## *Unit IX:*

# *Point Sources of Pollution: A Field Trip*

**Unit IX Point Sources of Pollution Field Trip**
**Introduction**

Water pollution is commonly classified into two main categories: point and nonpoint source pollution. Point sources originate from a specific point on the landscape such as a discharge pipe from a sewage treatment plant or a factory. Nonpoint sources originate over a widespread area of the landscape, and thus it is difficult to determine exactly where the pollution comes from.

In 1970, Congress founded the Environmental Protection Agency (EPA) to help clean up and protect the environment. However, there were no laws at that time effective enough for the EPA to use to clean up the environment. In 1972, Congress enacted the Clean Water Act (CWA) and empowered the EPA to enforce it. CWA heralded a new era in water pollution abatement. It was the first time the federal government changed its role from assisting states with pollution-abatement programs to overseeing such programs. Previously, federal laws reflected the view that pollution control was primarily a state responsibility, and simply set up funding mechanisms to assist states with their job. The need for uniform standards and a stronger federal role, however, became apparent as industries threatened to move out of states trying to enforce pollution controls to states where the requirements were less stringent.

One of the important programs CWA launched was the National Pollution Discharge Elimination System (NPDES) permit program to control industrial and municipal discharges into surface waters, and provided federal assistance for publicly owned wastewater-treatment facilities. It required states to set water quality standards (see Unit 8 introduction) for surface waterbodies within state boundaries. These standards were to incorporate a designated use and a defined level of water quality needed to support that use. Since CWA was enacted, billions of tax dollars have been spent to construct thousands of wastewater treatment plants for municipalities throughout the United States. As of 1996, 50 million more Americans are now hooked up to sewage treatment plants than in 1972.

The Water Quality Act of 1987 reauthorized the 1972 Clean Water Act and added additional requirements including a nonpoint source pollution control program. The Clean Water Act requires states to identify waters not meeting water quality standards and to develop plans for cleaning them up. The Total Maximum Daily Load (TMDL) program provides a process for determining pollution budgets for the Nation's waters. Once implemented, these budgets, or maximum loading of pollutants, will assure that Clean Water Act goals for individual waterbodies will be met. In the meantime, EPA continues to work on improvements to the TMDL program in order to further enhance the quality of the nation's waters. In 2001 and 2002 combined, more than 5,000 TMDLs were approved or established under the current TMDL rule. EPA has been working steadily to identify options to improve the TMDL program, including addressing problems reported by the National Academy of Sciences. The agency has conducted several public meetings and is reviewing its ongoing implementation of the existing program with a view toward continuous improvement and regulatory changes in light of stakeholder input and the NRC recommendations.

The Safe Drinking Water Act was also enacted by Congress. It specifically protects areas designated as sole source aquifers, such as the Hunt-Annaquatucket-Pettaquamscutt aquifer and the Pawcatuck aquifer. Sole Source Aquifers are designated by the US Environmental Protection Agency when over 50% of the drinking water supply comes from groundwater and no reasonable alternate source exists for that area. Federal funds cannot be committed to a project that may contaminate a sole source aquifer.

*Unlike most areas in Rhode Island, the Narrow River Watershed was not heavily industrialized during the Industrial Revolution. Because the Watershed lacked streams large enough to generate power for large factories, its tributaries were never harnessed for anything larger than small mills. Thus point sources of pollution such as factories may not have been significant. Today, there are no "point source dischargers" in the Narrow River watershed. The Westmoreland Wastewater Treatment Facility, located in the Watershed, actually discharges its effluent outside of the Watershed into the Atlantic Ocean. Stormwater outfall pipes are sometimes considered point sources of pollution. However, the pollution emanating from stormwater pipes usually originates from nonpoint source. Although point source pollution in the Watershed is not a significant water quality problem today, it is important for students to understand point source pollution and how it can affect water quality. In addition, some residents in the Watershed contribute to point source pollution in the coastal watershed through municipal sewer systems.*

**References:**

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# FIELD TRIP: **POINT SOURCES OF POLLUTION**

**OBJECTIVE:** Students will learn about point-source pollution. They will also learn about technologies and policies that lessen or prevent point-source pollution, including the Clean Water Act. Students will begin to see where human endeavors and water quality are in conflict, and ways in which compromises and solutions to conflicts are found.

**METHOD:** Students will have an opportunity to see first-hand some potential point sources of water pollution by visiting a [sewage treatment plant and/or a manufacturing plant of any kind that discharges into a water body]. They will learn from interviewing personnel at these sites who have direct experience and technical knowledge.

**MATERIALS:** Pencils and notebooks for taking notes, cameras are optional.

**BACKGROUND INFORMATION:**

1. Congress established the Environmental Protection Agency (EPA) in 1970 to help clean up and protect the environment. However, there were no laws at that time effective enough for the EPA to use to clean up the environment.

2. In 1972, Congress enacted the Clean Water Act (CWA) and empowered the EPA to enforce it. The CWA had three original goals:
   - To restore and maintain the chemical, physical, and biological integrity of the nations waterways.
   - To eliminate the discharge of pollutants into navigable waters by 1985. This was revised in 1987. The no-discharge goal has been extended and now they stress conservation and reuse of polluting materials.
   - To make waters fishable and swimmable wherever possible. Congress tried to do this indirectly by setting levels of effluent discharges.

3. Since the CWA was enacted, billions of tax dollars have been spent to build thousands of wastewater treatment plants for municipalities throughout the United States. As of 1988, 47 million more Americans are now hooked up to sewage treatment plants than in 1972. This is an increase to 127 million total people hooked up to sewage treatment plants.

4. The <u>Safe Drinking Water Act</u> was also enacted by Congress. It specifically protects areas designated as sole source aquifers. Federal funds cannot be committed to a project that may contaminate a sole source aquifer.

