

Appendix B – Public Education & Outreach

Stormwater Education & Outreach SOP

City of Aberdeen

Education and Outreach SOP

1. PURPOSE

Under the City of Aberdeen's (COA) current National Pollutant Discharge Elimination System (NPDES) Phase II Permit # WAR04-5026, the COA is required to develop an education and outreach standard operating procedure (SOP) for the development of the COA Education and Outreach program. The purpose of the education program is to educate residents, businesses, industries, elected officials, policy makers, planning staff, and other employees of the COA. This Standard Operating Procedure (SOP) shall establish uniform procedures pertaining to the preparation for, the performance of, and the reporting of the Education and Outreach program.

2. APPLICABILITY

The policies and procedures of the SOP are applicable to all personnel involved in the planning, coordination, preparation, conducting, and reporting of Education and Outreach.

3. STANDARD OPERATING PROCEEDURE - Education

A. Planning of Education Activities

- a) Topics of the 4 quarterly education activities are to be determined with one topic addressed to each of the following sub-groups
 - General public
 - General public, businesses, including home-based and mobile businesses
 - Homeowners, landscapers and property managers
 - Engineers, contractors, developers, review staff and land use planners
- b) Mailings, brochures, handouts, meetings, ect. May be used to convey the stormwater message.
- c) Consideration shall be given to the undertaking of a elementary education program for area fourth and fifth graders on an annual basis.

B. Participation of Education Activities

- a) Stormwater Maintenance Supervisor shall be in charge out activity.
- b) Adequate staff shall be scheduled to carry out activity.

C. Documentation

- a) The COA shall track and maintain records of Public education and outreach activities in the *Education and Outreach Activity Log*
- b) Upon completion, activity is changed in the *Education and Outreach Log* from pending to complete and a summary of the activity is written.

4. STANDARD OPERATING PROCEEDURE - Outreach

A. Planning of Outreach Activities

- a) During the first quarter of the calendar year, COA employees shall meet to discuss outreach activities.
- b) A minimum of two activities are to be decided upon.
- c) When activities have been determined, they are to be added to the *Education and Outreach Activities Log* and status is stated as pending.
- d) Activities are to be scheduled and advertised on the COA Stormwater website and mailings when possible and appropriate.

B. Participation of Outreach Activities

- a) Stormwater Maintenance Supervisor shall be in charge out activity.
- b) Adequate staff shall be scheduled to carry out activity.

C. Post Activity

- a) Site is to be cleaned up and supplies put away in a organized manner in the Stormwater supply closet

D. Documentation

- a) Staff shall track handouts and brochures that were distributed.
- b) Staff shall document approximate number of people that Outreach opportunity has contacted.
- c) The COA shall track and maintain records of Public education and outreach activities in the *Education and Outreach Activity Log*
- d) Upon completion, activity is changed in the *Education and Outreach Log* from pending to complete and a summary of the activity is written.

Stormwater Education & Outreach Activities

2012 Stormwater/NPDES Outreach Activities

SUMMARY

<i>Action Projects</i>	28	Volunteers
<i>Education</i>	2700	Participants
<i>Media Outreach</i>	6264	Citizens Reached
<i>Other</i>	6118	Promotional Items Handed out

Action Projects

Date	Event Name	Event Description	Topic/ Message	Target Group	Participants
5/19/2012	Fry Creek Clean-up	Created an opportunity for public involvement working with the Grays Harbor Stream Team to remove debris and garbage from Fry Creek.	Outreach / volunteer opportunity	Citizens interested in volunteering	23
9/6/2112	Placing stormdrain markers	Created an opportunity where citizens raised stormwater awareness by adhering stormdrain markers to curbs adjacent to catchbasins throughout the city	Stormwater Awareness / Volunteer Opportunity	Citizens interested in volunteering	5
				TOTAL PARTICIPANTS	28

Education

Date	Event Name	Event Description	Topic/Message	Target Group	Participants
7/4/2012	Splash Festival	Operated a stormwater educational booth, including a large fish "FIN" that children could take pictures with and climb into. Created a scavenger hunt activity where participants would locate catch basins in the area in order to get a spin on the prize wheel. Prizes consisted of reusable grocery bags, pens, water bottles, and bag clips which all had the stormwater logo and hotline number printed on them.	General Stormwater Awareness "CLEAN WATER - EVERYBODY'S BUSINESS"	general public	Approx. 1500
9/15/2012	Chehalis River Festival	Operated a stormwater educational booth. Created a scavenger hunt activity where participants would locate catch basins in the area in order to get a spin on the prize wheel. Prizes consisted of reusable grocery bags, pens, water bottles, and bag clips which all had the stormwater logo and hotline number printed on them.	General Stormwater Awareness "CLEAN WATER - EVERYBODY'S BUSINESS"	general public	Approx. 1200
TOTAL PARTICIPANTS					2700

Media Outreach

Date	Event Name	Event Description	Topic/ Message	Target Group	Citizens Reached
Feb-12	Stormwater Informational Letter	Add informational packets to the utility bill from January 2012, with information on illicit discharges and Grays Harbor Stream Team.	Stormwater & IDDE Awareness "Do Your Part and Get Involved"	All Utility Accounts (Aberdeen Citizens)	Approx. 6000 Mailings
2012	Website	City of Aberdeen Stormwater Website update	stormwater awareness	general public	224 page views
Summer 2012	Informational Brochures	Stormwater informational brochures and FAQ detailing adverse affects of car wash water draining to catch basins were hand delivered to citizens when they were observed washing their cars.	IDDE	general public	40

CITIZENS REACHED **6264**

Promotional Items Delivered to Public - All items printed with Stormwater Hotline Number

Date	Event Name	Event Description	Item Description	Distributed
7/4/2012	Splash Festival	City operated stormwater booth at the annual Forth of July celebration	Stormwater Brochures	1567
			Stormwater Pens	1175
			Stormwater Frisbees	315
			Stormwater Grocery Bags	315
			Potato Chip Bag Clip	315
9/15/2012	Chehalis River Festival	City operated stormwater booth at the annual Chehalis River Festival	Stormwater Water Bottles	315
			Stormwater Brochures	831
			Stormwater Pens	625
			Stormwater Frisbees	165
			Stormwater Grocery Bags	165
			Potato Chip Bag Clip	165
			Stormwater Water Bottles	165
TOTAL ITEMS				6118

