Keeping Fats, Oils and Grease Out of the Stormwater System...

helps protect our creeks, rivers and lakes from the unsightly and potentially toxic effects of these common byproducts of society.

Fats, Oils and Grease are generated as a result of food preparation, vehicle use and cleaning, oil production activities and industrial applications.

Leaking vehicles, illicit discharges, oil production, spills and sanitary sewer overflows can all contribute to the problem.

Oil and grease toxicity varies according to type (petroleum, animal or plant) and its level of refinement.

Oil and grease can prevent oxygen from entering a surface water and can also create a chemical oxygen demand which consumes dissolved oxygen thereby stressing aquatic systems.

Learn to recognize the difference between a naturally occurring organic or bacterial sheen and a petroleum based sheen representing a true pollutant. For more information, contact your local stormwater coordinator or the Oklahoma Department of Environmental Quality.

Additional Resources

Visit the ***Green Country Stormwater Alliance (GCSA)*** website listed below for more details about stormwater protection, including Best Management Practices (BMPs) and other pollution reduction strategies.

Green Country Stormwater Alliance
www.stormwaterok.net

Contact Information:

For information about Green Country Stormwater Alliance, contact INCOG at 918-584-7526 or by email at stormwater@incog.org . For local information, contact your city or county stormwater coordinator.

For more information about stormwater protection, contact the Oklahoma Department of Environmental Quality (DEQ) Water Quality Division at 405-702-8100 or visit the DEQ web site at: https://www.deq.ok.gov/water-quality-division/stormwater/

For stormwater related complaints, call the DEQ statewide hotline at 1-800-522-0206. This number is answered 24-7. Citizens may fill out an online complaint form at the DEQ web site at https://www.deq.ok.gov/environmental-complaints/ and submit it electronically to DEQ. The site also provides contact links to DEQ.

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Fats, Oils and Grease

Green Country Stormwater Alliance
Give Clean Water a Helping Hand

FOG

A Closer Look at ***FOG***

Fats, Oils and Grease

Petroleum Based Products

Vehicle fluids like motor oil, fuel, lubricants, hydraulic fluid and coolants are often found in stormwater. Poorly maintained vehicles cause releases of these "illicit discharges".

Most petroleum products are harmful to aquatic organisms and are toxic to humans.

- **Runoff** from streets and parking areas can add significant amounts of pollutants to stormwater collection systems.
- **Petroleum hydrocarbons** are readily absorbed onto particulates and then washed into streams. Best management practices (BMPs) can prevent oil and grease from entering stormwater.

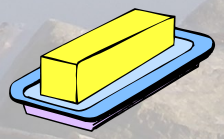
- **Facilities** working with vehicle fluids may need an oil/water separator between drains and sanitary sewers to prevent the discharge of petroleum products.
- **Discharge regulations** prohibit the discharge of materials that produce a sheen on the surface of a receiving water.

Animal and Plant Based Products

Food-handling locations like restaurants and cafeterias generate fats, oils and grease ("FOG"). Solidified FOG can plug sanitary sewers which overflow at manholes causing sewer system failures and discharges of harmful pollution.

- **Items** such as meat, fish, butter, cooking oil, shortening and gravy can contain considerable amounts of FOG.

- **When warm**, FOG is a liquid, but if poured down a drain it can solidify in cooler pipes and trap other solids creating blockages, backups and sanitary sewer overflows.
- **Commercial kitchens** should have properly functioning grease traps or interceptors to capture FOG discharged to drains before it can enter a sanitary sewer.



- **Grease traps and interceptors** must be pumped out, cleaned and inspected on a regular basis to ensure proper function.

Keeping FOG out of Stormwater

- **Don't dump** oil, grease or fat down sinks, floor drains or stormwater drains. If not recycled, domestic cooking oil should be poured into a sealable container and placed in the trash.
- **Cover** outdoor grease and oil storage containers, locate them away from storm drains and protect dumpster contents from rain.

- **Recycle** petroleum products (waste motor and transmission oil, coolants, hydraulic fluid, etc.) and cooking oil and grease whenever possible.
- **Clean up** oil spills promptly with absorbents. Place drain pans under leaky machinery.
- **Outside washing** and power washing operations (vehicles, equipment, parking lots) should not allow oils and grease to enter stormwater drains or creeks.
- **Inspect vehicles** for fluid leaks and fix promptly if detected.

Sediment Poses Environmental Risks

Loose soil can be carried in rainfall runoff in a process called **erosion**. The deposition of eroded soil in runoff into a new location is called **sedimentation**.

Soil disturbance at construction sites is inevitable. Disturbed soil can be eroded in rainfall runoff and carried into **stormdrains** and directly into waterways where it is considered a **pollutant**.

Too much sediment in a stormdrain or waterbody can block water flow which increases flooding potential. Excess sediment clouds the water which reduces sunlight, smothers aquatic habitat, clogs fish gills, and can even impede navigation in large waterways which requires expensive dredging to remove.

OKR10 requires

the **final stabilization** of construction sites to prevent soil erosion after the project has been completed. Site stabilization can play a significant role in reducing the impact of construction projects on the stormwater system and the environment. ***The present OKR10 permit will expire in 2022, and a new OKR10 will be finalized. Changes are expected.***

Additional Resources

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Final Stabilization at Construction Sites

OKR10 Requirements

OKR10 Requirements on
Final Site Stabilization

Site Stabilization in OKR10

SWP3: *P*ermittees must prepare a *Storm Water Pollution Prevention Plan* (SWP3) that describes the interim and final site stabilization measures required in OKR10.

OKR10 Stabilization Citations:

The following are some of the OKR10 passages that deal with site stabilization:

- **1.4**: Termination of coverage.
- **3.3.1**: Erosion and sediment control, area of disturbance.
- **3.3.1.D**: Minimize sediment track-out.
- **3.3.1.E.3**: Stockpiled sediment or soil.
- **3.3.1.G.3**: Disturbance of steep slopes.
- **3.3.1.H**: Preserving native topsoil
- **3.3.1.I**: Minimizing soil compaction.
- **3.3.1.L**: Sediment basin controls.

3.3.2: Stabilization Requirements:

Part 3.3.2 contains OKR10's most detailed requirements for stabilization, but there are many other references in OKR04 as well.

- **3.3.2.A.1**: Initiate installation.
- **3.3.2.A.2**: Completing installation.
- **3.3.2.B**: Stabilization criteria.

OKR10 Stabilization Requirements

OKR10 has requirements for ***temporary and final*** stabilization. Most construction projects do not have to account for impacts to ***sensitive waters***, such as 303(d) impaired, Outstanding Resource Waters (ORW), or Aquatic Resources of Concern (ARC).

For non-sensitive waters, OKR10 **Part 3.3.2.A** allows 14 days for completion of stabilization practices, and 7 days for sites having to protect sensitive waters.

Part 3.3.2.A specifies that ***stabilization requirements must be met*** if construction activities have permanently ceased or if any portion of the site will be temporarily inactive for 14 or more days.

Part 3.3.2.B.1 requires that ***vegetative cover*** be ***70% or more*** of the "*vegetation native to local undisturbed areas*." If native cover was 50% of the surface, then 70% of the 50% would require 35% of the disturbed site to be vegetated in site stabilization.

For construction sites having to protect sensitive waters, completion of stabilization must be within 7 calendar days.

More OKR10 Stabilization Citations

- **1.4**: Termination of coverage.
- **3.5.1.D**: 303(d) requirements.
- **3.5.2**: OWR and ARC requirements.
- **3.6.3**: Common Plan of Development.
- **4.3.4.D**: SWP3 schedules.
- **4.3.11.A.3**: SWP3 stabilization description.
- **4.3.11.A.4.a**: SWP3 common drainage.
- **Part 8 Definitions**: 31. Stabilization (includes both temporary and final).
- **10.2 Step 2 (ARC), A.4**: stabilization requirements within ARC buffer areas.
- **10.2 Step 2 (ARC), B**: implementation schedule for stabilization requirements within ARC buffer areas.