5. An important consideration about sewers is that they remove water that would normally return to the groundwater. If water is removed from an aquifer for household consumption, and then piped out of the watershed to a sewage treatment plant, there is less water left in the watershed. This may impact natural areas, particularly during low flow periods.

**PROCEDURE:**

<u>Point-source pollution</u> can be tracked down to one spot or outflow pipe. In the case of the Wastewater Treatment Facilities, you can see where the sewage comes in, where it is treated, and

where the discharge comes out of a pipe into the [ocean or other waterbody]. Some watersheds are only partially sewered. Others will have their sewage pumped to a facility outside the watershed. Be sure that the treatment plant has some connection to the students. In the case of manufacturing plants, they must have a permit to discharge into a waterbody. Arrange to have a tour of the whole facility, not just the wastewater treatment process. That way students can understand the importance of industry to the community.

Note: The following procedure and discussion questions are designed for a field trip to the Westmoreland Wastewater Treatment Facility.

1. Explain to students that they will be visiting the Westmoreland Wastewater Treatment Facility. Have them brainstorm questions to ask the personnel at this site. Questions may include:

- What potential sources of water pollution may result from your operation.
- How do you plan, mitigate, or prevent these impacts? What needs improvement?
- What state and federal regulations do you adhere to or strive to abide by?
- Are you meeting all of them? What are your plans to work towards compliance?
- Have you always met them? What is the "pollution history" of your facility?
- How has your facility changed since the Clean Water Act was passed in 1972?
- How much money do you spend per year on pollution control measures?
- How much has your facility spent since CWA regulations have been in place?
- How much more would it cost to enact additional pollution control measures that would bring your operations up to current regulatory standards?

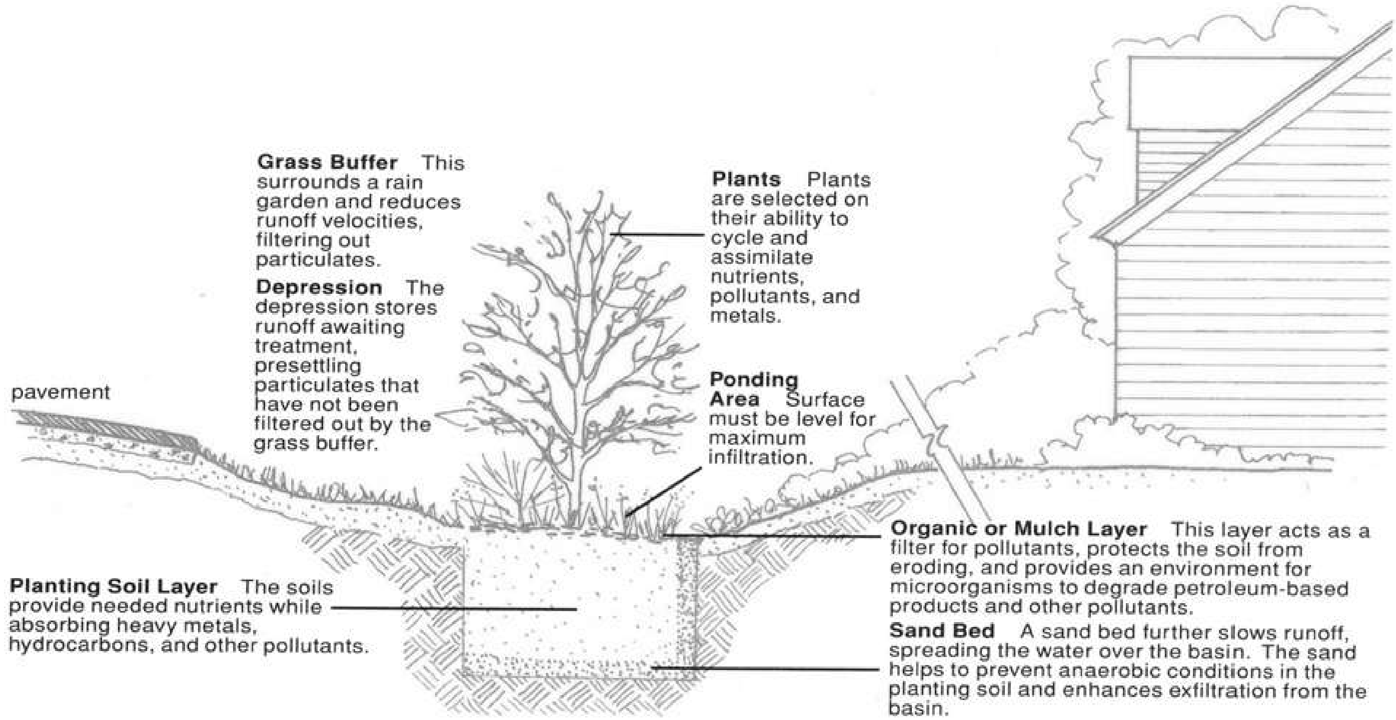
2. Go on field trip!

3. Back in the classroom, have students share notes about the responses they receive and discuss.

4. What can we do, as citizens and consumers, to help protect the quality of water resources in the Watershed?

NRS 361 Rain Garden Lab Exercise

**Purpose:** To gain insight and experience with the design and layout of rain garden to intercept and infiltrate roof runoff.
A rain garden is essentially a depression – resembling a very, very shallow pond -- that is dug out and amended with permeable materials to enhance infiltration. It is usually planted with vegetation.