Stormwater Website Visitor Information

Entry Page	Pageviews	First Time Visitors	Avg. Time on Page	Entrances	Bounce Rate	% Exit
/pw/stormwater-faq.php	110	67	0:02:29	4	0.5	0.1364
/pw/stormwater-faq.php	75	61	0:02:18	3	0.67	0.2
stormwater.php	224	178	0:01:41	20	0.7	0.3125

Yearly Breakdown

Jan 01, 2013-Mar 24, 2013	27	23	0:02:35	1	1	22.22
Aug 20, 2012-Dec 31, 2012	48	45	0:00:57	8	0.75	39.58

Monthly Review

1-Aug-12	44	9	0:00:28	1	0	0.0227
1-Sep-12	8	7	0:01:55	0	0	12.5
1-Oct-12	12	11	0:03:09	2	0.5	0.3333
1-Nov-12	19	16	0:01:23	0	0	0.1519
1-Dec-12	2	2	0:06:18	0	0	0
1-Jan-13	10	8	0:03:06	0	0	0.1
1-Feb-13	11	9	0:01:04	1	1	0.3636
1-Mar-13	6	6	0:03:47	0	0	0.1667

NOTE: There were no visits made to the pdf files listed on the stormwater.php page.

Stormwater Education & Outreach Materials

Brochures – Mailings - Handouts



STORMWATER

What is Stormwater?

Stormwater comes from the precipitation that flows across the ground or pavement when it rains or when snow and ice melt. The water seeps into the ground or flows into our storm drains. These are the drains you see at street corners or low points on the sides of your streets. The water that flows into the drains is called stormwater runoff. Stormwater runoff is a concern because of the pollutants it may carry as it is conveyed to the nearest body of water - such as a local stream, pond, harbor or ocean beach.



Unlike water that goes into our sanitary sewer system - from our showers and toilets, for example - stormwater, and all that it is carrying, is not treated before being discharged to our surrounding water bodies.

Why is Stormwater Pollution a Problem?

Stormwater pollution can harm fish and other aquatic wildlife, kill native vegetation, destroy aquatic habitats and make recreational areas unsafe and unpleasant. Furthermore, the nutrients carried by stormwater, or released into surface waters through decomposition, may cause undesirable algae and vegetative growth.

Substances carried by stormwater that are considered to be pollutants are:

- Sediment, trash and debris
- Oil, grease and toxic chemicals
- Soap and paint products from outdoor maintenance activities
- Pesticides and fertilizers from lawns and gardens
- Viruses, bacteria and nutrients from pet waste

What Can I Do?

Consider taking part in the Grays Harbor Stream Team. The Stream Team is a coalition of students, educators, citizen volunteers, local agencies and non-profit organizations dedicated to the protection and restoration of streams that flow through Grays Harbor County.



Stream Team activities include garbage clean-ups along streams and the Grays Harbor shoreline, community outreach and education, water quality monitoring, developing partnerships and involving residents in hands-on projects that foster environmental stewardship.



Report all illicit discharges! An illicit discharge is generally any discharge into a storm drain system that is not composed entirely of stormwater.

Important Contact Information

City of Aberdeen Stormwater
Jeff Springer 360-537-3393
Email: jspringer@aberdeewa.gov
aberdeeninfo.com

Grays Harbor Stream Team
Janel Spaulding 360-538-4212
Email: jspauldi@ghc.edu

Grays Harbor
Stream Team

WASHINGTON
waters
OURS TO PROTECT

Fry Creek Clean-Up Day

Saturday, May 19th

The City of Aberdeen Stormwater Department and the Grays Harbor Stream Team are partnering to hold the 1st Annual Fry Creek Clean-Up!

Come help remove litter and debris from Fry Creek, a salmon-bearing stream, which flows through Aberdeen.

When: Saturday, May 19th from 10am-1pm (or until we finish).

Where: Meet at the Dollar Tree Store parking lot, 2612 Simpson Avenue, Aberdeen

What to Bring: Yourself, work clothes, rubber boots or hip waders, sturdy shoes, and gloves if you have them.

More details:

- No experience necessary-we will discuss safety and give an overview of the project.
- The event will take place rain or shine so dress for the weather.
- Volunteers 10 years of age and younger must be accompanied by an adult.
- Volunteers 11-17 years of age must have a signed parental release form.

For more information about the Fry Creek Clean-Up Day contact:

Rick Sangder
(360) 537-3241

Email: rsangder@aberdeenwa.gov

Website:

<http://aberdeenwa.gov/pw/street.php>

Janel Spaulding
(360) 538-4212

Email: jspauldi@ghc.edu

Website: www.chehalisbasinpartnership.org

Do Your Part and Get Involved

City of Aberdeen

The City of Aberdeen supports clean water. Here are some things you can do at home to help protect water quality in our watershed:

- Never put anything into the storm drain, drainage ditch, or creek.
- Always clean up after your pet.
- Use fertilizers and pesticides only when needed and apply the correct amounts.
- Dispose of leaves, grass clippings and other yard waste properly.
- Throw litter in the trash. Reduce, Reuse, Recycle.
- Recycle motor oil, antifreeze, and other auto fluids at an auto parts store or the county landfill.
- Wash your vehicle on the grass or take it to a commercial car wash.
- Check your vehicle for leaks and repair them.
- Tell a friend or neighbor how they can help protect our waterways too!

For more information about the City of Aberdeen Stormwater Department contact:
Rick Sangder, Deputy Public Works Director
(360) 537-3241
Email: rsangder@aberdeenwa.gov
Website: aberdeenwa.gov

WHAT IS STORM WATER?

In general terms, stormwater is rainfall or snow melt that flows over the ground. Impervious surfaces such as rooftops, driveways, sidewalks, and streets prevent stormwater runoff from naturally soaking into the ground. Stormwater runoff can pick up pollutants such as fertilizers, pesticides, animal waste, debris, oil and other toxins. This untreated runoff flows into storm drains and eventually reaches streams, rivers, lakes, and the ocean.