Part 3.6.3 (Common Plan of Development) includes stabilization requirements for both the "primary" and "secondary" operators at construction sites. **Part 3.6.3** also defines these terms.

This brochure does not provide complete guidance on the OKR10 General Permit for construction activities. Consult the OKR10 permit or DEQ for all regulatory construction site compliance information.

Keeping pollutants from food facilities out of the storm drain

helps the environment. Everything that washes into storm drains is untreated and ultimately ends up in our creeks and rivers.

Food waste in storm drains creates odors and also sustains populations of cockroaches, flies and rats. Detergents, cleaners and grease are harmful to aquatic life. Even “biodegradeable” cleansers can be harmful when poured down the storm drain.

It is important to *never* put wastes from *equipment cleaning, dumpsters, mop buckets, & grease bins* into the storm drain.

Food facilities such as restaurants, cafeterias, bakeries, coffee shops and grocery stores that send wastewater, grease and other materials into the storm drain are likely to be violating their local ordinances and codes.

Additional Resources

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A Food Service Guide to Waste Disposal

A Closer Look at

Food Service Industry Waste

Food Service Pollutants

Food service employees should be trained to keep food pollutants out of storm drains. Employees should be aware of the harmful effects of wastewater and food waste on water quality. Important tips to remember:

Mops

- Never empty mop buckets into a storm drain. Always use the mop sink.
- Keep the mop sink accessible. Don't use it to store materials or equipment.

Outdoor Cleaning & Washing

- Clean floor mats, garbage cans and equipment at a mop sink or floor drain.
- For large items that cannot be cleaned indoors, consider the following:
  - Construct a permanent wash pad that is connected to a sanitary sewer.
  - Use a temporary containment area (see "Steam Cleaning Equipment" in the phone book).
  - Hire a cleaning service with the right equipment to collect and dispose of wastewater.
- Wastewater from outside wash areas should be discharged to the sanitary sewer or properly disposed of without letting it flow into the storm drains.
- Use dry cleanup methods to clean outside areas whenever possible.
- Restaurants that use outside companies to do their outside washing are still responsible if wastewater is improperly disposed of into the storm drain.

Outdoor Spills

- For outdoor spills, use a mop, rag or absorbent material (such as kitty litter) to clean spills.
- Always keep used absorbent material out of the storm drain. Don't let the absorbent material get saturated. Dispose of it by placing it in a sealed plastic bag and place it in the Dumpster.

Cleaning Fluids

- Store cleaning fluids indoors so leaks and spills can't reach storm drains.

Grease

- Always use grease bins to dispose of oils and greases.
- Minimize spills when transferring oil and grease to grease bins by using containers of adequate size that are equipped with spouts.
- Clean up spills as soon as possible using dry absorbents such as cat litter.
- Maintain grease traps to prevent overflows. Hire a professional service for proper grease hauling and disposal.

Dumpster Management

- Never dispose of liquids in a Dumpster. Keep the Dumpster drain closed and inspect it for leaks on a regular basis.
- Keep the Dumpster lid locked (if possible) to keep out rain and scavengers.
- When the Dumpster needs cleaning, call your waste hauler for cleaning or replacement.

- Use garbage bags to contain the waste, then throw the bags into the Dumpster. Do not throw loose waste into a Dumpster.

Storm Drains vs. the Sanitary Sewer

Storm drains and sanitary sewers have two distinct functions. It is important to understand the difference.

Storm drains are intended to collect and transport runoff from rainfall. Storm drain systems do not remove pollutants from water before it is discharged into streams and rivers. Generally, these are the drains found in streets and in parking lots.

Sanitary sewers collect wastewater from indoor plumbing such as toilets, sinks, washing machines and floor drains. The wastewater flows to a sewage treatment plant. The treatment plant removes pollutants from wastewater before it is discharged to the receiving stream.

GCSA Goals:

- Provide employee training on a variety of topics, including pollution control, resources, regulatory issues, and permit compliance.
- Assist members with preparation and updating of stormwater maps.
- Prepare regional and local maps of and technical data about 303(d) impaired and TMDL waterbodies within GCSA areas.
- Provide time-sensitive updates on topical issues of concern via fact sheets, emails and news bulletins.
- Support local city councils and county commissions with timely information about the regulatory stormwater program and GCSA.
- Provide regional public education assistance, including GCSA website, brochures, and outreach to professional organizations.
- Conduct and assist with regional water quality sampling programs and 303(d) / TMDL studies.
- Host workshops and conferences on stormwater issues to support GCSA Members.

Additional Resources

Visit the ***Green Country Stormwater Alliance (GCSA)*** website listed below for more details about stormwater protection, including Best Management Practices (BMPs) and other pollution reduction strategies.

Green Country Stormwater Alliance
www.stormwaterok.net

Contact Information For:

Local stormwater programs, contact your city or county stormwater coordinator.

State Stormwater regulatory program, contact the Oklahoma Department of Environmental Quality (DEQ) Water Quality Division at 405-702-8100, or visit the DEQ web site at: https://www.deq.ok.gov/water-quality-division/stormwater/

INCOG's GCSA program, including membership and resources for controlling local pollution, contact INCOG's Environmental and Energy Planning Division at (918) 584-7526 or email at stormwater@incog.org.

General information about water quality within the INCOG area, visit the Environmental & Energy Planning webpage linked at www.incog.org.

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Give Clean Water a Helping Hand

Green Country Stormwater Alliance

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GCSA

A Closer Look at INCOG's:

Green Country Stormwater Alliance

History - Who We Are

In 1999, EPA finalized new "Phase II" stormwater regulations that would require permits on stormwater discharges from thousands of cities and counties across the nation. Most of these new permittees had populations under 20,000.

INCOG's member cities and counties listed in these new EPA "Phase II" regulations requested help from INCOG in understanding the new EPA mandates and to look for possible assistance from INCOG in meeting these new requirements.

INCOG began a comprehensive suite of support services using EPA grants to assist its membership. Eventually additional permitted cities joined in what became INCOG's **Green Country Stormwater Alliance (GCSA)**.

Now that grant funding is no longer available, INCOG's GCSA program is self-sustaining by membership dues. With each Fiscal Year cycle, GCSA membership represents about half of all Phase II stormwater permittees in Oklahoma. Contact INCOG to learn more about GCSA and how to become a member.

INCOG Services to GCSA

From 1999 to 2005, INCOG developed strategies and resources to help Phase II stormwater permittees obtain initial permit coverage, define local program activities, prepare documents, and jump-start public education programs.

Since 2005, INCOG has added the more technically difficult GCSA support tasks of providing resources and information on the policy and regulatory issues relating to permit compliance. INCOG also conducts and compiles data from water quality studies in its service area that directly benefits its GCSA Members. Principal areas of GCSA assistance are:

- Mapping and Data Services
- Water Quality Sampling Data & Methods
- Stormwater Management Program Support
- Annual Report Requirements and Content
- Program Evaluations by DEQ
- Employee Training on Technical Issues
- Researching Regulatory Issues
- Hosting Workshops & Conferences
- Representing GCSA on State Work Groups
- General Permit Revision Committees
- Regional Public Education Programs
- Technical Research and Guidance

Why GCSA Is Important

- Frequent changes in ***EPA policies and regulations*** and in State General Permits require constant vigilance.
- New ***technically difficult initiatives*** such as Low Impact Development (LID) and BMP Effectiveness Assessments must be implemented by permittees.
- ***Regional programs*** such as Employee Training and Public Education are cost-effective and more efficient.
- ***Technical resources*** are not readily available for smaller cities, such as for water quality, sampling methods, proper handling of hazardous chemicals, etc.
- ***Changes in city staff and Councils*** require refreshing of knowledge about the stormwater program.

GreenCountryStormwaterAlliance
www.stormwaterok.net

This brochure describes the benefits of GCSA membership, including the sharing of resources and having comprehensive technical assistance from INCOG. Contact INCOG for more information about GCSA at (918) 584-7526 or by email at stormwater@incog.org.