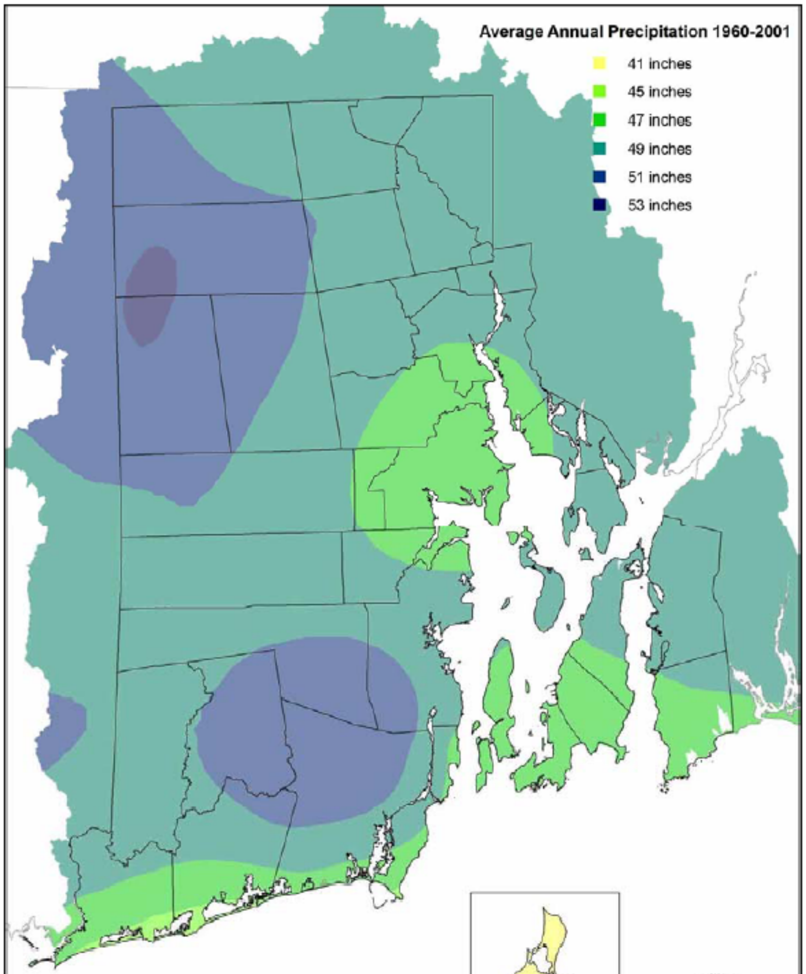

**How Rain Gardens Work:**
A variety of factors contribute to a rain garden's ability to treat and infiltrate runoff:

- Absorption to soil particles
  - *Removes dissolved metals and soluble phosphorus*
- Plant uptake
  - *Removes small amounts of nutrients*
- Microbial processes
  - *Removes organics and pathogens*
- Exposure to sunlight and dryness
  - *Removes pathogens*
- Sedimentation and filtration
  - *Removes total suspended solids, floating debris, trash, soil-bound phosphorus, some soil-bound pathogens*
- Infiltration of runoff
  - *Provides flood control, groundwater recharge, and nutrient removal*

**How much water does a typical rain garden treat in a year?**

90% of all storm events produce less than 1 inch of rain. Therefore, the key to reducing pollutant loads is to treat the runoff associated with the first 1 inch of rain (Clayton & Schueler, 1996). Rhode Island has approximately 51" of rain per year

**Figure H-8 Average Annual Precipitation Values for Rhode Island**




**Source:** RI DEM. 2010. Rhode Island Stormwater Design and Installation Standards Manual. Final Draft,

- The rain garden will treat and recharge:

  0.9 x 51" = 46"/year = 3.8 ft/year
- A typical rain garden receives runoff from 1,000 $ft^2$, so the total volume treated and recharged by the rain garden is:

  1,000 sq. ft. x 3.8 ft/year = 3,800 $ft^3$/year = 28,400 gallons/year

Build 36 rain gardens and we have treated and recharged over 1 million gallons of water per year! **Mass Balance Comment:** To make an impact within small watersheds, we need to make rain gardens a routine aspect of construction – we would need about 9,000 rain gardens (treating 200 acres of impervious cover) to generate a steady, year-round baseflow of 1 cfs in a stream.

**Installing a Rain Garden:**

***Basic Backyard Rain Garden Tips:***

- The rain garden should be at least 10 feet from the house so infiltrating water doesn't seep into the foundation.
- Do not place the rain garden within 15 feet of an onsite wastewater treatment system.
- Do not put rain garden in places where the water already ponds (high water tables).
- **Determine existing utility lines – call before you dig!**

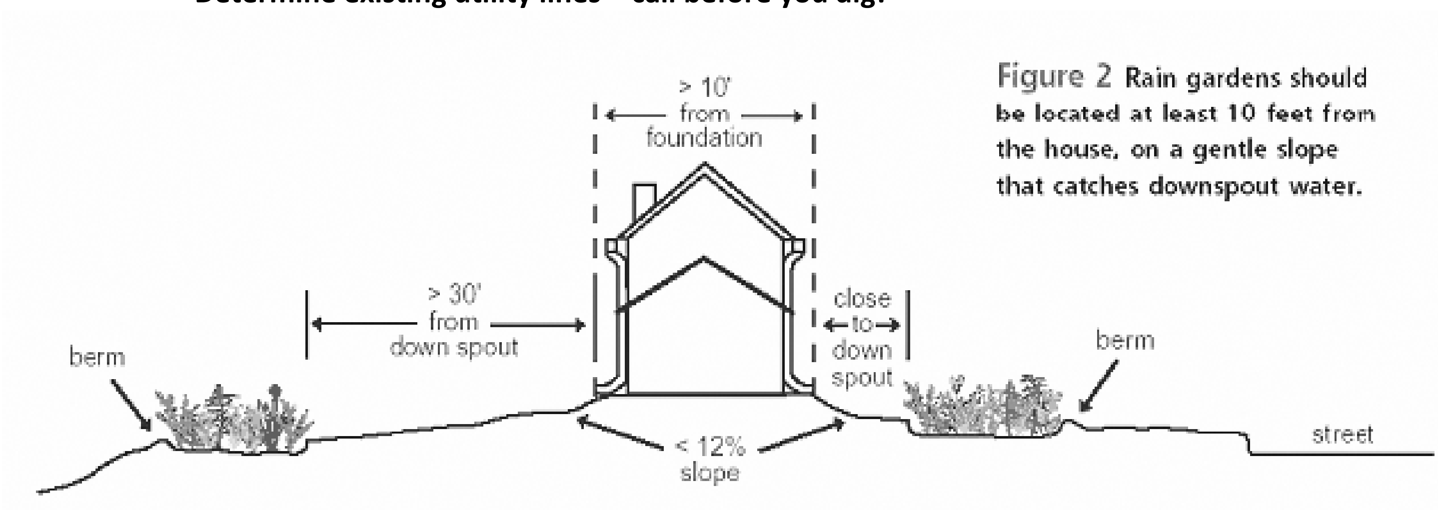



Figure 2 Rain gardens should be located at least 10 feet from the house, on a gentle slope that catches downspout water.