THE CHEHALIS RIVER BASIN WATERSHED

The City of Aberdeen lies within the Chehalis River Basin Watershed. A watershed is the region draining into a river system, or other body of water. In this case, the receiving waters are the Chehalis River and Grays Harbor.

Grays Harbor Stream Team

"A coalition of students, educators, citizen volunteers, local agencies, and non-profit organizations dedicated to the protection and restoration of streams that flow through Grays Harbor County."

Activities: Litter clean-ups along local streams and the Grays Harbor shoreline, invasive species removal, community outreach and education, develop partnerships with local cities and organizations, and involve residents in hands-on projects that foster environmental stewardship.

For more information about the Grays Harbor Stream Team contact:
Janel Spaulding
(360) 538-4212
Email: jspauldi@ghc.edu
Website: www.chehalisbasinpartnership.org

Environment
Education Guide

Protecting Washington's waters from stormwater pollution

Did you know Washington has a stormwater runoff problem?

Stormwater runoff is damaging salmon habitat. It's the Number 1 water pollution problem in the urban areas of our state, and it causes and contributes to flooding.

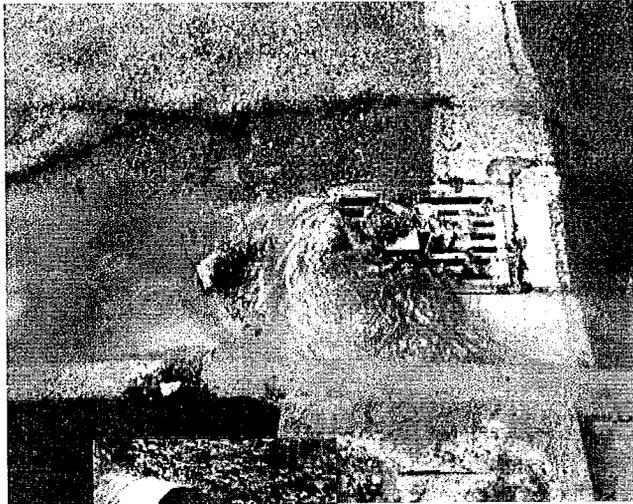
Chances are pretty good you've seen stormwater runoff. It's the water from rain or snow that runs off yards, roofs and roadways. As gravity pulls it downhill into low spots, ditches and storm drains, the water picks up soil, chemicals and other pollutants and carries them into our lakes, rivers and marine waters.

Our waters and salmon as well as other fish and wildlife species aren't the only things at risk. Stormwater problems also affect the health and safety of people.

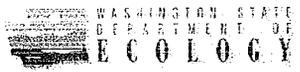
As we develop land to accommodate Washington's growing population, our state's stormwater problem grows, too. The good news is we can do something about it—all of us.

In Washington, the state Department of Ecology, the U.S. Environmental Protection Agency and local governments all work together to regulate stormwater.

The key to solving the problem isn't really in the rules and permits. It's in people—how we live on the land and the everyday choices each of us makes.



Stormwater runoff is damaging salmon habitat. It's the Number 1 water pollution problem in the urban areas of our state, and it causes and contributes to flooding.



From rain to runoff – what comes down must go somewhere...

If you want to understand stormwater, watch what happens the next time it rains. Pay attention to how shapes and surfaces determine what happens to the water.

Watch how rainwater flows downhill and collects in low places. See how quickly it starts running down a downspout or into a gutter. Feel how pavement stays hard but soil gets soft. Pay attention to what the water sweeps along in the gutter and where there's an oily sheen on a puddle. Notice what happens to streams and rivers. Notice how runoff seems to be everywhere in the city and is harder to find in the forest.



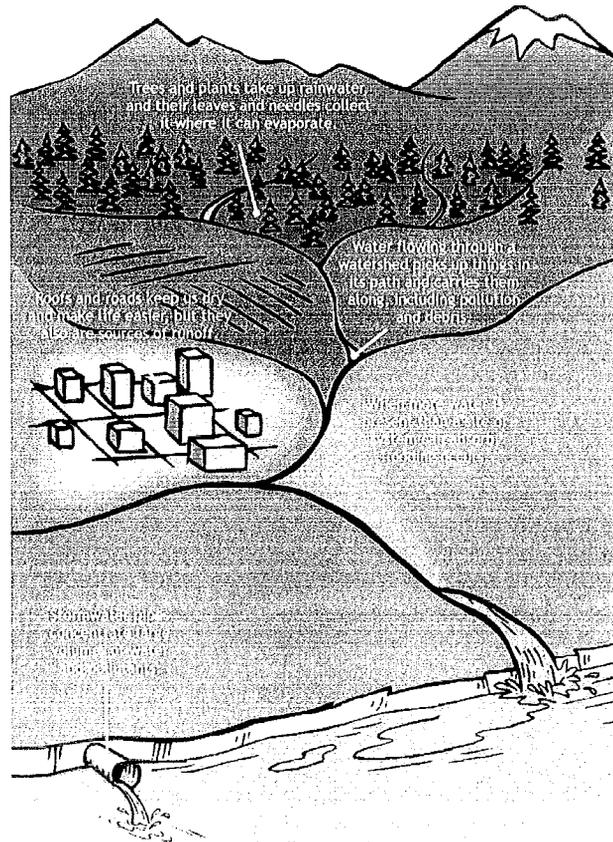
In Washington's forests, the needles of evergreen trees hold a lot of rain—as much as 40 percent of a low intensity rainfall.

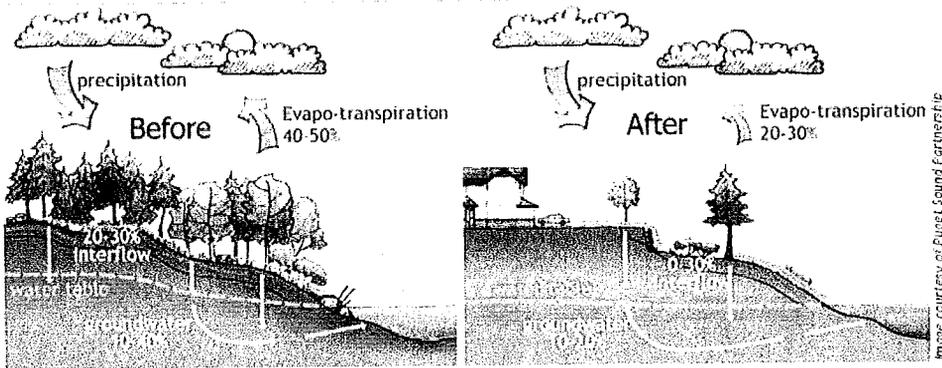
A watershed is all the land that drains to the same body of water. A watershed's natural drainage system includes a network of streams and rivers. In a large watershed, many different sources and land uses can contribute to stormwater runoff.