Good housekeeping has an impact

especially when it comes to the responsible management of common chemicals — the kinds found at many municipal facilities and worksites.

The failure to properly handle, store or dispose of hazardous materials can result in harmful pollutants ending up in local waterways. Proper management of hazardous materials can significantly reduce pollution runoff.

The most common pollutants that result from municipal operations are:

- **Sediment**
- **Oils and grease**
- **Nutrients, including fertilizers**
- **Trash**
- **Metals**
- **Bacteria**
- **Organics**
- **Pesticides**
- **Oxygen demanding substances**
- **Degreasers and solvents**
- **Oil-based paints**
- **Hydraulic fluids**
- **Antifreeze**
- **Salt**
- **Fuels**

Additional Resources

Visit the ***Green Country Stormwater Alliance (GCSA)*** website listed below for more details about stormwater protection, including Best Management Practices (BMPs) and other pollution reduction strategies.

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Handling & Disposal of Chemicals at Municipal Sites

A Closer Look at

Proper Chemical Handling & Disposal

Chemical Management Basics

Best management practices (BMPs) used for the storage and handling of chemicals will help minimize volumes of wastes generated.

Some Basic BMPs include keeping work areas clean, disposing of wastes properly, maintaining machinery, inspecting facilities regularly, and training employees to respond to spills.

Scheduled inspections will help with storage and disposal of harmful chemicals and help the facility meet state and federal HAZMAT rules.

State and federal rules on the handling of chemicals in the workplace are complex. They cover the generation, transport and disposal of wastes; the storage and use of materials at facilities; and worker safety in handling chemicals.

Internet Resources (good starting points):

OSHA:
https://www.osha.gov/Publications/osha3084.html

RCRA: https://www.epa.gov/rcra

USTs: http://occeweb.com/ps/aboutpst1.html

SDS (was MSDS):
https://www.osha.gov/Publications/OSHA3514.html

Tips for Chemical Handling

How chemicals and hazardous substances are handled can affect the amount of pollution in stormwater runoff.

- Ensure that all employees who handle chemicals are properly trained.
- Use chemicals only as directed.
- Ensure that all chemical containers are labeled and stored properly.
- Follow all recommended procedures when preparing chemicals.
- Do not overfill containers.
- Clean up all spills as soon as possible using proper spill containment and personal protection methods and gear.
- Ensure that personal protective equipment (PPE) is maintained properly.
- Never dispose of unused chemicals by washing them into storm drains, ditches, or streams.
- Do not flush chemicals down an indoor drain or toilet.
- Know how to read and use SDS forms, and know where they are located at the worksite.
- Know what to do and who to contact in case of an emergency.

Tips for Chemical Disposal

It is NEVER safe to pour chemical waste down a drain, into a gutter or into a trash receptacle. Some tips for safe chemical disposal include:

- Properly dispose of contaminated containers and never put chemicals in the trash.
- Follow all local, state and federal safe chemical disposal methods for spills.
- Never combine chemicals by placing them together in a waste container.
- Always refer to federal, state, and local guidelines for hazardous material disposal.
- When in doubt, ask before taking steps to dispose of chemicals or chemical waste.

Additional Information Sources:

OSHA Training:
https://www.osha.gov/dte/index.html

EPA NPDES Stormwater Program:
https://www.epa.gov/npdes/npdes-stormwater-program

This brochure is not intended to be a complete guide to hazard communication (HAZCOM) or hazardous materials (HAZMAT). Consult your manager or supervisor on your responsibilities with handling chemicals in the workplace.

Basic Erosion Controls

Best management practices (BMPs) control erosion at construction sites:

- Preserve existing trees and grass.
- Re-vegetate as soon as possible.
- Use silt fences on downslopes.
- Place soil piles away from waterways.
- Install diversions around stockpiles.
- Use rock off-tracking at entries.
- Clean sediment from streets.
- Use downspout extenders on roofs.

Consequences of Erosion

The consequences of not controlling erosion include:

Taxes: The expense of sediment removal is paid by taxpayers.

Road maintenance costs: Removing sediment adds costs to local government budgets.

Property values: Neighboring property values are damaged.

Fishing: Sediment smothers fish feeding and spawning areas and causes injury.

Weeds and algae: Sediment carries fertilizers that fuel algae and weed growth.

Site safety: Erosion can create unstable and unsafe worksite conditions.

Additional Resources

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A Homebuilder's Guide to Erosion Control

A Closer Look At Some Suggested

Erosion Control Methods

Consult local codes and OKR10 for compliance requirements.

Silt Fence

- Install prior to soil disturbance.
- Install on downslopes and parallel to the contour of the land.
- Extend the ends upslope to pond runoff.
- Bury 8 inches of silt fabric in trench.
- Drive silt fence stakes 1 to 2 feet deep.
- Leave no gaps in silt fence.
- Inspect once a week and repair as needed.
- Remove sediment deposits that reach half the fence height.
- Maintain until grass cover is established.

Soil Piles

- Cover with plastic and place away from streets, drains or waterways.
- Use temporary seed such as annual rye or winter wheat for topsoil piles.

Access Drive

- Use large aggregate at entrances.
- Stone should be deep enough to capture dislodged dirt from vehicles.
- Use to prevent tracking dirt onto the road by vehicles.
- Maintain throughout construction.
- Use geotextile under the stone.

Sediment Cleanup

- Remove tracked soil from streets daily.
- Remove soil from streets after a storm.

Stormdrain Inlet Protection

- Protect stormdrain inlets with wattles, silt fence or other measures.
- Remove sediment deposits after storms.

Downspout Extenders

- Install when gutters and downspouts are completed to prevent erosion.
- Use plastic drainage pipe to route water to a grassed or paved area.

Preserving Existing Vegetation

- Preserve existing trees and vegetation.
- Protect trees marked for preservation.
- Use mesh barriers around trees to protect the roots below branches.

Revegetation

- Seed, sod or mulch bare soil.
- Comply with OKR10's site stabilization requirements.

Seeding and Mulching

- Use topsoil when needed.
- Fertilize and lime if needed according to soil test, and water as needed.
- Seed with an appropriate mix for the site.
- Rake lightly to cover seed and roll lightly.
- Anchor mulch by punching into the soil, watering, or by using netting.
- Water enough to keep soil moist. Water less once grass is established.

Sodding

- Use topsoil when needed.
- Fertilize and lime if needed according to soil test and water the sod to establish.
- Tamp or roll sod lightly after laying.
- Peg sod in place from the bottom of a slope to the top in a brickwork pattern.
- Wet soil thoroughly with the initial watering. Keep soil moist until established.
- Sod and seed in early fall or spring.

Concrete Wash Water

- Deposit onto soil away from waterways.
- Dispose of remaining cement. Concrete wash water can kill vegetation.

De-Watering

- Place de-watering water away from entry into stormdrains and surface waters.

Material Storage

- Properly store chemicals and materials to avoid contamination of runoff.
- Comply with all requirements of the site's SWP3 and OKR10 permit.

Be aware of how you

dispose of household chemicals; special methods are needed.

Fertilizer Container Disposal

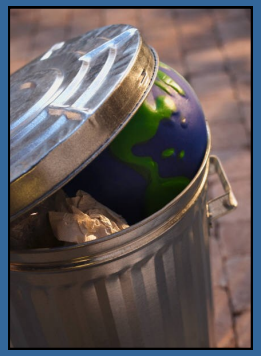
- Cap the empty container or bag, wrap it in newspaper, and put it in the trash.

Pesticide Container Disposal

- Use the fertilizer disposal method.
- Never pour pesticides into a street gutter or storm drain.
- Never flush pesticides down an indoor drain or toilet.

Used Motor Oil Disposal

- Do not dispose of oil in the trash. Store the used oil in a clean plastic container labeled “used motor oil”.
- Make sure the oil doesn't come in contact with other contaminants, such as window-washing fluids, gasoline, antifreeze, paint or other types of oil or water. Mixing oil with other waste fluids makes it more difficult to recycle.