***Standards from RI DEM. 2010. Rhode Island Stormwater Design and Installation Standards Manual. Final Draft, August 2010***

- *Under the RI Storm Water Design and Installation Standards rain gardens and bioretention areas are considered FILTERING systems.*
- *Rain gardens are small bioretention areas used in residential landscapes or light commercial and public properties. Bioretention areas are typically used on commercial or institutional sites and are often larger and have an engineered design.*
- *Rain gardens and bioretention areas that are unlined and designed to infiltrate the volume treated must also meet standards for INFILTRATION systems.*

**Table 5-2 Minimum Horizontal Setbacks from Infiltration Facilities**

| | From small-scale facilities serving single residential properties (ft) | From all other infiltration facilities (ft) |
|---|---|---|
| Public Drinking Water Supply Well – Drilled (rock), Driven, or Dug | 200 | 200 |
| Public Drinking Water Supply Well – Gravel Packed, Gravel Developed | 400 | 400 |
| Private Drinking Water Wells | 25 | 100 |
| Surface Water Drinking Water Supply Impoundment* with Supply Intake | 100 | 200 |
| Tributaries that Discharge to the Surface Drinking Water Supply Impoundment* | 50 | 100 |
| Coastal Features | 50 | 50 |
| All Other Surface Waters | 50 | 50 |
| Up-gradient from Natural slopes > %15 | 25 | 50 |
| Down-gradient from Building Structures | 10 | 25 |
| Up-gradient from Building Structures | 10 | 50 |
| Onsite Wastewater Treatment Systems (OWTS) | 15 | 25 |

***Standards for Rain Gardens designed to infiltrate***

- *Separation from seasonal high groundwater table and bedrock of at least 2 Feet for residential uses, and 3 feet for other uses.*
- *Minimum soil infiltration rate of 0.5 inches per hour*
- *Maximum dewatering time 48 hours.*
- *Natural slope less than 15%*
- *Cannot accept runoff from Land Use with Higher Pollution Potential (LUHPPL) – area where the land use has the potential to generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater.*

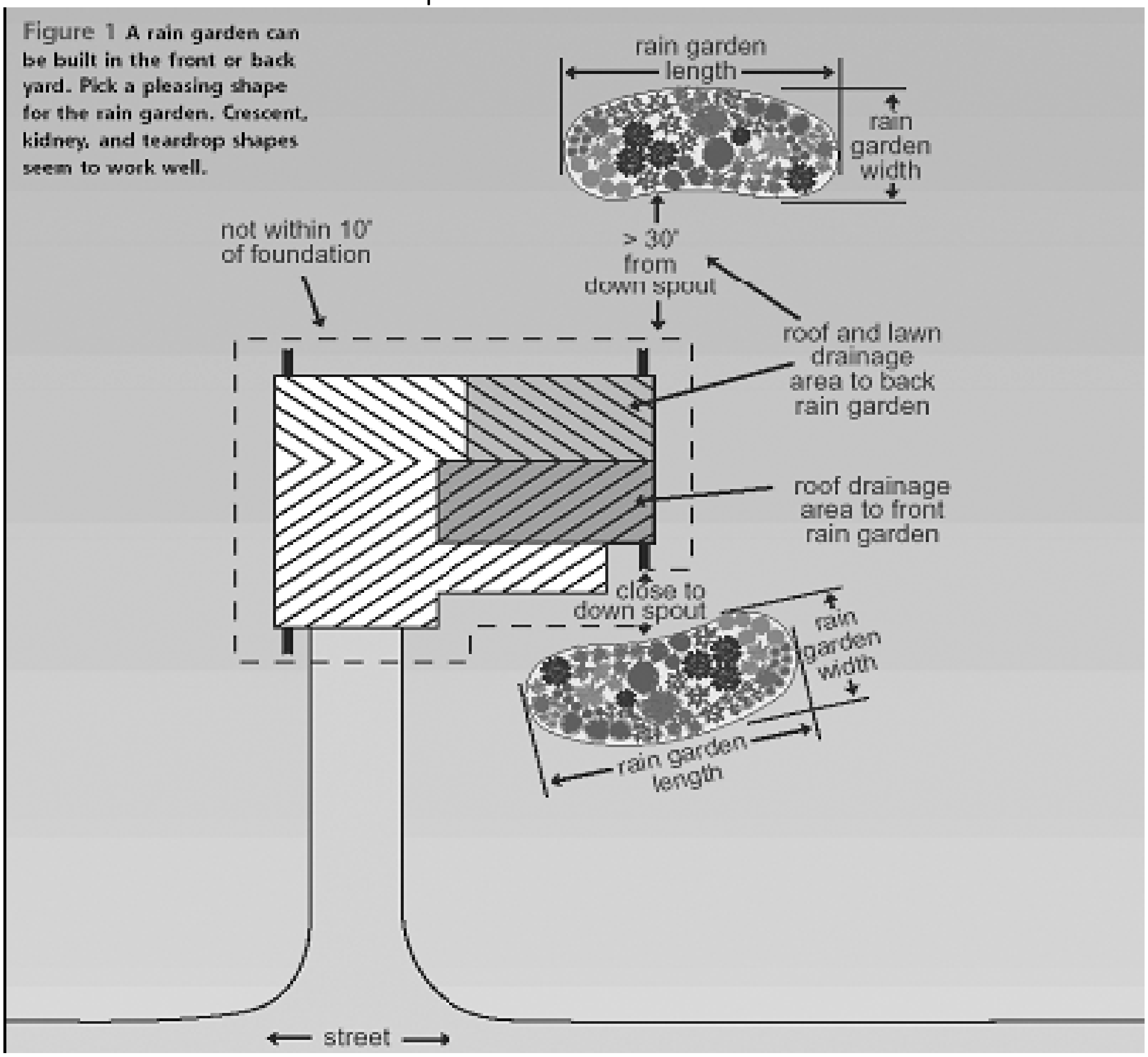
***What if the soil is shallow or there is a high water table?*** *Where the depth to seasonal high water table or bedrock is less than 2 feet, the rain garden may be designed to filter runoff and include an underdrain to direct treated runoff to vegetated areas or to a drainage system. ALSO: Rain gardens installed in potentially contaminated areas, such as former industrial sites or "brownfields" require an impermeable liner with underdrain.*