The landscape connection is the key to stormwater runoff

On undeveloped sites, water from rain or snow follows natural patterns of drainage and circulation. Much of the water seeps down into the soil and into underground water supplies. In forests and grasslands, trees and other plants will take up some of this water. Water will also collect on their leaves and needles and evaporate.

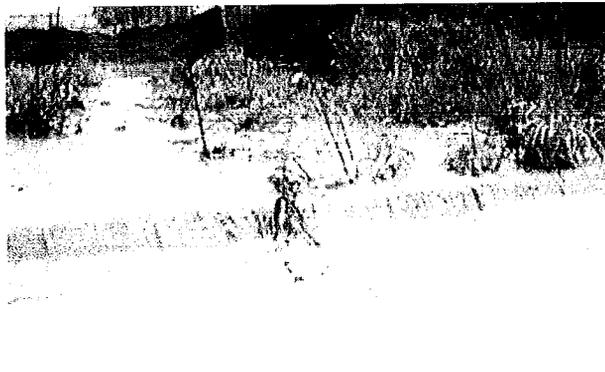
Wetlands absorb and hold runoff. In a natural or near-natural setting, the water that does run off directly into streams or other waters is usually filtered and slowed by the web of plants it runs through, a sort of natural purifying system.





Before development almost all rainfall is taken up by plants, evaporates or infiltrates through the ground. After conventional development, surface runoff increases significantly while evaporation and infiltration into the ground decrease.

Developing land typically has meant removing trees or other vegetation, reshaping the land, compacting soil, and creating hard surfaces. These changes alter the natural water patterns, or hydrology, of a site. Much of the water that plants and soil previously would have absorbed now runs off into local waters, either directly or through a system of gutters, ditches, swales, or pipes. These systems collect runoff and concentrate the flow, quickly conveying it into streams or other waters.



Water flowing through a watershed picks up things in its path and carries them along, including pollution and debris.

Covering as little as 10 percent of a watershed with impervious surfaces can degrade streams, harming salmon, trout and other aquatic life.

The way we use and develop the land changes not only where stormwater goes and how fast it gets there, but also what it meets along the way—parking lots, roads, roofs, farms, ranches, ball fields and more. Whatever stormwater runoff picks up from these places, it carries into Washington's waters.

How much stormwater do we make?

POTENTIAL RUNOFF	1,200-square ft. roof	1-acre of pavement
1 inch of rain or snow melt	748 gallons	27,150 gallons
Average annual precipitation		
Seattle (37 in./yr)	27,700 gallons	1 million gallons
Spokane (17 in./yr)	12,700 gallons	0.5 million gallons
Olympia (51 in./yr)	38,100 gallons	1.4 million gallons

Roofs, roads and paved parking lots keep us dry and make life easier, but they are also common sources of runoff. Imagine all the roofs and roads in your area and across the state, and imagine how much runoff they generate. Precipitation data source: NOAA. Average annual precipitation: 1971-2000. Figures are rounded.

Washington's growing problem with stormwater runoff

Altered flows — too much, too soon and too little, too late

Stormwater often gets to where it's going faster after an area is developed. Runoff quickly flows into streams and other surface waters instead of seeping into the ground to recharge groundwater and slowly feeding those streams year round.

The results include much higher stream flows and flooding when it rains (especially during heavy rains), and much lower stream flows in the dry season. These extreme high and low flows are bad for salmon, trout and other fish as well as people and communities.

The high-energy, faster, heavier flows erode stream channels and scour streambeds, churning up silt and damaging spawning areas. The energy from high flows also flushes away tiny aquatic life that serve as part of trout and salmon's diets and part of a healthy stream.

Extreme low flows are also a problem for fish. Some urban streams that used to run year round sometimes dry up in the summer. Others have too little flow to allow salmon to swim up them to spawn. Hardened surfaces contribute to this problem by interrupting the natural water-absorbing process. Rainfall hits these hard surfaces and escapes directly into rivers rather than soaking into the ground to recharge underground water supplies that feed small streams in the summer months.

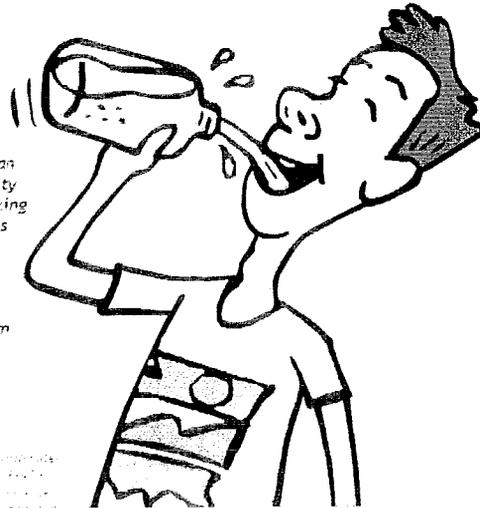
Did you know...?

- z *Economic costs related to stormwater in the Puget Sound region are expected to exceed \$1 billion over the next decade.**
- z *Even the drier east side of the state has to deal with stormwater, especially in urban areas. If laid end-to-end, Spokane's storm sewers would stretch all the way to Seattle and back.*



With high amounts of hardened or paved surfaces, urban areas generate more and faster runoff, increasing the risk of flooding.

There are other flow-related impacts, too. Flooding from extreme high flows can damage private property, public roads and utilities. And when stormwater runs off instead of seeping into groundwater, some wells may go dry.



Stormwater runoff can affect both the quality and quantity of drinking water supplies. Cities and counties require more stormwater protection in areas near public supply wells to protect them from pollution.