- Take the oil to the nearest recycling center or household pollutant collection event.
- Never dump motor oil, petroleum products, antifreeze, transmission fluids, engine cleaners or battery acid down storm drains or on the ground.

Additional Resources

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Green Country Stormwater Alliance
Give Clean Water a Helping Hand

A Homeowner’s Guide to Protecting Our Water

Protect Water Quality by Improving

Chemical Use at Home

Fertilizers

Fertilizer Use Recommendations

- Apply only the recommended amount.
- Sweep driveway and sidewalk overcast back onto the lawn.
- Avoid over-watering that creates runoff.
- Rely on a soil test to show what nutrients the soil needs. Contact the OSU Extension Office at 918-746-3700 for soil test information.

How to Reduce Fertilizer Use

- Choose plants that resist drought and enhance the growth of other plants.
- Use a mulching mower and cut 1/3 of the height of the grass. Clipped grass adds nutrients back into the soil.
- Compost yard waste and use it on flower beds and gardens.

Healthy lawns and gardens enhance appearance and environmental benefits. They provide feeding areas for birds, prevent soil erosion, filter contaminants from rainwater, and absorb many types of airborne pollutants. Plants also produce oxygen, a process that helps clean the air.

Pesticides

Pesticide Use Recommendations

- Only apply recommended amounts.
- Label all mixed solutions with solution name, date and use information.
- Do not over-water or apply when rain is in the forecast.

- Do not apply when it is windy.
- Try to use low-toxicity chemicals that are biodegradable.
- Do not pour tank rinse water into the storm sewer; apply to the yard.

How to Reduce Pesticide Use

- Landscape for low maintenance, and use native plants to aid pest control.
- Attract insect-eating birds and bats to your home. Contact the ODWC at 918-299-2334.
- Use integrated pest management (IPM) strategies that rely on biological, cultural and chemical methods.
- For more pest management information, contact the Master Gardener Hotline at 918-746-3701.

Motor Oil

Motor Oil Use Recommendations

- Keep your car well maintained. Repair auto fluid leaks immediately.
- Use kitty litter, sawdust or wood chips to soak up oil and put it in the trash.
- Follow handling and disposal methods on container labels.

How to Reduce Motor Oil Pollution

- Recycle the motor oil you use at home.
- Recycling used oil keeps it from polluting soil and water.
- You can usually recycle used oil filters at the used oil recycling centers.
- For information about used oil recycling, contact the **Metropolitan Environmental Trust (Met)** at www.metrecycle.com or call 918-584-0584.

Experts estimate that 40 percent of oil pollution in America's waterways is from used motor oil.

Household waste

is an increasing problem in today's "throw- away" culture. From single serving food containers to junk mail, household waste is abundant. When trash is discarded, it can wash into the stormwater system which impacts water quality. The EPA suggests the following 12 ways to reduce solid waste:

1. *Reduce the amount of packaging*
2. *Reduce waste toxicity*
3. *Consider reusable products*
4. *Maintain and repair products*
5. *Reuse bags, containers, water bottles and other items.*
6. *Borrow, rent or share items that are used infrequently*
7. *Sell or donate goods instead of throwing them out*
8. *Choose recyclable products and containers, and recycle them.*
9. *Use products made from recycled materials*
10. *Compost yard waste and food scraps*
11. *Educate others and inform manufacturers and merchants*
12. *Reduce waste creatively!*

Additional Resources

Visit the ***Green Country Stormwater Alliance (GCSA)*** website listed below for more details about stormwater protection, including Best Management Practices (BMPs) and other pollution reduction strategies.

Green Country Stormwater Alliance
www.stormwaterok.net

Contact Information:

For information about Green Country Stormwater Alliance, contact INCOG at 918-584-7526 or by email at stormwater@incog.org . For local information, contact your city or county stormwater coordinator.

For more information about stormwater protection, contact the Oklahoma Department of Environmental Quality (DEQ) Water Quality Division at 405-702-8100 or visit the DEQ web site at: https://www.deq.ok.gov/water-quality-division/stormwater/

For stormwater related complaints, call the DEQ statewide hotline at 1-800-522-0206. This number is answered 24-7. Citizens may fill out an online complaint form at the DEQ web site at https://www.deq.ok.gov/environmental-complaints/ and submit it electronically to DEQ. The site also provides contact links to DEQ.

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Green Country Stormwater Alliance
Give Clean Water a Helping Hand

A Homeowner's Guide to Recycling & Reuse

Get to know the Three R's:

Reduce, Reuse, Recycle

Reduce

Reduce the consumption of ***little-used items***, such as power tools and party goods which can be rented or shared. The same holds true for newspapers, magazines, etc.

Other ways to reduce consumption:

- Purchase clothing at ***resale shops*** or hold clothing "swaps" with others at your school or community center.
- Purchase ***energy efficient items*** such as LED light bulbs, low flow faucets and toilets, and ENERGY STAR® products.
- ***Borrow or stream*** books, movies and music from the library or internet.
- Purchase products with ***recycled content*** or that are packaged in recycled materials.

- Use Mail Preference Service to be ***removed from mailing lists***, which reduces the amount of delivery mail. http://www.dmaconsumers.org/offmailinglist.html
- Ask yourself, "***Do I really need it?***" Often, the answer is "No"
- Check your ***ecological footprint*** (the amount of land and water it takes to support your lifestyle) at: https://www.footprintcalculator.org/

Reuse

- Use ***coffee mugs*** instead of Styrofoam cups.
- Use ***rechargeable*** batteries.
- Use ***cloth*** napkins, sponges and dishcloths.
- ***Avoid single-use*** items.
- Reuse ***plastic containers and egg cartons*** for crafts and garden use.

- Use a lawn ***mulching mower,*** and rake leaves as mulch around bedding plants.
- Reuse ***gift and shopping bags***.
- ***Avoid*** shopping ***bags*** when possible.

Greenscaping:

- ***Reuse yard waste*** such as grass clippings to mulch bare spots to reduce soil erosion.
- ***Compost*** household waste, such as grass clippings, fruit and vegetable scraps, coffee grounds and newspapers.
- Use specialized ***plants and beneficial insects*** as alternatives to insecticides.

Home landscaping and yard waste *is second only to paper in the municipal solid waste stream. Lawn and garden pesticides and fertilizers can threaten water quality.*

Recycle

Recycling at home is not just for ***aluminum cans*** any more. Recycling can also include:

- ***Plastic*** containers and other plastic items.
- ***Paper and cardboard***, such as newspapers, office paper, mail and phone books.
- Household, computer and car ***batteries***.
- Oil-based ***paint*** and ***chemicals***.
- ***Electronic*** products (see e-cycling below).

*The **EPA's WasteWise program** helps organizations and businesses promote the use and reuse of materials more productively over their product life cycles. Visit their website at:* https://www.epa.gov/smm/wastewise

E-cycling:

The exponential growth in electronics has given rise to a new environmental challenge: the proper disposal of electronic waste. Many electronic devices have valuable materials including steel, aluminum, glass, plastic, and precious metals.

Types of e-cycled electronics include computers, TVs, cell phones, DVD players and more. Visit the Met website at www.metrecycle.com for local electronic recycling options.

Water Quality Starts at Home

where each of us has an impact on the pollutants that we introduce into our environment. The EPA suggests these tips for protecting water quality:

1. Use fertilizers sparingly, and sweep excess off driveways and sidewalks.
2. Never dump or discard anything down storm drains.
3. Vegetate bare spots in your yard.
4. Compost your yard waste.
5. Minimize pesticide use, and consider Integrated Pest Management (IPM).
6. Direct gutter downspouts onto soil, away from pavement.
7. Take your car to a car wash instead of washing it in the driveway.

8. Check your car for leaks, and recycle motor oil.
9. Pick up after your pet.
10. Have your septic tank pumped and inspected regularly.