Source: Schueler File Photo

## ***Design Considerations***

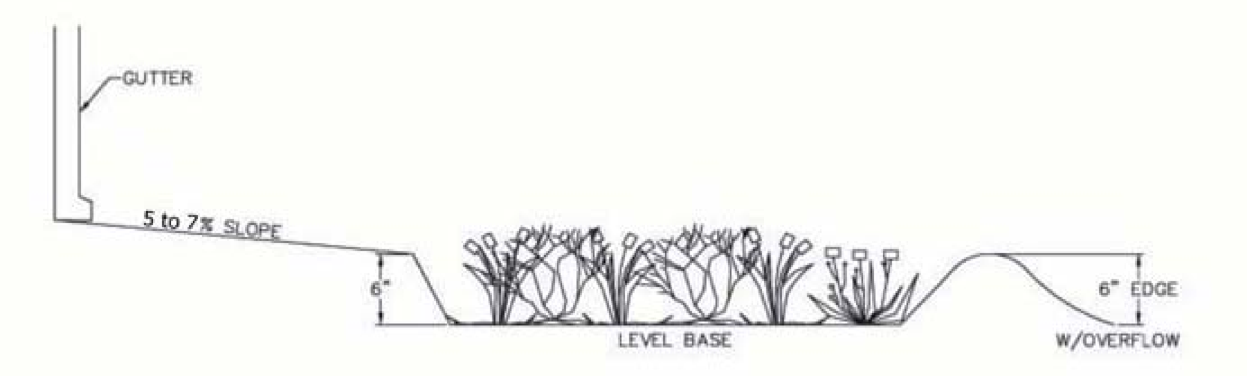
### *I. Contributing Area:*

- Determine the impervious area that will be draining to your rain garden.
- If you have multiple downspouts from a roof top, estimate the percent of the roof that feeds to that downspout.

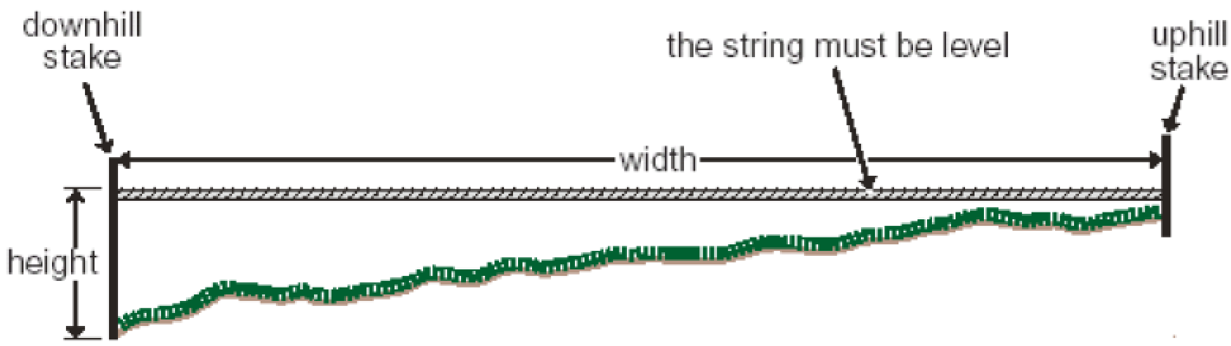



### *II. Slope Determines Rain Garden Depth:*

The depth is how deep a basin you need to dig to make the base of your rain garden level. A typical rain garden is between four and eight inches deep. A rain garden more than eight inches deep might pond water too long. A rain garden much less than four inches deep will need an excessive amount of surface area to provide enough water storage to infiltrate the larger storms.




The slope of the lawn determines depth of rain garden.




***III. Determining the Size of the Treatment Area – Know the Soil Characteristics***

Soil texture will determine the infiltration rate of your garden. Different techniques can be used to determine soil type and how that impacts your rain garden design. Dig and hole and examine::

- Texture of surface soils (sandy, loamy or clay)
- Depth to any restrictive layer (dig a 2 ft hole and note if you hit a dense layer)
- Depth to seasonal high water table (look for redoximorphic features)