*Source: a report by the Puget Sound Economic Development Council, "The Economic Costs of Stormwater in the Puget Sound Region," 2002.

Polluted waters

Most stormwater runoff carries pollution and more pollution comes from highly urbanized areas. More importantly, most of it is not treated, or "cleaned up" before it enters Washington's waters.

Stormwater runoff is the Number 1 urban water pollution problem in the state.

As runoff flows over roofs, pavement and developed land, it picks up soil particles, oil and grease (mostly from cars and trucks), and many different toxic chemicals, including those from fertilizers, weed-killers, and pesticides. It also picks up bacteria from pet and livestock waste and failing septic systems.

About one-third of the state's waters are too polluted to meet state water quality standards. Frequently, the cause of this pollution is stormwater. This water is not fit for drinking or swimming.



Photo: Jiff Williams

Contaminated stormwater runoff can create hazards to human health and affect recreation, tourism, fishing, and businesses.

Beaches have been closed for swimming and shellfish harvesting.

Salmon suffer not only from chemical pollutants, but also from soil washed in from construction sites and other bare ground. Mud can cover spawning areas, suffocating salmon eggs. It also can clog gills, making it harder or impossible for salmon, trout, and other fish to breathe.



Shared connections

Polluted stormwater runoff is an issue across the state. It's easy to see how it connects to issues about Puget Sound, the Spokane River, the Columbia River, and salmon recovery. Stormwater runoff connects to other issues, too:

- z Many of the same things that pollute runoff and surface waters can also pollute aquifers, which are sources of drinking water.*
- z The danger from landslides and unstable slopes increases in areas with stormwater problems.*
- z As we prepare for climate change, we must consider how changes in rain and snowfall could affect flooding and water supplies.*

The good news is that solutions for stormwater can help us deal with many of these connected issues.

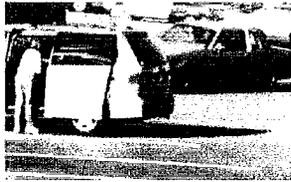
Salmon and trout need cool water to survive, but stream temperatures can rise when cool groundwater isn't available to feed a stream year round. Also, stormwater runoff entering a stream is often warmer than the stream itself.

Rethinking stormwater runoff

Dealing with stormwater has traditionally focused on getting it out of the way quickly. In Washington, many communities have rules for managing stormwater as part of regulating development and preventing erosion and flooding.

However, many communities are not as used to dealing with stormwater runoff as a major source of pollution or destroyer of habitat. With increasing stormwater runoff problems and new state and federal requirements, Washington is rethinking how it handles stormwater.

Washington has successfully tackled other pollution problems. By combining regulations with cooperation, creativity and good long-term planning, we can reduce the problems with stormwater runoff.



Our transportation choices are part of the runoff picture. Many pollutants in runoff from roads, driveways and parking lots come from cars and trucks. Some sources are:

- z Antifreeze
- z Brake fluid
- z Brake lining
- z Exhaust particles
- z Oil
- z Pavement particles
- z Tire particles
- z Transmission fluid

Page 6

A new approach – reduce runoff at its source

Stormwater runoff accumulates, and so do the problems it creates as it flows downhill. It makes sense to try to stop the problems before they start or get too big to manage.

Innovative developers, engineers and designers are already looking at ways to reduce runoff at its source and better mimic nature's systems by:

- z Retaining more natural vegetative cover.
- z Reducing hardened surfaces and soil compaction.

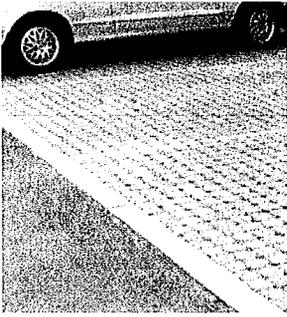
z Keeping more stormwater on site to percolate into the ground.

Better designs for new developments can make a difference for the future, but improvements to existing developments can help deal with today's stormwater problems, too. The Department of Ecology is providing grants to local governments to help fund innovative approaches to preventing stormwater runoff.



Photos: Seattle Public Utilities

Seattle's SEA (Street Edge Alternatives) Streets pilot project reduced the amount of stormwater runoff leaving a street by 98 percent for a small rain event. This successful project has inspired similar projects, and the City expects that future projects will cost less than traditional street improvements.



Permeable pavement like this provides a hard, drivable surface, but it also lets some stormwater soak back into the ground.

Choices for the future

Stormwater pollution often goes hand in hand with growth. Since 1982, Washington's population has grown by two million people, adding the equivalent of 10 new cities the size of Spokane or Tacoma. Millions more people are expected to be added in the next few decades. As the state's population grows, we can choose to limit polluted runoff and the harm it does, or risk losing some of what makes Washington a special place to live.

While new regulations and technologies can help, we can't expect them to completely make up for the impacts of converting forests and grasslands into shopping malls or subdivisions.

Choices we make about how we use the land, including how much development to allow, where it occurs, and how much vegetated land is retained, are crucial for successfully managing stormwater and for keeping Washington's watersheds healthy.

Washington Waters – Ours to Protect

People really can make a difference when it comes to reducing stormwater runoff and the problems and costs that go with it. Because we all contribute to the problem, we all can be a part of the solution. It starts with paying attention to stormwater — at home, at work and in our communities.

We can reduce the amount of runoff.

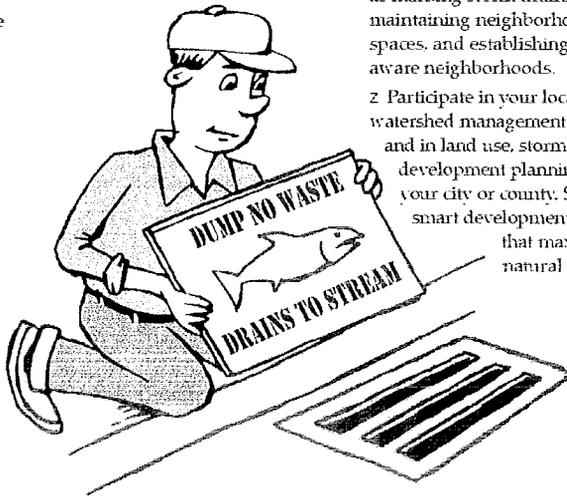
- z Reduce the amount of paved or hard surface areas. Consider permeable paving for that new patio or driveway.
- z Look for ways to keep runoff out of the stormwater system so it can soak into the ground. Plant rain gardens. Use rain barrels. Wash your car on the lawn or at commercial car wash that recycles water. (This helps prevent runoff pollution, too!)