Additional Resources

Visit the ***Green Country Stormwater Alliance (GCSA)*** website listed below for more details about stormwater protection, including Best Management Practices (BMPs) and other pollution reduction strategies.

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How to Protect Your Local Watershed

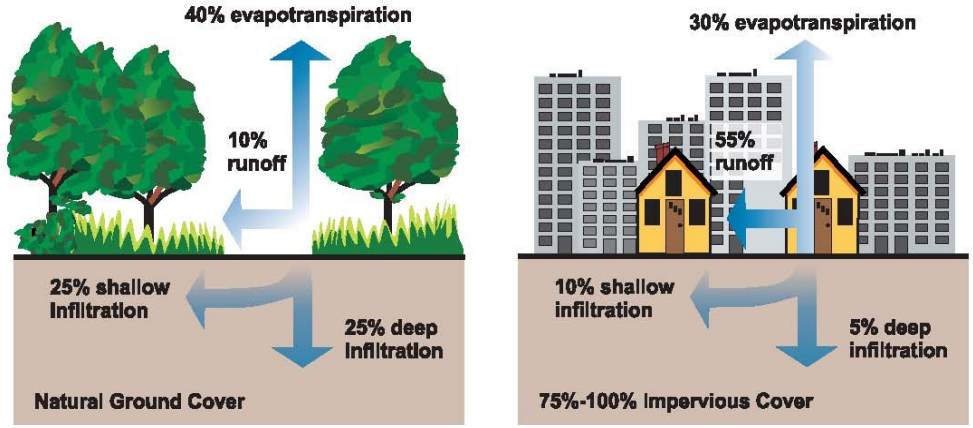
A Closer Look at

Ways to Protect Your Watershed

Understand Runoff

Urbanized areas have increased storm-water runoff in local watersheds. Because much of the urban landscape is ***paved***, rainfall does not soak into the ground as well as in areas with natural cover (see the illustration below).

A typical city block generates ***five times more runoff*** than a woodland area of the same size. Increased urban runoff causes an increase in ***pollutants*** such as oil, grease, pesticides, pet waste, sediment, and other substances to enter the storm drainage system. These pollutants then flow ***untreated*** to local waterways.



IMPERVIOUS COVER CAUSES INCREASED SURFACE RUNOFF. As little as 10 percent impervious cover in a watershed can result in physical stream degradation and biological impacts.

What Local Residents Can Do

Homeowners should ***use fertilizers sparingly***. ***Sweep*** driveways and sidewalks instead of using a hose. ***Compost*** yard waste.

Visit the EPA website on pesticide use at: https://www.epa.gov/pesticides/ for information on ***pesticide*** regulation, use, proper disposal and EPA's Integrated Pest Management (IPM) program for alternatives that minimize the use of pesticides.

Pick up after ***pets***, and use, store and dispose of ***chemicals*** properly. Check ***cars*** for leaks, and ***recycle*** motor oil and antifreeze. ***Wash cars*** in driveways causes polluted runoff (oils, detergents, etc.). Instead, use car wash facilities to reduce runoff.

Households served by ***septic systems*** should have them inspected professionally and pumped every 3 to 5 years.

Water ***conservation measures*** should be used to extend the life of septic systems.

Protect Your Local Streams

It is best to leave your local stream in a wild state. A ***riparian zone*** (the area along stream and pond banks where trees, grasses, and shrubs grow) should be left intact to protect the waterbody. The ***natural growth*** along the stream will:

- Add ***shade*** to keep water cool, which helps stream life,
- Provide ***roots*** to keep soil in place and stabilize banks,
- ***Filter pollutants*** from water, and
- Offer wildlife ***habitat and corridors*** for movement.

In urban areas, ***riparian zones are often cleared*** for development or to create a "manicured" look. Neighborhoods should understand the value of riparian areas and learn how to protect them.

Become a Volunteer Stream Monitor

The Oklahoma Conservation Commission (OCC) manages the ***Blue Thumb*** volunteer stream monitoring program. Volunteers collect chemical, biological and physical data about local streams. Blue Thumb also has education and outreach activities. To contact Blue Thumb: https://www.bluethumbok.com/.

Urban Stormwater Pollution

Urban stormwater pollution has been considered a major cause of water quality impairment since the 1970s. When rain falls on hard "impervious" surfaces in urban areas (e.g., streets, rooftops, parking lots, etc.), the water cannot be absorbed into the ground, so it flows untreated into nearby creeks and ponds via storm sewer collection systems. This transport of rainfall runoff also carries with it an abundance of pollutants, such as:

- ***Sediments***
- ***Bacteria / pathogens***
- ***Excess nutrients***
- ***Fertilizers and pesticides***
- ***Organic chemicals***
- ***Oils, solvents and grease***
- ***Automobile fluids***
- ***Heavy metals***
- ***Trash and litter***

Stormwater discharges occur throughout an urban area, introducing pollutants from thousands of individual points of discharge into local waterbodies. The accumulated effect is that many of these receiving streams cannot assimilate the pollutant loads. This results in water quality degradation which triggers the need for pollution control permits and programs to improve water quality.

What Is LID ?

Because stormwater pollution discharges are dispersed throughout an urban area, it is not possible to have "end of pipe" pollution treatment systems. ***Low Impact Development (LID)*** is a relatively new approach to employ smaller and innovative pollution treatment systems and runoff management strategies close to pollution sources.

LID is most often thought of as physical structures and devices that infiltrate rainwater and absorb pollutants into plants and soils. However, communities can also incorporate holistic non-structural LID strategies into urban planning, often called ***"Green Infrastructure (GI)"*** implementation. Examples of GI are adopting development codes that include use of LID features and creating open natural spaces.

Types of LID

LID systems are designed to infiltrate water to reduce flow volume and rate and to absorb pollutants into plants and soils. Typical structural LID features include rain gardens, bioswales, bioretention ponds, roof gardens, artificial wetlands, rain barrels, vegetative buffers, and permeable pavement. Many cities and developers are finding that using LID features is cost-effective.

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LID Pollution Controls

Cost-Effective Source Treatment

For More Information on LID or GCSA

Contact INCOG at (918) 584-7526 or email at stormwater@incog.org

A Closer Look at

LID Pollution Controls

LID Benefits and Costs

Certain costs of LID are easily quantifiable, such as costs of materials, manpower and contract expenditures. Likewise, certain benefit costs can be quantified, such as the cost savings for curbs and gutters that were not used in lieu of bioswales, or the reduction of asphalt costs because street widths were reduced to increase infiltration.

However, there are many benefit and cost aspects of using LID that are more difficult to quantify. These include calculating the benefit of improved water quality or the reduction in stream bank erosion and downstream flooding due to reduced peak runoff.

Developers who want bottom lines may not find a direct positive benefit to cost ratio for implementing LID in their projects. Municipalities need to encourage LID adoption in local development projects based not only on quantifiable monetary gains, but also the benefits of environmental protection, enhanced desirability of projects, and increased property values. LID clearly benefits these bottom lines as well.

Treating At The Source

LID systems control stormwater at the source by using small-scale LID pollution controls distributed around the site. These systems, such as infiltration ponds, rain gardens and bioswales, are much less expensive to construct and maintain than placing large-scale treatment systems at stormwater discharge outlets. In addition, many LID features are designed to be attractive amenities to the property, and they provide habitat for beneficial insects and wildlife.

How LID Reduces Pollution

Rainfall runoff picks up pollution from many small sources throughout the watershed. By placing LID features near those small sources, the smaller volumes of water and pollutants can be absorbed into the soils and plants within the LID feature, such as a rain garden. Pollutant removal efficiencies are impressive. In addition, by absorbing and slowing the velocity of runoff, stream bank erosion and sediment transport downstream is greatly reduced. This helps reduce flooding and property damage.

LID Maintenance

Probably the biggest issue facing widespread use of LID is maintenance. Often there is uncertainty of responsibility, especially when properties are sold. It is important that the new owner fully understand the purpose of the LID feature and their role in maintaining its integrity.