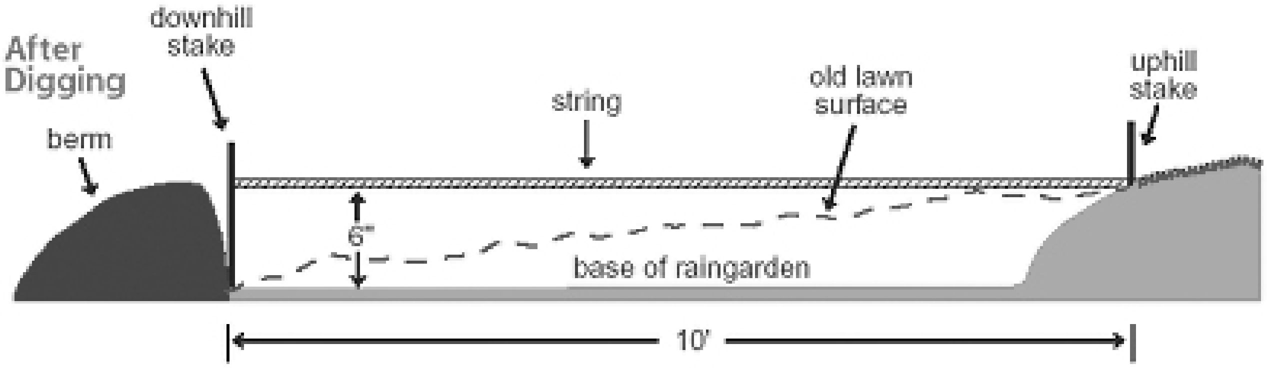
How Do Difficult Soils Impact Rain Garden Construction and Design?

- If in doubt about the soil infiltration capacity, consider amending the soil with sand or compost ***If you find a restrictive layer or evidence of high water tables, make the raingarden bigger by 30-40%.***

***IV. Handling Large Storm Events – Designing for Overflow:***

The rain garden is designed for small storms. A berm is constructed at the lower edge of the slope to contain the runoff. Consider what will happen to any rain garden runoff during *very large* storms. When there is a great deal of rain, the rain garden will fill and eventually overflow.

In order to minimize the impact that this overflow will have direct it toward grassy areas, wooded areas or existing storm drains.




Sources:

Rain Garden Site Selection and Installation, Gregory Rusciano, Program Associate, Amy Boyajian, Program Associate, Rutgers Cooperative Extension Water Resources Program

*NPSNJ Rain Garden Manual*, The Native Plant Society of New Jersey. Office of Continuing Professional Education, Cook College 102 Ryders Lane New Brunswick, NJ 08901-8519, **www.npsnj.org**

*Rhode Island Stormwater Design and Installation Standards Manual.* Final Draft, August 2010, RI DEM. 2010**.**

**Designing a Rain Garden – Lab Exercise.**

**We will design a rain garden to handle the runoff from a portion of the roof where we have NRS 361 (The RDVL building):**

In selecting a possible site for a rain garden we need to examine the potential sites around the building and determine if any concentrated flows from other sources are likely to flow towards the possible rain garden locations. If necessary, either intercept and treat those waters or route them away from your rain garden.

Materials:

- Level, String, 2 wooden stakes, measuring tape

Drainage Area:

- Walk around the building and estimate what percent of the roof feeds to that downspout.
- Find the building's footprint, the area of the first floor.
- **Multiply the roof area by the percent of the roof that feeds to the rain garden downspout to obtain the drainage area**.

| Percentage of Roof feeding to downspout | Area of Roof | Contributing Area |
|---|---|---|
| | | |

Rain Garden Depth:

- Find the slope of the ground
  - Pound one stake in the ground at the uphill end of your rain garden site and pound another stake in the ground at the downhill end. The stakes should be about 15 feet apart.
  - Tie a string to the bottom of the uphill stake and run the string to the downhill stake. Use a string level or the carpenter's level, make the string level and tie to downhill stake.
  -

| Width between stakes | Height of string on downhill stake | Slope of lawn |
|---|---|---|
| | | |

  - **Use slope to determine rain garden depth.**
    - Slope less than 4% should have 3 to 5-in. deep rain garden.
    - Slope between 5 and 7% should have a 6 to 7 in. deep rain garden.
    - Slope is between 8 and 12% should have an 8 in. deep rain garden.
    - If the slope is more than 12%, find another site.

Soil Type:

- The rate of infiltration will depend on the type of soils existing on the site. **The size of the rain garden will depend on the type of soils** since faster draining soils will not need to hold as much water as slower draining soils.
- Use the following sizing factors depending on your soil type and depth of the rain garden.

| Type of Soil | Depth: 3- 5 inches | Depth: 6 -7 inches | Depth: 8 inches. |
|---|---|---|---|
| Sandy | 0.19 | 0.15 | 0.08 |
| Silty | 0.34 | 0.25 | 0.16 |
| Clayey | 0.43 | 0.32 | 0.20 |

Rain Garden Surface Area:

- The surface area of your Rain Garden will depend on the depth, type of soils, and drainage area (see table above)
- Multiply the size factor by the drainage area. This number is the recommended rain garden surface area.

  Drainage Area x soil sizing factor = garden surface area ___________________

Overflow

- Our rain garden can hold a volume of ____________. Knowing the area of the roof that drains to our rain garden, how many inches of rain can fall before our rain garden overflows.

Site the Rain Garden:

- Determine the rain garden dimensions. The rain garden should be about twice as long (perpendicular to the slope) as it is wide.
- The rain garden must be at least 10 feet from building foundation (if there is a basement, garden should be at least 30 ft).
- Locate and size the rain garden on the site – keeping overflow in mind.