We can create cleaner runoff.

- z Reduce fertilizers, turf builders and pesticides on your lawn and garden. Use small amounts of slow-release fertilizer and environment-friendly products for problem areas.
- z Reduce pollution from roads, driveways and parking lots. Wear and tear on roads, tires and brakes leaves a lot of pollutants behind. Fix vehicle fluid leaks immediately, and consider alternatives to driving solo.
- z Reduce bacterial pollution from animal waste. Scoop pet waste and put it in your garbage. Cover and control animal manure on small farms.
- z Maintain your septic system. This will keep it from failing and causing pollution.

We can work together.

- z Get involved with community stormwater projects such as marking storm drains, maintaining neighborhood green spaces, and establishing pesticide-aware neighborhoods.
- z Participate in your local watershed management group and in land use, stormwater and development planning with your city or county. Support smart development practices that maximize the natural vegetation.



For more information

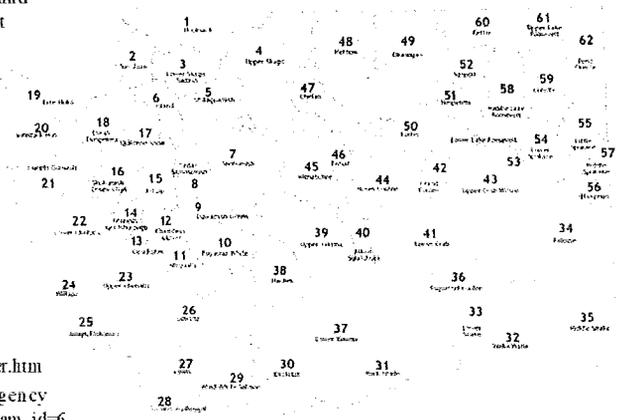
Washington Department of Ecology

Water Quality Program
www.ecy.wa.gov/programs/wq/stormwater/index.html

Jocelyn Winz
Stormwater Community Outreach and
Environmental Education Specialist
360-407-7529

Sandy Howard
Communications Manager
360-407-6408

*Water Resource Inventory Areas
are administrative and planning
boundaries for water basins,
commonly known as watersheds.*



Watershed planning

To find out what watershed you
live in and how to get involved:
www.ecy.wa.gov/watershed/index.html

Helpful websites

- z Puget Sound Partnership
www.psp.wa.gov/our_work/stormwater.htm
- z U.S. Environmental Protection Agency
cfpub.epa.gov/npdes/home.cfm?program_id=6
- z Seattle Public Utilities SEA Streets Project
www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/Natural_Drainage_Systems/Street_Edge_Alternatives/index.asp

Other resources

- z For local information, contact your city or county.
- z Search the Internet for more information on stormwater, runoff, rain gardens, low impact development, etc.

To view this publication online, go to: <http://www.ecy.wa.gov/biblio/0710058.html>

If you need this publication in an alternate format, please call
(360) 407-7006. Persons with hearing loss can call 711 for Washington
Relay Service. Persons with a speech disability can call (877) 833-6341.

Grays Harbor Stream Team Participants

- Chehalis Basin Fisheries Task Force
- Chehalis Basin Partnership
- Concerned Citizens
- Coastal Resources Learning Center
- Educators from local schools
- Friends of Grays Harbor
- Grays Harbor 2020
- Grays Harbor College students
- Grays Harbor College
- Grays Harbor County Marine Resources Committee
- Local High School students
- Veterans Conservation Corps



View of Grays Harbor at low tide from the Bishop Athletic Complex.



Volunteers plant trees along Mox-Chehalis Creek at the ORV Park near McCleary.

Grays Harbor Stream Team

Chehalis Basin Partnership and
Grays Harbor College
1620 Edward P. Smith Drive
Aberdeen, WA 98520

For more information contact:
Janel Spaulding
(360) 538-4212
Email: jspauldi@ghc.edu

Website: www.chehalisbasinpartnership.org



Grays Harbor Stream Team

"A coalition of students, educators, citizen volunteers, local agencies, and non-profit organizations dedicated to the protection and restoration of streams that flow through Grays Harbor County."





Tree planting and education in action at the ORV Park near McCleary in February, 2010.

Grays Harbor Stream Team

First Project: Our first project has focused on restoring portions of Alder Creek, which flows through Grays Harbor College and empties into the Chehalis River and Grays Harbor in South Aberdeen. Some of our first tasks include tree plantings, stream clean-ups, past restoration project maintenance like pruning and trimming trees, and trail maintenance and repair.

Activities: Garbage clean-ups along streams and the Grays Harbor shoreline, community outreach and education, water quality monitoring, developing partnerships, involve residents in hands-on projects that foster environmental stewardship.



Grays Harbor College students plant willow stakes along the Mox-Chehalis Creek near McCleary.

Do you know of a stream that needs attention?

The Grays Harbor Stream is always looking for suggestions from the community about other streams that are in need of cleaning up and restoration work. If you have suggestions please contact Janel Spaulding. Contact info is listed on the back of this brochure. We hope to see you at one of our upcoming events! Bring your family, friends and neighbors!



Removing old plant protectors at a previous restoration site along Alder Creek.



Teaming up to plant trees along the Mox-Chehalis Creek near McCleary.



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www.epa.gov/pdes/stormwater
or visit
www.epa.gov/pws

For more information contact:

After the Storm



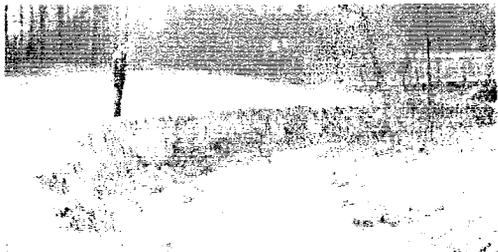
The effects of pollution



Stormwater runoff occurs when precipitation from the atmosphere condenses over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can clog fish gills and bird tails.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris - plastic bags, six-pack rings, bottles, and cans, tires, washed and car batteries can choke, suffocate, or injure aquatic life. He ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or using polluted water.



Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

Polluted stormwater often affects drinking water sources. This in turn can affect human health and increase drinking water treatment costs.



Residential

Roads properly disposed household products that contain hazardous materials such as pesticides, paint, solvents and auto fluids. Don't pour them into the gutter or into storm drains.

Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.



Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.

Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.

Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.

Cover piles of dirt or mulch being used in landscaping projects.

Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).

Don't dispose of household hazardous waste in sinks or toilets.



Pet waste

Pet waste can be a major source of bacteria and excess nutrients in local waters.

When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

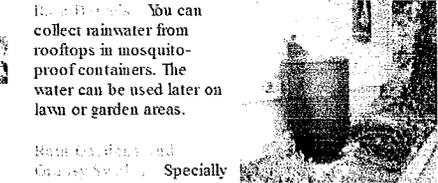


Rainfall landscaping

Permeable pavement. Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

Rain barrels. You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain gardens. Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.



Filter strips. Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.



Commercial

Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.

Cover grease storage and dumpsters and keep them clean to avoid leaks.

Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

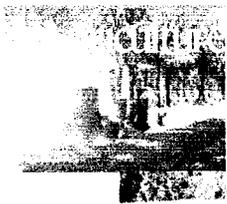
Divert stormwater away from disturbed or exposed areas of the construction site.

Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.

Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.



Construction



Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.

Keep livestock away from streambanks and provide them a water source away from waterbodies.

Store and apply manure away from waterbodies and in accordance with a nutrient management plan.

Vegetate riparian areas along waterways.

Rotate animal grazing to prevent soil erosion in fields.

Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.



Improperly managed logging operations can result in erosion and sedimentation.

Conduct preharvest planning to prevent erosion and lower costs.

Use logging methods and equipment that minimize soil disturbance.

Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.

Construct stream crossings so that they minimize erosion and physical damage to stream.



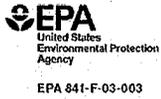
Automotive facilities

Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

Clean up spills immediately and properly dispose of cleanup materials.

Provide cover over fueling stations and design or retrofit facilities for spill containment.

Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being 3/19/2013 2:49 PM



Protecting Water Quality from URBAN RUNOFF

Clean Water Is Everybody's Business

In urban and suburban areas, much of the land surface is covered by buildings and pavement, which do not allow rain and snowmelt to soak into the ground. Instead, most developed areas rely on storm drains to carry large amounts of runoff from roofs and paved areas to nearby waterways. The stormwater runoff carries pollutants such as oil, dirt, chemicals, and lawn fertilizers directly to streams and rivers, where they seriously harm water quality. To protect surface water quality and groundwater resources, development should be designed and built to minimize increases in runoff.

How Urbanized Areas Affect Water Quality

Increased Runoff

The porous and varied terrain of natural landscapes like forests, wetlands, and grassland traps rainwater and snowmelt and allows them to filter slowly into the ground. In contrast, impervious (nonporous) surfaces like roads, parking lots, and rooftops prevent rain and snowmelt from infiltrating, or soaking, into the ground. Most of the rainfall

The most recent National Water Quality Inventory reports that runoff from urbanized areas is the leading source of water quality impairments to surveyed estuaries and the third-largest source of impairments to surveyed lakes.

Did you know that because of impervious surfaces like pavement and rooftops, a typical city block generates more than 5 times more runoff than a woodland area of the same size?

and snowmelt remains above the surface, where it runs off rapidly in unnaturally large amounts.

Storm sewer systems concentrate runoff into smooth, straight conduits. This runoff gathers speed and erosional power as it travels underground. When this runoff leaves the storm drains and empties into a stream, its excessive volume and power blast out streambanks, damaging streamside vegetation and wiping out aquatic habitat. These increased storm flows carry sediment loads from construction sites and other degraded surfaces and eroded streambanks. They often carry higher water temperatures from streets, roof tops, and parking lots, which are harmful to the health and reproduction of aquatic life.

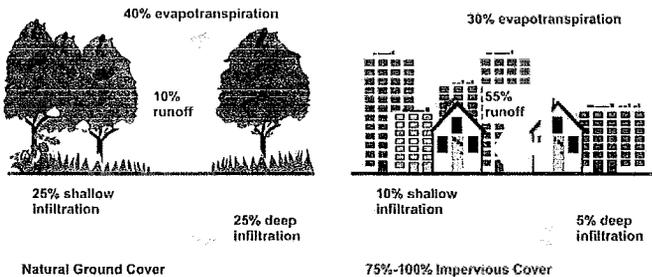
The loss of infiltration from urbanization may also cause profound groundwater changes. Although urbanization leads to great increases in flooding during and immediately after wet weather, in many instances it results in lower stream flows during dry weather. Many native fish and other aquatic life cannot survive when these conditions prevail.

Increased Pollutant Loads

Urbanization increases the variety and amount of pollutants carried into streams, rivers, and lakes. The pollutants include:

- Sediment
- Oil, grease, and toxic chemicals from motor vehicles
- Pesticides and nutrients from lawns and gardens
- Viruses, bacteria, and nutrients from pet waste and failing septic systems
- Road salts
- Heavy metals from roof shingles, motor vehicles, and other sources
- Thermal pollution from dark impervious surfaces such as streets and rooftops

These pollutants can harm fish and wildlife populations, kill native vegetation, foul drinking water supplies, and make recreational areas unsafe and unpleasant.



Runoff from impervious surfaces, such as streets, parking lots, and rooftops, carries pollutants into streams, rivers, and lakes. In ground cover, rain soaks into the ground, reducing runoff and carrying pollutants.

Managing Urban Runoff What Homeowners Can Do

To decrease polluted runoff from paved surfaces, households can develop alternatives to areas traditionally covered by impervious surfaces. Porous pavement materials are available for driveways and sidewalks, and native vegetation and mulch can replace high maintenance grass lawns. Homeowners can use fertilizers sparingly and sweep driveways, sidewalks, and roads instead of using a hose. Instead of disposing of yard waste, they can use the materials to start a compost pile. And homeowners can learn to use Integrated Pest Management (IPM) to reduce dependence on harmful pesticides.