Many LID systems require about the same level and type of maintenance as any flower garden. Weeding, trash removal, keeping plants healthy, and ensuring good drainage. Some LID features, such as grass bioswales along streets, simply need mowing and kept free from obstructions. It is the responsibility of the property owner or tenant to maintain LID features.

This brochure is not intended to provide complete guidance on LID materials, design, costs or construction. It is intended for general information purposes only.

Municipalities

should establish Best Management Practices (BMPs) for the handling and disposal of materials that can impact the stormwater system. Municipal activities needing special attention are:

- Park and open space management
- Fleet maintenance
- Building maintenance
- Street maintenance
- Construction and site disturbance
- Stormwater system maintenance

By having employees follow BMPs, municipalities can significantly reduce the discharge of pollutants from parking lots, storage and maintenance yards, streets, *salt & sand* storage areas, parks, playgrounds, fleet yards, and vehicle maintenance facilities.

Strong chemicals such as motor oil, solvents and fertilizers that are commonly used can pose potential threats to water quality. Even such materials as lawn clippings are pollutants. Including water protection BMPs in municipal job duties is an important part of protecting our storm water systems and water quality.

Additional Resources

Visit the ***Green Country Stormwater Alliance (GCSA)*** website listed below for more details about stormwater protection, including Best Management Practices (BMPs) and other pollution reduction strategies.

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Municipal Best Management Practices that Protect Our Water

A Closer Look at

Municipal Best Management Practices

Park and Open Space Management

Best Management Practices (BMPs) for Municipal Parks and Open Spaces include:

- Implementing lawn/landscape chemical usage plans to minimize or eliminate runoff of chemicals into the stormwater system.
- Incorporating natural, uncut ("no mow") buffer zones around municipal waterways, and encouraging tree growth.
- Preventing runoff from chemical and landscaping storage areas from entering the stormwater system.
- Implementing a leaf recycling program.

Building Maintenance

Municipal sites where materials are stored and handled include waste transfer stations, landscaping depots, construction sites, vehicle maintenance garages and storage lots. Common BMPs are:

- Preventing runoff from waste transfer stations from entering the stormwater system.
- Cleaning and sweeping parking lots to prevent the runoff of automotive fluids.
- Properly disposing of demolition, remodeling and construction debris.

Fleet Maintenance

Municipal fleet vehicles are sources of chemical pollutants such as antifreeze, motor oil and brake fluid. BMPs include:

- Using drip pans to collect leaks.
- Washing vehicles and equipment in areas not connected to storm drains.
- Using less toxic chemicals.
- Not overfilling during fueling.
- Promptly servicing leaking vehicles.

Construction Site Disturbance

Municipalities can reduce pollution from construction sites by employing BMPs such as:

- Disposing of all wastes promptly to avoid contact with rainfall runoff.
- Implementing sediment and erosion controls such as silt fences and sedimentation basins.
- Storing fuel, solvents, cleaners, paints and other chemicals away from stormwater runoff.
- Using proper concrete washout procedures in designated areas.
- Protecting site exits with grates or large rock to avoid offsite tracking of dirt.

Street Maintenance

Regular street sweeping is one of the best BMPs for keeping pollutants and sediments from entering the storm sewer system. Some common BMPs include:

- Storing bulk materials away from storm drains and out of rainfall.
- Covering storage piles of road salt and sand under a tarp or roof.
- Sweeping streets of salt and sand after a snowfall to prevent contaminated runoff.
- Maintaining roadside vegetation to enhance absorption of street runoff.

Stormwater System Maintenance

Failure to maintain the stormwater system will lead to increased pollution and flooding. Some common BMPs are:

- Keeping storm sewer pipes free of debris.
- Performing regular cleanout of drop inlets and rainfall runoff access points to the storm drains.
- Removing excess vegetation from storm drains and stream channels.
- Removing trash, chemical containers, dead animals and other sources of pollutants at bridge stream crossings.

As stormwater flows

over driveways, lawns, and sidewalks, it picks up debris, chemicals, dirt and other pollutants. Stormwater flows into storm sewer systems or directly to a pond, lake, stream, river or wetland.

Anything that enters a storm sewer system is discharged untreated into the same waterbodies 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, homeowners can keep common pollutants like pesticides,

pet waste,

grass clippings, and automotive fluids off the ground and out of stormwater.

Pet waste contains potentially harmful bacteria, viruses and parasites that can cause illness in people and animals.

Adopt these healthy household habits, and help protect our valuable water resources. Remember to share these good habits with your friends and neighbors!

Additional Resources

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Give Clean Water a Helping Hand

A Pet Owner's Guide to Protecting Our Water

A Closer Look at

The Impacts of Pet Waste

Responsible Pet Ownership

Pets produce a lot of fecal waste. Many people think that pet waste is good fertilizer or is not harmful. Both are false.

Pet Waste

All animal waste contains ***bacteria, viruses and parasites*** that are harmful to people and animals. Pet waste causes polluted runoff that lowers water quality in our streams. Pet waste can ***cause illness*** in humans if contaminated water gets in contact with open wounds or is ingested, even by splashing.

The nutrients washed to local waterbodies from pet waste can cause excess algae growth which is unsightly and leads to low dissolved oxygen. Pet waste nutrients can also cause growth of noxious organisms which can harm fish.

What Can You Do?

When walking your pet in a park or street, use a plastic bag or pooper scooper to pick up your pet's waste. You can flush it down the toilet, bury it in the yard, or bag it and put it in the trash (if local codes allow).

Do not compost pet waste; the compost pile does not have high enough temperatures to kill harmful organisms. Also, never use pet waste to fertilize food plants or bury in gardens.

Pet Bathing

Pet bath water can contain pollutants. Bathe pets indoors in a bathtub or sink using less toxic shampoos, or consider having your pet professionally groomed. Pet shampoos and soaps, even when biodegradable, can have toxic chemicals. Consider using less toxic alternatives such as oral or topical flea control products. Dispose of unwanted quantities of flea control products properly.

Flea Dip Disposal

Do not pour flea dip solutions onto driveways or into the street where they can enter the storm drain and flow to nearby creeks; flea dip insecticides harm aquatic life.

If you are applying an insecticide to your lawn for flea control, avoid rainfall runoff. Rain can wash the insecticide off your lawn into the storm drainage system which flows directly to local creeks.

Solutions containing ***pyrethrins*** or ***organophosphate*** chemicals such as Dursban, Diazinon or Malathion cannot be disposed of in the sanitary sewer. It is best to take unused chemicals to a local household pollutant collection event.

Do not pour dipping solutions and insecticides on the ground, down sink drains or into storm drains. Use local household pollutant collection facilities and events.

Pet Waste FAQs

Q. I don't walk my dog near a creek or river. How does my dog's waste get there?

A. *When it rains, pet waste is washed into storm drains which discharge into local streams.*

Q. Why doesn't the sewage treatment plant clean this water before it reaches the river?

A. *Sewage treatment plants only process waste water from indoor plumbing. Sewage treatment plants do not treat rain water.*

Q. Other animals such as squirrels, rabbits and birds already “use the facilities” outdoors as their bathroom. Why should I worry about my pet?

A. *Pet populations are concentrated in urban areas. The waste from all these pets is not adequately absorbed into the environment.*

Q. Should I pick up the pet waste in my own yard?

A. *Yes, definitely. During a rain storm pet waste contaminants get washed out of your yard and into the storm drain system causing pollution in local streams. When pet waste is not removed, it leaves a large quantity of nutrients that can burn out grasses by overfeeding them, creating a spotty looking yard. Pet waste can also attract rats and other vermin.*

What Is A Rain Barrel?

A Rain Barrel is a small storage tank that collects rainwater from rooftop gutter downspouts that would otherwise be lost to runoff and stores it for non-potable use, such as for watering lawns and gardens.