Example Calculations:

**Required Site Data are highlighted in bold**

- **Building dimensions (this yields the building area in $ft^2$)**
- **Proportion of the building contributing water to the downspout that will feed the gardent**
- **Slope of the site where the rain garden is to be constructed**
- **Soil type – this yields a coefficient to size the rain garden based on the slope and contributing area.**

- Roof **Contributing Area** = **(proportion of building area feeding to downspout) X (Building area**)

  (**0.25**) x (**104ft x 64ft**) = **1,664 $ft^2$**
- Depth – depends on slope

  **Slope** = (Height of string on bottom stake)/ (width of stakes)

  = (0.5 ft/120ft) = **5% slope** → 6 inch deep rain garden
- **Soil Type**

  **Sandy Soil** → Multiply drainage area by factor of 0.15

- Surface Area of Raingarden

  (**Contributing Area**) x (soil factor)

  1,664 $ft^2$ x 0.15 = 250 $ft^2$

  Sizing ≈ 22 ft x 11 ft

- Overflow

  Storage Volume in Rain Garden = (surface area) x (depth)

  = 250 $ft^2$ x 0.5 ft = 125 $ft^3$

  Inches of rain falling on roof to generate 125 $ft^3$ = (Storage Vol)/ (drainage area)

  = 0.075 ft = 0.9 inches

Example of hydrology course assignment:

**Lab Summary: LID and Rain Gardens**
**Use the following questions to frame your typed summary**
**(Approximately 2 pages)**

1. Design and site a rain garden that handles runoff from the entire RDVL roof.
    a. Explain the factors that determine surface area, depth, storage volume, and rainfall amounts handled.
    b. Show your calculations
    c. Describe exactly how you would site and locate the rain garden(s) around the building (be sure to consider how you would handle overflow from a large storm event).
2. How might this design be different if your site had a high water table, a shallow depth to bedrock, or was located on a brownfield?
3. Describe the CBLS stormwater system: its purpose, drainage sources, functionality, and ability to deal with large storm events. Specify the function of at least 3 components.
4. How do you think small backyard rain gardens compare to the highly engineered systems like CBLS in terms of function, versatility, and effectiveness.

Grading: (out of 25)

√+ (25pts): Questions answered fully and correctly, incorporated information from readings and handouts, well organized.
√ (21 pts): Questions answered correctly; well-organized
√- (17 points): Incomplete, inaccurate and/or poorly organized.

# The Clean Water Act at Thirty

1972 **30** 2002

## Time to Keep the Promise

***The Clean Water Act is commonly viewed as one of the most successful environmental laws in America.*** In many ways, the Act truly did turn the tide on water pollution. Measures of our progress since 1972 include:

- 30 years ago, only 30 to 40 percent of the nation's rivers, lakes and coastal waters were estimated to be safe for fishing and swimming. Today, approximately 60 percent of our assessed waters are safe for these uses.[1]
- In 1968, sewage treatment plants served only 140.1 million people, or 69 percent of the population. In 1996, the number of people served increased to 189.7 million Americans, or 72 percent of the population.[2]
- In 1972, the country lost an estimated 450,000 acres of wetlands each year. Today, losses are estimated at about one fourth that rate.[3]

## The Reality: Progress, But Not Success

Despite some important successes, there is still a long way to go in order to achieve the Act's goals. Unfortunately, opposition from corporate special interests and foot-dragging by state and federal government has slowed progress. These forces have chipped away at fundamental public health and aquatic life protections. *What is the state of our rivers, lakes, and coastal waters today?*

- **Approximately 40 percent of our rivers, lakes, and coastal waters do not meet basic safety standards.** States report they only monitor 23 percent of our nation's rivers. Of those, 45 percent of the river miles are threatened or impaired. Similarly, states monitor only 42 percent of lakes and report 54 percent are threatened or impaired. Only 32 percent of the nation's estuaries are monitored and 53 percent are threatened or impaired.[4]
- **Polluters routinely break the law.** A recent report found that over 26 percent of major sewage treatment and industrial plants were violating the law during the 15-month study period.[5] Other studies show that water polluters are too rarely fined for their violations.[6] When polluters are fined, penalties are often too low to discourage future pollution.[7]
- **Too many of our beaches are unsafe for swimming due to pollution.** In 2000, there were at least 11,270 days of beach closings and advisories, as well as 48 extended closings and advisories and 50 permanent closings. 85 percent of these were due to bacteria levels that exceeded health standards for swimming. The largest known source of beach bacteria problems is polluted stormwater.[8]
- **Wetlands continue to be lost at an alarming rate.** Since the 1800s, the conterminous United States has lost just over half of its wetlands. Ten states have lost 70 percent or more of their wetland acreage and 22 states have lost more than 50 percent. Only three states — Alaska, New Hampshire, and Hawaii — have lost less than 20 percent of their wetlands.[9]
- **Polluted fish endanger our health and our children's futures.** In 2000, 100 percent of the Great Lakes, 71 percent of coastal waters in the lower 48 states, 23 percent of our lakes, and 9.3 percent of our river miles were subject to public

health advisories. Advisories warn members of the public to limit their consumption of fish due to high concentrations of dangerous chemicals such as mercury or PCBs.[10]

- **Toxics continue to be dumped into our rivers, lakes and coastal waters.** In fact, large industrial facilities and sewage treatment plants dumped almost 260 million pounds of toxic chemicals into our waterways in 1999.[11]

- **Federal and state governments are dragging their feet on cleaning up the most polluted waterways.** Over 20,000 segments of rivers, lakes, and estuaries are in need of cleanup plans to make them safe for people and aquatic life.[12] Cleanup plans are decades overdue.

## The Need: Everybody Deserves Clean Water

America needs clean water for drinking water, support of fish and wildlife, recreation, a diet of safe fish and shellfish, and more. Clean water is such a fundamental need that the economic benefits can be hard to quantify. Just a sampling of the quantifiable benefits we reap from clean water include:

Americans make a total of 910 million recreational trips to the coasts each year, spending about $44 billion.[13]

Recreational anglers spent $38 billion in 1996 pursuing their love of sportfishing.[15]

In California alone the seafood industry generates more than $800 million in sales annually.[14]

Many businesses need clean water. For example, the soft drink industry uses over 12 billion gallons of water to produce over $58 billion worth of products annually.[16]

## The Vision: The Goals Of The Clean Water Act

The Clean Water Act's overall objective is clear and complete: To protect and restore the physical, chemical, and biological integrity of the nation's waters. The Act aims to turn that objective into reality by setting the following goals:

1. Eliminating the discharge of toxics in amounts that harm people or wildlife.

2. Ensuring that all our rivers, lakes and coastal waters are safe for people to swim and fish in and for fish, shellfish and wildlife to live in.

