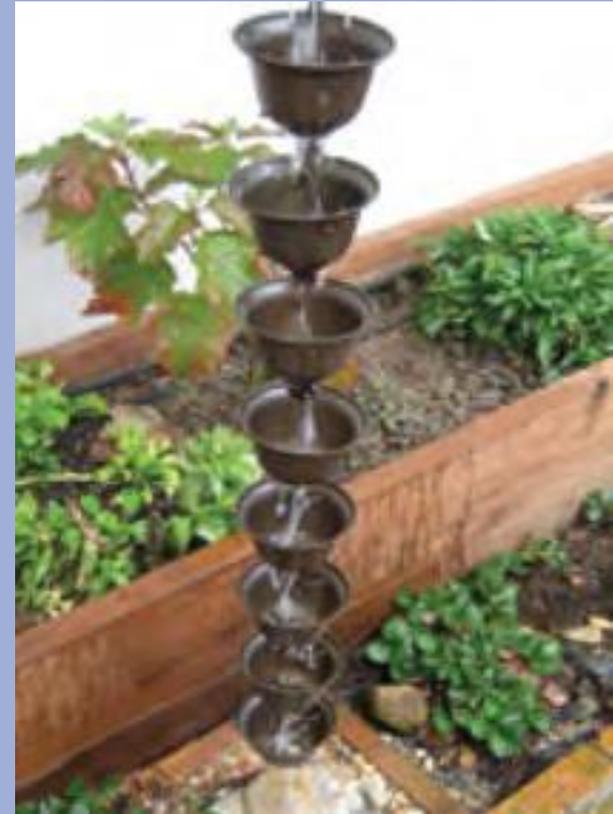
Getting Roof Runoff to Landscaping



- **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

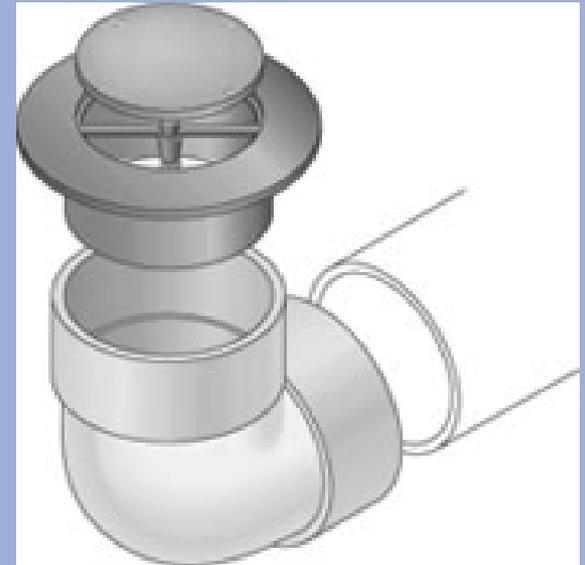
- **Rain Chain:**
 - Enhances aesthetics.
 - Provide small area of hardscape below rain chain to prevent erosion at point of concentrated flow.
 - Must be installed to convey runoff away from building.



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.

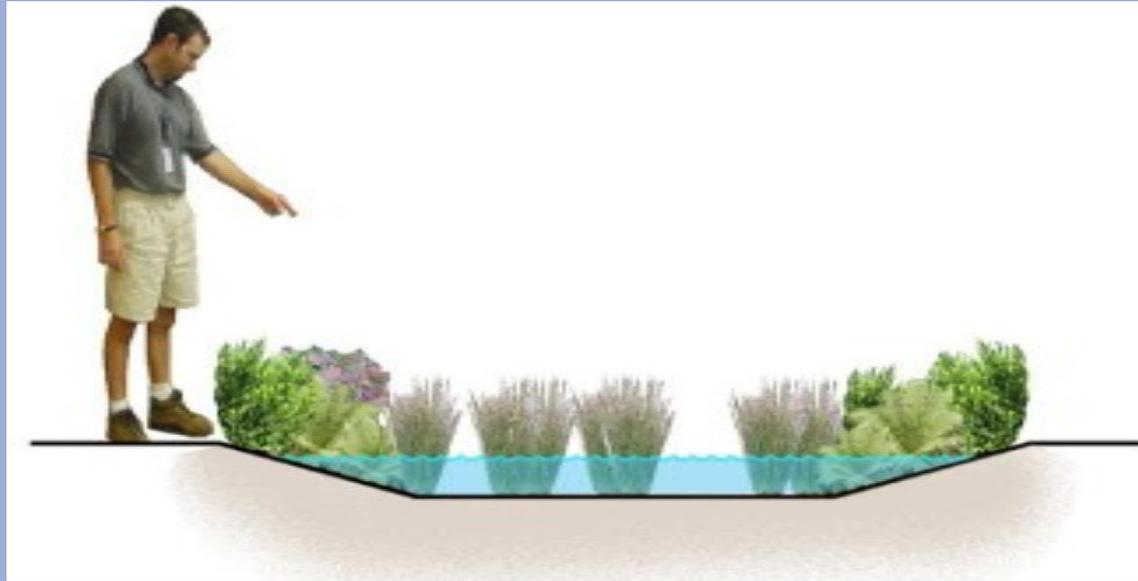
Getting Pavement Runoff to Landscaping

- 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.



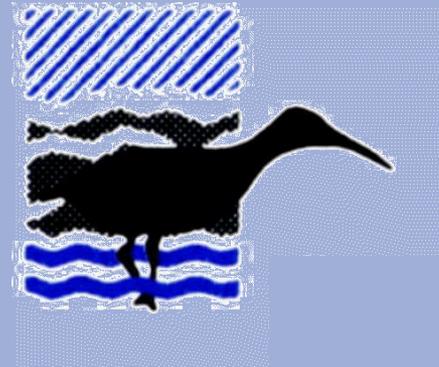
Swales and Dry Creeks

- 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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