Types of Rain Barrels

A typical residential Rain Barrel consists of a 40 to 55 gallon container, usually made of plastic or wood, with a screen for catching leaves and debris, and some type of spigot for attaching a series of pipes or hoses to distribute water as needed. Ceramic, glass and bricks are not normally used as they are heavier and harder to handle. Rain Barrels should be easy to move to other locations if needed.

Benefits of Rain Barrels

- *Stored water from rainfall can be used during dry periods.*
- *Rain water is free from chlorine and hardness additives.*
- *Reduces the impacts of stormwater runoff.*
- *Lessens the demand on municipal water supplies.*
- *Rain Barrel drip irrigation is more efficient for watering garden plants.*
- *Rain Barrels encourage and inspire environmental protection and stewardship in others.*

Rain Barrel Costs

Rain Barrels can be as simple as a plastic garbage can underneath a gutter downspout. Homemade barrels are best constructed from wood or plastic. The cost of homemade barrels with simple screens, spigots and pipes is around **$60 to $120**.

Vendor-supplied barrels are preferred because they are constructed specifically for use as Rain Barrels, and they have the proper openings, spigots, screens and other supplies. Purchased barrel kits can cost **$100 to $200**.

Additional Supply Costs:

In addition to the cost of the barrel, accessory supplies may be needed:

- *Leaf and debris screens (~$15)*
- *Cleaning supplies (~$15)*
- *Water distribution lines (~$25)*
- *Spigot / water outlet (~$20)*
- *Gutter connections (~$10)*
- *Brick, stone, boards for base (~$30)*
- *Pump, electrical cord, outlet (~$70).*

Many organizations and municipalities offer Rain Barrel kits at discounts or sometimes for free. Some include all supplies needed for installation. Ask!

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EPA

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Rain Barrels

Practical Water Conservation for Your Home

For More Information on LID or GCSA

Contact INCOG at (918) 584-7526 or email at stormwater@incog.org

A Closer Look at

Rain Barrels

Rain Barrel Supplies

In addition to storing collected rainwater, Rain Barrels must filter out leaves and trash and have a way to distribute the stored water. This can be either through gravity flow via pipes or with an electrical pump. The gravity system is much preferred for reduced cost and maintenance.

Typical Rain Barrel supplies are:

- *Gutter extensions and connectors*
- *Screens for leaves and debris*
- *Outlets such as spigots*
- *Distribution pipes and hoses*
- *Boards, bricks or stones for base*
- *Pump with electrical cords*
- *Brushes and cleaning supplies*

Do-It-Yourself Rain Barrels

Rain Barrels are deceptively complicated; they need adequate filtration, access for maintenance, stability, good sealed connections, valves, perhaps pumps, distribution lines, etc. Vendor supplied barrel kits take all factors into account, making them affordable and easy to install and maintain.

Rain Barrel Vendors

Purchasing Rain Barrels and supplies has gotten much easier. It is common to find discounted and free barrels and complete kits. To find barrel and supply vendors, contact:

- *Hardware and garden supply stores*
- *Home improvement centers*
- *Internet shopping websites*
- *Non-profit organizations & Trusts*
- *Municipal Public Works*
- *Household Pollutant collectors*
- *Schools and youth organizations*

Rain Barrel Limitations

Rain Barrels have limited capacity. They capture and distribute rainwater most often during higher rainfall periods when use of stored water is not needed as much. Storing captured rainwater requires removal of accumulated leaves and sediment to control excess growth of bacteria & mosquito breeding. Rain barrels themselves cannot eliminate all property runoff; they should be integrated into a comprehensive stormwater management program.

Rain Barrel Maintenance

Leaf filtering screens must be kept free of accumulated matter. The pumping and distribution systems need to be kept unclogged to work effectively. Mosquitoes can be controlled by draining the barrel within 10 days of filling or by using a larval pesticide. Ensure that the base is level and sturdy.

Local Codes and Permits

While arid states may restrict rainwater capture, Oklahoma passed the Water for 2060 Act in 2012 to promote pilot projects for rainwater and gray-water use. Local codes may affect use of Rain Barrels, including subdivision regulations, zoning and building codes, subdivision covenants, and Homeowners Association restrictions. Contact your local municipal planning officials about any restrictions that may apply.

This brochure is not intended to provide complete guidance on Rain Barrel materials, design, costs or construction. It is intended for general information purposes only.

What Is A Rain Garden?

A Rain Garden is a constructed depression in permeable soil that captures runoff from hard surfaces such as roof tops, driveways and parking lots. Rain Gardens are designed to reduce the amount of stormwater flow and to absorb pollutants in stormwater runoff. The vegetation in Rain Gardens also provides food and shelter for butterflies, song birds and other wildlife.

Types of Rain Gardens

A Rain Garden can be a simple vegetated depression for collecting rain water or a complex system of amended soils and infiltration media with underdrains and plumbed outlets. The more complex systems are often referred to as bioretention or bioinfiltration cells, and bioswales if elongated into channels. All are designed to slow, infiltrate and remove pollutants from runoff.

Benefits of Rain Gardens

Rain garden benefits include pollution control, flooding protection, habitat creation and water conservation. They help recharge groundwater, improve water quality, reduce mosquito breeding, reduce flooding potential, provide beneficial habitat for insects and wildlife, reduce lawn care and lawn chemical needs, provide better drainage around homes and buildings, and enhance the beauty of properties.

Rain Garden Costs

Small and simple Rain Gardens can be done by individual homeowners. Larger and more complex systems require more complex designs and construction methods. A simple Rain Garden can cost around $2 to $4 per square foot, while larger complex systems for commercial and institutional applications can cost $10 to $40 per square foot. In either case, cost factors to consider are:

- *Area and depth of excavation.*
- *Use of on-site soils and rock.*
- *Street curb cuts and flow channels.*
- *Constructed inlets and outlets.*
- *Mixed media, under-drains.*
- *Use of volunteer labor.*
- *Use of donated materials and funds.*
- *Use of professional design firms.*
- *Amount of hired labor needed.*
- *Specialized equipment needed.*
- *Compliance with local codes.*
- *Availability and types of plantings.*

As a general Rule-of-Thumb:

Do-It-Yourself: $100 - $2,000

Professionally Installed Basic Design: $1,500 - $3,000+

Large, complex Commercial, Industrial or Institutional: $4,000 - $15,000+

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Green Country Stormwater Alliance
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GCSA
Green Country Stormwater Alliance
www.stormwaterOK.net

Rain Gardens

How To Make Your Project a Success

For More Information on LID or GCSA

Contact INCOG at (918) 584-7526 or email at stormwater@incog.org

A Closer Look at

Rain Gardens

Rain Garden Designs

Rain gardens work in many climates, but they are most effective in areas with natural groundwater hydrology, especially areas with deep soils that absorb water rather than in rocky areas of higher runoff potential. For Do-It-Yourself designs, an internet search will provide a wealth of technical information and great suggestions on design and construction. Some factors to consider are:

- *Blend into your other landscaping.*
- *Know all runoff flow patterns.*
- *Locate for best effectiveness.*
- *Size according to expected runoff.*
- *Use appropriate filtration media.*
- *Use native plants.*
- *Design for ease of maintenance.*
- *Follow all local codes and permits.*
- *Try several smaller rain gardens.*
- *Free is best: consult local organizations, schools and agencies.*
- *Document your project.*
- *Review credentials and experience of professional services.*
- *Be Proud! Promote your project.*

Rain Garden Limitations

As with all stormwater "Best Management Practices" (**BMPs**), Rain Gardens do have limitations. Their effectiveness is limited to their functional size, drainage area, design constraints, and how they are maintained. The following factors are important when assessing Rain Garden limitations:

- *Effectiveness of design.*
- *Ratio of rain garden size to size of drainage area treated.*
- *Type of infiltration media used.*
- *Types and health of plants used.*
- *Percolation rate of soils.*
- *Types of pollutants in watershed.*
- *Chemical removal efficiency of rain garden soils and mixed media.*
- *Flow patterns within rain garden.*
- *Maintenance adequacy.*
- *Effectiveness of under-drains.*

Rain Gardens should not be located near potable water wells or septic tank fields. They are also difficult to locate in tight urban areas with little soil. Rain Gardens with no under-drain plumbing are better at pollutant removal.