3. Stopping the discharge of pollutants into waters of the United States.

# The Way: The Clean Water Act Can Protect Our Waters

## Implement existing laws

If federal, state, and local governments simply implement and enforce the Clean Water Act, our nation can achieve the Act's goals and objectives. Specifically, EPA, the states, and other responsible agencies need to:

- Stop illegal polluters and deny them profits from their wrongdoing.
- Move forward quickly with cleanup plans for our 20,000 most polluted rivers, lakes and coastal waters.
- Protect and restore our wetlands so that they can filter out harmful pollution before it reaches our waters, save communities from floods, and sustain fish and wildlife.
- Require factory farms to stop contaminating our rivers, lakes, and coastal waters with animal manure and urine.
- Update technology standards to ensure the most modern pollution controls are in place at industrial and sewage plants.
- Prevent additional pollution from degrading our high-quality rivers, lakes, and coastal waters.

## Tackle old problems with new solutions

Some problems will require new solutions. These include:

- Establishing an enforceable national system to prevent contaminated runoff from polluting our rivers, lakes, and coastal waters — this system must stop "dead zones" from forming in our coastal waters as a result of pollution.
- Notifying the public when waters, beaches, or fish contain dangerous levels of contamination. In addition, governments should give the public Internet access to real-time information on specific pollution risks and sources.
- Cleaning up toxic sediments at the bottom of our rivers, lakes, and harbors and protecting sediments from future contamination.
- Reforming the pollution control system so that permits are issued on time and with enforceable, increasingly protective pollution control requirements.
- Dramatically increasing support for drinking water and sewage treatment infrastructure needs through increased federal funding, partnerships between federal, state and local governments, and requirements that polluters pay the costs of cleanup.
- Providing governmental incentives for water conservation and reuse, harvesting stormwater as a resource, and use of green infrastructure to absorb and treat water naturally.

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### Conquer the challenges

Several of the most important steps Congress and the Bush administration should take this anniversary year to protect our rivers, lakes, and coastal waters are listed below. Actions on these items will be key markers of Congress and the administration's commitment to clean water.

- Congress should pass enforcement legislation that ensures polluters are held accountable for violating the law.
- Congress should amend the Clean Water Act to reaffirm that the law is meant to protect all waters, including isolated waters.
- The Bush administration should implement, not weaken, the Clean Water Act's Total Maximum Daily Load program – the watershed cleanup program for the most polluted rivers, lakes, and coastal waters.
- Congress and the administration should support legislation to close the so-called "Tulloch" loophole which developers have exploited to destroy wetlands and degrade streams without permits or controls.
- The Bush administration should act to reform the Corps of Engineers' regulatory program to ensure greater protection for our nation's wetlands, lakes, rivers and streams.
- The Bush administration should stop the discharge of raw sewage into our streets, neighborhoods, and playgrounds by releasing strong Sanitary Sewer Overflow rules.
- Congress should address coastal polluted runoff by reauthorizing the Coastal Zone Management Act with targeted funding for the Coastal Nonpoint Pollution Control Program.
- Congress and the Bush administration should fully fund Clean Water Act programs such as the Beaches Environmental Assessment and Coastal Health Act of 2000 (BEACH ACT), infrastructure rehabilitation, watershed cleanups, enforcement, the National Estuary Program, and other clean water needs.
- The Bush administration should follow through with the cleanup of contaminated sediments in waters such as the Hudson and Fox Rivers.

## The Future: Keeping The Promise Of Clean Water

If the public and our elected officials unite to implement and enforce the Clean Water Act, our nation can achieve the Act's goals and objectives. The year of the Clean Water Act's 30th anniversary gives us the chance to make the Act's promise of safe and clean water for everyone reality.

It is time to keep the promise.

10 U.S. EPA, Office of Water. "National Listing of Fish and Wildlife Advisories Fact Sheets." April 2001.

11 U.S. EPA. 1999 Toxics Release Inventory Executive Summary. "Public Data Release." April 2001.

12 U.S. EPA. 1998 Section 303(d) List Fact Sheet. "National Picture of Impaired Waters Highlights of the 1998 303(d) Lists." http://www.epa.gov/owow/tmdl/states/national.html

13 U.S. EPA. "Liquid Assets 2000: America's Water Resources at a Turning Point." May, 2000.

14 U.S. EPA. "Liquid Assets 2000: America's Water Resources at a Turning Point." May, 2000.

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16 U.S. EPA. "Liquid Assets 2000: America's Water Resources at a Turning Point." May, 2000.

# Clean Water for Anglers and Kids

Bobby Schroader, a steelworker in Indiana, fishes to relax. He loves the Great Lakes — fishing and reading the history of the Great Lakes and their role in the development of the United States are two of his favorite hobbies.

However, even though Bobby lives within 15 miles of Lake Michigan he travels to other states to fish. He feels he cannot eat or feed the Great Lakes' fish to his family because of mercury and PCBs in the fishes' flesh.

"I like to eat what I catch without having to fear any long-term effects of my meals to my health or my granddaughter's. I like to share my catch of fish with my friends but don't want to poison them," says Bobby. "I just hope that I am not fooling myself thinking another state is taking better care of their water than we do here at home."

"I must check the newspaper or the local news before I can take my granddaughter to enjoy the beaches of Lake Michigan. I want to take my granddaughter to the beach without worrying about her getting sick because of a day in the sun and water," Bobby worries. "It's a shame I am afraid of the lake not for its moods but for what we have done to change its chemical make-up."

# Clean Water for Public Health and for Businesses

Donna Frye understands the need for clean water from both a personal and a business perspective. Donna -— co-owner of Skip Frye Surfboards in San Diego — began to notice that many surfers, including her husband Skip, consistently displayed similar illness symptoms. