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HAPPI-Home 12

Runoff Control in Your Yard and Garden

Well maintained yards cause few if any water quality problems. However, improper yard and garden management can cause water pollution. This worksheet is the first of three HAPPI-Home documents that will help you identify and correct some of the major water pollution risks from your yard and garden management practices. This worksheet provides information on water runoff and soil erosion risks. No. 13, *Yard and garden nutrient management,* focuses on fertilizers and yard wastes, and no. 14, *Yard and garden pest management,* covers pesticide use. This series is designed for people with yards and for apartment dwellers who have plots in community gardens. If you are producing vegetables, fruits, or flowers in large areas or for sale, please consult the HAPPI-Farm series of publications.

Here are definitions of some yard and garden management terms:

Impervious surface: Any surface that does not allow water to soak in; instead, water forms puddles or runs off such as concrete, asphalt, and metal.

Stormwater: Water from rainfall that does not soak into the ground.

Runoff: Water flowing over the ground, grass, or paved areas; this water is called runoff until it reaches a stream or other water body.

Soil erosion: The process that moves soil from one place to another. The most common kind of erosion in Hawaii is caused by water washing over soil and carrying it downhill to streams and the ocean.

Why is stormwater important?

As stormwater flows, the runoff collects and moves pollutants such as soil, nutrients, chemicals, and pathogens to streams and coastal waters. Soil clouds water and degrades habitats for fish and other marine organisms, including corals. Nutrients promote growth of algae in streams and coastal waters. Large amounts of algae make the water unfit for swimming and can crowd out other aquatic life. Chemicals such as oil and pesticides can be toxic to fish and other aquatic life. Bacteria and parasites from animal wastes can make streams and beaches unsafe for wading and swimming after storms. Even if your house is not next to a stream or the ocean, urban and suburban storm drains carry runoff water from your neighborhood to the ocean. Common sources of stormwater pollutants include:

Silt, sand, and clay particles and other debris: Construction sites, bare spots in lawns and gardens, wastewater from washing cars and trucks on driveways or parking lots, unprotected streambanks.

Nutrients: Overused or spilled fertilizers, pet wastes, grass clippings and leaves left on streets or sidewalks.

Hydrocarbons: Car and truck exhaust, leaks and spills of oil and gas.

Pesticides: Improperly applied or spilled pesticides.

Where does stormwater go?

Next time it rains, watch where the rainwater goes. On the sketch of your property that you made using HAPPI-Home 2, draw arrows showing the direction that stormwater runoff flows. Note where it soaks in and where it makes puddles. Your soil type affects water infiltration (soaking into the ground). Water infiltrates sandy soil quickly but has a hard time seeping into clay soils. In areas on the Big Island that have very thin soils, especially those on top of pahoehoe lava, water can run off very quickly. Find out how far it is to the nearest storm drain, ditch, wetland, stream, or body of open water, and observe whether runoff flows onto your land from adjacent streets, lands, or stormwater systems.

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Concrete and asphalt are impervious surfaces that prevent rainwater from soaking into the ground. When you have the choice, consider materials such as gravel for driveways and gravel, brick, or wood chips for walkways. Avoid paving areas such as patios. Where you need a more solid surface, consider using a "porous pavement" made from interlocking cement blocks or rubber mats that allow spaces for rainwater to seep into the ground. If you must pour concrete, keep the paved area as short and narrow as possible.

Your house roof is also an impervious surface that sheds water. If downspouts from roof gutters empty onto grassy areas, the water will have a chance to soak into the ground. Aim downspouts away from foundations and paved surfaces. For roofs without gutters, plant grass, spread mulch, or use gravel under the drip line to prevent soil erosion and increase the ground's capacity to absorb water. Consider using cisterns or rain barrels to catch rainwater for watering in dry weather.

Watering your trees, lawn, or garden

Most plants can stand short dry periods, and watering should be timed to meet the needs of the plants. Slow, deep watering helps develop deep roots so that plants need to be watered less often. Too much watering can cause runoff that carries eroded soil, nutrients, and pesticides, especially if the latter have been applied recently. Overwatering can also result in the leaching of nutrients and pesticides through the soil and into the groundwater.

If you live in a drier area, Xeriscaping® is an option. With Xeriscaping, you use less water including choosing plants that are naturally suited to dry areas. More information on Xeriscaping is available from the Halawa Xeriscape Garden on Oahu (808-527-6113), or your county board of water supply, or on the Web at <http://www.hbws.org/fa_conserv/fa01_ct01_mainpage.htm> or <http://www. mauiwater.org/xeriscape.html>.

If possible, water using drip irrigation or a soaker hose instead of a sprinkler. Since sprinkler systems put water on top of the vegetation, the water evaporates directly into the air. The time of day when you water matters, too. In the heat of the day, more water will evaporate instead of going into the soil. Early morning or late afternoon are the best times. More information on watering practices can be found in the free CTAHR publications, *Watering lawns* (TM-7) and *Watering trees* (L-2), on the Web site <http://www2.ctahr.hawaii.edu/oc/freepubs/> or at your local CTAHR Cooperative Extension Service office.

Controlling soil erosion

Bare soil in vegetable and flower gardens, newly seeded lawns, areas under trees with thick shade, bare dirt paths and driveways, and areas around construction projects is most likely to cause erosion because rain can wash the soil away. Sloping areas have even greater erosion risk. Planting grass or other groundcovers is the best way to stop erosion. If a groundcover will not work for you, mulch will also slow erosion. Wood chips and macademia nut shells are common mulching materials. More information on mulching can be found in the free CTAHR publication, *Mulching for healthier landscape plants* (L-3). Diversion ditches and commercially available silt fences around construction sites can help slow runoff and trap sediment on-site. If you are working with a contractor, insist runoff and erosion are controlled during construction.