Rain Garden Maintenance

In addition to maintaining structural integrity, Rain Gardens must be inspected for vandalism, trash, drain blockage, car damage, illegal dumping, and to ensure proper drainage for vector control.

Local Codes and Permits

Construction projects must comply with all local codes and permits, including those for utility locations, construction, earth change, floodplain, subdivision regulations, zoning codes, comprehensive plans, homeowners association requirements, covenant restrictions, stormwater permit limitations on discharges to the MS4, and nuisance abatement. Contact your municipal planning office for all requirements.

Customers look to you for information

about the yard and household chemicals that they purchase. Home-use pesticides pose a particular risk to our stormwater system.

Pollution of our local waterways can occur by washing pesticides and other chemicals into storm drains. Contaminated runoff is a major cause of environmental pollution in streams.

The purpose of this brochure is to assist the managers of garden supply stores to

educate employees

on how to advise customers about safe pesticide use and disposal. . Your business and its employees can play a big role in helping to protect our streams, rivers and lakes in Oklahoma.

This brochure is not intended to provide complete guidance on the use or disposal of pesticides. Always refer to and follow the manufacturer's instructions.

Additional Resources

Visit the ***Green Country Stormwater Alliance (GCSA)*** website listed below for more details about stormwater protection, including Best Management Practices (BMPs) and other pollution reduction strategies.

Green Country Stormwater Alliance
www.stormwaterok.net

Contact Information:

For information about Green Country Stormwater Alliance, contact INCOG at 918-584-7526 or by email at stormwater@incog.org . For local information, contact your city or county stormwater coordinator.

For more information about stormwater protection, contact the Oklahoma Department of Environmental Quality (DEQ) Water Quality Division at 405-702-8100 or visit the DEQ web site at: https://www.deq.ok.gov/water-quality-division/stormwater/

For stormwater related complaints, call the DEQ statewide hotline at 1-800-522-0206. This number is answered 24-7. Citizens may fill out an online complaint form at the DEQ web site at https://www.deq.ok.gov/environmental-complaints/ and submit it electronically to DEQ. The site also provides contact links to DEQ.

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Green Country Stormwater Alliance
Give Clean Water a Helping Hand

A Retailer's Guide to Pesticide Basics

Retail Customer Considerations for

Over-the-Counter Pesticides

Talk To Your Customers:

- Have they *identified* the pests and know *which chemicals* to use?
- Do they know of *alternative* treatments?
- Do they know how to view the *labels* and follow label instructions?
- Do they know how the product will affect *pets and beneficial insects*?
- Do they know how to get *safety information* and use protective gear?
- Do they know how to *safely use* the product, especially concentrates?
- Do they know which *application conditions* apply (sunlight, season, rainfall, mowing, watering, etc.)?
- Do they know about the possible need for *repeat applications*?
- Do they know how to properly and safely *clean up* applicators and spills?
- Do they know how to properly *dispose* of unused product and containers?

Many pesticides are harmful to people, animals and our environment. Pesticide use often requires repeat applications. Over time some pests become resistant which reduces pesticide effectiveness.

Product Display Area Management:

- A store's chemical products area has *potential for injury* to customers.
- Many products are *concentrates* of toxic chemicals in glass containers on shelves.
- Some chemicals are *sensitive* to strong sunlight or extremes of temperatures.
- Many strong pesticide chemicals require special types of absorbents and other supplies for proper *spill cleanup*.
- *Disposal of waste* cleanup materials may require special handling.
- *Spill cleanup kits*, along with kit use instructions, should have easy access.
- Employees should be *trained* in chemical handling, stocking and spill cleanup.
- Floor *managers should be knowledgeable* to address customer's questions and concerns about chemical use, safety and proper disposal.
- *Shelves* should be sturdy, and containers placed on shelves to avoid falls.
- *Aisles* between product displays should be wide enough to minimize bumping by customers and their shopping carts.

Pesticide Use Tips for Customers:

- *Read labels* carefully for important information on product use, safety and cleanup.
- Be certain *which pesticide* is the best option for controlling the target pests.
- Use the manufacturer's *hotline and customer service* for safety questions.
- Minimize *pesticide runoff* by not applying during or just before rainfall runoff.
- When *mixing solutions* from concentrates, make sure the container is labeled with the product, intended use, date and expiration.
- *Use only the amounts* and application procedures recommended by the manufacturer. Applying overly concentrated solutions can have dangerous consequences for the environment.
- Always wear the recommended *safety gear* when working with pesticides.

Visit **EPA's pesticide webpage** at: https://www.epa.gov/pesticides/ for information about pesticide regulation, use and disposal, and EPA's Integrated Pest Management (IPM) program on alternatives to pesticide use.

Phase II Overview

The Phase II stormwater program is a mandatory permit program for designated stormwater permitted cities and counties in Oklahoma. The permit allows discharges of stormwater from a ***Municipal Separate Storm Sewer System (MS4)****. Designated stormwater permittees must comply with all Federal and State regulations governing the discharges.*

Each Phase II City and County MUST implement a comprehensive suite of ***Best Management Practices (BMPs)*** *to protect local water quality.*

This is ***NOT*** *a flood-related permit; it is specifically established to protect water quality, not quantity.*

The three pillars of a successful Phase II stormwater program are:

Education & Participation

Inspection & Enforcement

Pollution Control BMPs

Additional Resources

Visit the ***Green Country Stormwater Alliance (GCSA)*** website listed below for more details about stormwater protection, including Best Management Practices (BMPs) and other pollution reduction strategies.

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Give Clean Water a Helping Hand

Stormwater Permit Basics for Municipal Officials

A Closer Look at

Municipal Stormwater Permits

What must be done to comply

EPA has defined six Minimum Control Measures (MCMs) that must be addressed. Each requires implementation of many "Best Management Practices" (BMPs). These are:

1. *Public Education*
2. *Public Participation*
3. *Illicit Discharge Detection and Elimination*
4. *Construction*
5. *Post-construction*
6. *Good Housekeeping*

Each permittee must also prepare a "Stormwater Management Program" (SWMP) document and submit Annual Reports to DEQ.

INCOG created the **Green Country Stormwater Alliance (GCSA)** to provide regional assistance to municipal permittees, including education outreach and technical support. Visit the GCSA website for more information at www.stormwaterok.net.

ILLICIT DISCHARGES

Under Phase II, nothing but rainwater and snowmelt should enter local waterways. EPA and DEQ regulations require that a Phase II permittee implement local controls on pollution sources discharging to the storm water system, and enforce local codes that prohibit illicit discharges.

LOCAL CODES & ORDINANCES

Each Phase II permittee must adopt local ordinances that will prevent storm water pollution. Three ordinances are required:

1. *Construction*
2. *Post-construction*
3. *Illicit discharges*

The Phase II program requires local inspections and enforcement. Phase II counties may partner with the DEQ or co-permit with a Phase II city to ensure there is enforcement of State regulations and local codes.

For Post-Construction, Phase II permittees must encourage implementation of Low Impact Development (LID) practices.

Phase II permittees must also implement a variety of public education and outreach programs as a means to control stormwater pollution at its source.

OTHER REQUIREMENTS

The Phase II's municipal public works staff, engineers, inspectors, building officials, planners and department supervisors will all be involved with Phase II program implementation.

Municipal budgets need to ensure adequate funding for this EPA mandated permit. **This program will change how you relate and work with local industries, developers, businesses and your citizens.** For more information about Phase II, please contact INCOG or DEQ.

Green Country Stormwater Alliance
www.stormwaterok.net

Phase II Stormwater CONTACTS

INCOG & GCSA:
Phone: 918-584-7526
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GCSA: www.stormwaterok.net

DEQ:
Phone: 405-702-8100
Request the Stormwater Dept.