In addition, households can prevent polluted runoff by picking up after pets and using, storing, and disposing of chemicals properly. Drivers should check their cars for leaks and recycle their motor oil and antifreeze when these fluids are changed. Drivers can also avoid impacts from car wash runoff (e.g., detergents, grease, etc.) by using car wash facilities that do not generate runoff. Households served by septic systems should have them professionally inspected

and pumped every 3 to 5 years. They should also practice water conservation measures to extend the life of their septic systems.

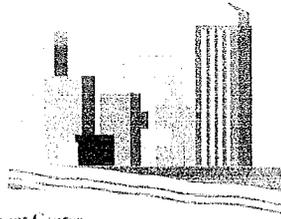
Controlling Impacts from New Development

Developers and city planners should attempt to control the volume of runoff from new development by using low impact development, structural controls, and pollution prevention strategies. Low impact development includes measures that conserve natural areas (particularly sensitive hydrologic areas like riparian buffers and infiltrable soils); reduce development impacts; and reduce site runoff rates by maximizing surface roughness, infiltration opportunities, and flow paths.

Controlling Impacts from Existing Development

Controlling runoff from existing urban areas is often more costly than controlling runoff from new developments. Economic efficiencies are often realized through approaches that target "hot spots" of runoff pollution or have multiple benefits, such as high-efficiency street sweeping (which addresses aesthetics, road safety,

and water quality). Urban planners and others responsible for managing urban and suburban areas can first identify and implement pollution prevention strategies and examine source control opportunities. They should seek out priority pollutant reduction opportunities, then protect natural areas that help control runoff, and finally begin ecological restoration and retrofit activities to clean up degraded water bodies. Local governments are encouraged to take lead roles in public education efforts through public signage, storm drain marking, pollution prevention outreach campaigns, and partnerships with citizen groups and businesses. Citizens can help prioritize the clean-up strategies, volunteer to become involved in restoration efforts, and mark storm drains with approved "don't dump" messages.



Related Publications

Turn Your Home into a Stormwater Pollution Solution!
www.epa.gov/nps

This web site links to an EPA homeowner's guide to healthy habits for clean water that provides tips for better vehicle and garage care, lawn and garden techniques, home improvement, pet care, and more.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas
www.epa.gov/owow/nps/urbanmm

This technical guidance and reference document is useful to local, state, and tribal managers in implementing management programs for polluted runoff. Contains information on the best available, economically achievable means of reducing pollution of surface waters and groundwater from urban areas.

On-site Wastewater Treatment System Resources
www.epa.gov/owow/on-site

This web site contains the latest brochures and other resources from EPA for managing on-site wastewater treatment systems (OWTS) such as conventional septic systems and alternative decentralized systems. These resources provide basic information to help individual homeowners, as well as detailed, up-to-date technical guidance of interest to local and state health departments.

Low Impact Development Center
www.lowimpactdevelopment.org

This center provides information on protecting the environment and water resources through integrated site design techniques that are intended to replicate pre-existing hydrologic site conditions.

Stormwater Manager's Resource Center (SMRC)
www.stormwatercenter.net

Created and maintained by the Center for Watershed Protection, this resource center is designed specifically for stormwater practitioners, local government officials, and others that need technical assistance on stormwater management issues.

Strategies: Community Responses to Runoff Pollution
www.nrc.gov/water/pollution/storm/stoinx.asp

The Natural Resources Defense Council developed this interactive web document to explore some of the most effective strategies that communities are using around the nation to control urban runoff pollution. The document is also available in print form and as an interactive CD-ROM.

For More Information
U.S. Environmental Protection Agency
Nonpoint Source Control Branch (4525T)
1275 P Street, NW
Washington, DC 20004
www.epa.gov/nps

Figure 2-1-1

As stormwater flows over driveways, lawns, and sidewalks, it picks up debris, chemicals, dirt, and other pollutants. Stormwater can flow into a stormwater system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the water bodies we use for swimming, fishing, and providing drinking water. Polluted runoff is the nation's greatest threat to clean water.



By practicing healthy household habits, home owners can keep common pollutants like pesticides, pet waste, grass clippings, and automotive fluids off the ground and out of stormwater. Adopt these healthy household habits and help protect lakes, streams, rivers, wetlands, and coastal waters. Remember to share the habits with your neighbors.

Healthy Household Habits for Clean Water

Vehicle and Garage

- Use a vacuum or brush to clean your car or driveway on a paved surface to minimize the amount of dirt, sand, and water flowing into the storm drain and eventually into your local water body.



- Check your car, boat, motorcycle, and other machinery and equipment for leaks and spills. Make repairs as soon as possible. Use spill kits that contain absorbent material like kitty litter or sand, and don't rinse the spills into a runoff storm drain. Clean other spills, such as oil, at the designated location.

- Recycle used oil and other automotive fluids at participating service stations. Don't dump these fluids down the storm drain or dispose of them in your trash.

Lawn and Garden

- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Avoid application during rain or after rain, when chemicals will be washed away in runoff.

- Plant native plants and grasses that reduce the need for irrigation. Native plants require less water, fertilizer, and pesticides.

- Use gravel and edging rather than concrete to separate a driveway or parking area from the yard.

- Don't wash your car in a driveway. If you do, use a hose and bucket that water will not drain into a storm drain.

- Cover piles of dirt, mulch, chemicals, or fuel with a plastic tarp to prevent these pollutants from blowing or washing into storm drains and local water bodies. Always use appropriate disposal methods.

Home Repair and Improvement

- Perform regular maintenance on the sewer system drains and pipes that connect to the sewer system.

- Know your property. Discover potential drains with a professional survey.

- Use a professional to install gutters, downspouts, and downpipes. Make sure your downspouts are not clogged. Use rain barrels, rain gardens, or other water management techniques to reduce runoff.

- Practice good lawn care. Avoid fertilizing and use only recommended amounts of fertilizer.

- Collect and dispose of household hazardous waste properly. For each disposal, contact your local hazardous waste management authority.

- Reduce the amount of paint you use. Buy paint in small quantities. For each disposal, contact your local hazardous waste management authority.