You can also reduce erosion by avoiding soil compaction so water can go into the soil. Compacting the soil under your lawn, which can be caused by heavy athletic use or by driving or parking on it, reduces infiltration and leads to water runoff that can cause soil erosion.

When eroded soil reaches a water body, it is called sediment. Sediment pollution of the coastal waters is the biggest water pollution problem in Hawaii. You can help stop it by keeping sediment on your property. One way to do this is to surround bare soil areas, such as a driveway, a flower bed, or under a mango tree, with vegetation, such as a lawn. Water carrying soil will run slowly through the grass. More water will soak in, and the soil particles will be left to enrich the lawn. If your property is on a hill, terraces can prevent erosion. Consider "naturalizing" large areas with native plants.

If your property is next to a stream or drainage ditch, please take extra care. Mowing right up to the water's edge makes it easier for runoff to cause erosion. It is better to leave a buffer strip of vegetation along the stream bank. This will trap any pollutants before they reach the stream or ditch and will protect the banks from erosion. Your local office of the CTAHR Cooperative Extension Service, the Natural Resources Conservation Service, or the Soil and Water Conservation District can help you decide the best plants for buffer areas.

Assessing your risks

The next step is to determine the water pollution risks from your yard and garden. Compare the items in the risk assessment table below with your management practices and rate your risk for each category. For areas that you identified as high or moderate risk, decide what action you need to take and fill out the Action Plan on page 4.

Risk Assessment Table for Water Management in Yards and Gardens

	Low risk	Moderate risk	High risk	Your risk
Paved surfaces	Paved surfaces are minimized. Alternatives such as wood chips or paving blocks are used for walkways, patios, and other areas	Some small areas are paved for patios or basketball	Paved surfaces are used extensively	❑ low ❑ moderate ❑ high
Roof drainage	Downspouts and drip lines direct roof drainage onto a lawn or garden where water soaks into the ground	Some downspouts and drip lines discharge water onto paved surfaces or grassy areas where water runs off	Most or all drip lines or downspouts discharge onto paved surfaces, or downspouts are connected directly to storm drains	❑ low ❑ moderate ❑ high
Bare soil in lawns and gardens	Bare spots in the lawn are promptly seeded and topped with a layer of straw or mulch; bare soil in gardens and under trees is covered with mulch; soil aerated regularly	Grass or other ground cover is spotty, particularly on slopes; all bare soil areas are surrounded by vegetated areas	Spots in the lawn or garden are left exposed without mulch or vegetation for long periods; bare soil areas exist on steep slopes or near streams or ditches	❑ low ❑ moderate ❑ high
Bare soil on paths or driveways	No dirt paths or driveways	Dirt paths or driveways surrounded by vegetated areas	Water runoff from dirt paths or driveways goes directly into a ditch or stream	❑ low ❑ moderate ❑ high
Bare soil during construction	Bare soil is seeded and mulched as soon as possible (before construction is completed); sediment barriers are used until grass covers soil	Soil is left bare until construction is completed; sediment barriers are installed and maintained to detain muddy runoff until grass covers soil	Soil is left bare and no sediment barriers are used	❑ low ❑ moderate ❑ high
Landscaping and buffer strips	Yard is landscaped to slow the flow of stormwater and provide areas where water soaks into the ground; unmowed buffer strips of thick vegetation are left along streams	No areas are landscaped to encourage water to soak in, but yard is relatively flat and little runoff occurs; mowed grass or spotty vegetation next to a stream	There is no landscaping to slow the flow of stormwater, especially on hilly areas; stream banks are eroding	❑ low ❑ moderate ❑ high
Watering methods	No runoff from watering occurs; low water-use devices (e.g., soaker hoses, drip systems) are used; the sprinkler system is on manual control	Watering is excessive (e.g., the sprinkler is left unattended, and much water lands on the pavement);moderate runoff occurs	Sprinkler system is used daily without regard to weather conditions; there is excessive water runoff;soil loss (eg. gullies) is evident	❑ low ❑ moderate ❑ high

Your Action Plan

After assessing your water management practices, you can take action to change practices that may be causing water pollution. For areas that you identified as high or moderate risk in the table on page 3, decide what action you need to take and fill out the Action Plan below.

Write down all your moderate-risk and high-risk activities below	What can you do to reduce the potential risk for water pollution?	Set a target date for action
Samples of action items:		
Downspouts from roof gutters flow directly onto the driveway and on into the storm drain	*Buy new sections of pipe and redirect downspouts onto grassy areas*	*One month from today*

This HAPPI document was adapted by Michael Robotham, Carl Evensen, and Linda J. Cox from *Stormwater management* by Carl DuPolt and Carolyn Johnson, and *Yard and garden care*, by K. Marc Teffeau and Ray Bosmans, Chapters 2 and 7, pp. 15–22 and 69–74, respectively, in *Home•A•Syst: An environmental risk assessment guide for the home* developed by the National Farm•A•Syst /Home•A•Syst Program in cooperation with NRAES, the Northeast Regional Agricultural Engineering Service. Permission to use these materials was granted by the National Farm•A•Syst / Home•A•Syst Office. HAPPI-Home materials are produced by the Hawaii's Pollution Prevention Information (HAPPI) project (Farm•A•Syst/Home•A•Syst for Hawaii) of the University of Hawaii College of Tropical Agriculture and Human Resources (UH-CTAHR) and the USDA Cooperative Extension Service (USDA-CES). Funding for the program is provided by a U.S. EPA 319(h) grant administered by the Hawaii State Department of Health.