## Why do we need BMPs?

Due to urbanization- the addition of roads, buildings, houses, and other surfaces that prevent water from soaking into the ground (known as impervious surfaces), our natural systems have been changed. Poorly managed agricultural land and forests can contribute excess sediment and chemicals such as pesticides due to overgrazing, overapplication or free-roaming feral ungulates. During storms, large amounts of water flow off of these areas causing both flow and water quality problems. This is known as stormwater runoff.

## How is stormwater currently managed?

Traditionally, management of polluted runoff has focused on getting water quickly out into street drains through a series of underground pipes, transferring directly into our streams and ocean waters without taking pollutants out of the stormwater. Even stream beds have been carved out and covered with concrete to help get the water out to the ocean fast.

## Is there a better way?

More cities are moving towards smaller site-based sustainable stormwater management techniques that take advantage of nature's natural processes to filter out pollutants before they reach our waterways. These BMP techniques focus on detention, retention and infiltration; slowing water down so that it reduces erosion, allows for removal of pollutants and even storage of water for use during dry times. Controlling or reducing runoff from individual sites also can help reduce the risk of flooding and overloading sewage pipes, which can lead to overflows.

## For more information:

**Center for Watershed Protection:**
http://www.cwp.org/

**CWP's Stormwater Manager Resource Center:**
www.stormwatercenter.net/

**EPA, Green Infrastructure:**
http://cfpub.epa.gov/npdes/home.cfm?program_id=298

**City of Portland, Oregon:**
www.portlandonline.com/bes/index.cfm?c=34598

**Hawai'i Backyard Conservation pamphlet:**
www.hbws.org/cssweb/display.cfm?sid=1619

**Hawai'i rainwater catchment:**
www.HawaiiRain.org/index.php

**Hawai'i Department of Transportation Stormwater Management:**
www.stormwaterHawaii.com/

**City and County of Honolulu, Department of Environmental Services:**
www.cleanwaterhonolulu.com/storm/index.php

**STORMWATER MANAGEMENT EXAMPLES:**

**Water Environment Research Foundation, Case Study, City of Portland, Oregon:**
www.werf.org/livablecommunities/studies_port_or.htm

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Kathy Chaston, Liz Foote, Matt Rosener, Lisa Stratton and Wendy Wiltse

# BEST MANAGEMENT PRACTICES:

## BMPing up conservation efforts for clean water

You've been helping out at beach cleanups, using phosphorus—less soaps, and conserving water by taking shorter showers. But you may be wondering—is that enough? What are these BMPs you hear government agencies talking about?

A "BMP" stands for Best Management Practice. It is primarily used to indicate the most preferred method to control water pollution. BMPs are usually required by local, state or federal agencies to control pollution that comes from construction, industrial sources, sewage and wastewater, or stormwater.

# EXAMPLES OF STORMWATER BEST MANAGEMENT PRACTICES

## INFILTRATION/TREATMENT EXAMPLES:

**Buffers** are areas of shrubs or vegetation that slow down the flow of storm water and catch pollutants before they enter the environment. To perform optimally, they should be situated along roads or other impervious areas or near the banks of streams or gullies.

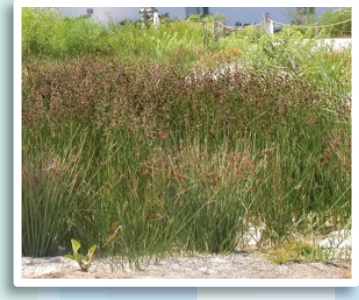
**Rain Gardens** are similar to buffers in that they use vegetation to catch the runoff water; however they are designed with a shallow depression in the center to catch excess water and let it slowly filter back into the water table.

**Swales** are wide shallow depressions, usually comprised of just grass and found along sidewalks, parking lots, and between divided highways. **Vegetated swales** are more appealing to the eye and provide more filtering of pollutants.

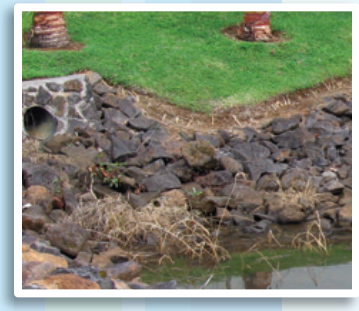
**Stream Restoration** is the act of restoring streams through stabilizing stream banks by planting native trees and other vegetation and creating a natural flow of water in the stream. This can prevent too much sediment and other debris to enter the stream and ocean and prevent flooding and property loss.

**Pervious Concrete** allows water to seep into the ground where it can be filtered and resupply our groundwater.

## DETENTION/RETENTION EXAMPLES:



**Backyard Wetlands** catch and filter runoff. They differ from rain gardens by generally holding water for longer periods of times after it rains and transplanted with plants and trees that "like to get their feet wet".



**Retention Ponds** are ponds that are designed to catch and filter runoff from impervious areas such as parking lots, house and building roofs, etc. They catch and filter excess water, but unlike the rain garden, which only holds water during or for a short while after rains, they are designed to hold water at all times.

**Rain Barrels or Water Catchment Systems** can be used to catch and store rainwater coming off rooftops. This water can be used for any household use, such as watering household plants, gardens or water for pets. Overflowing water from a catchment system, can be directed through an overflow pipe to a retention pond, rain garden or backyard wetland.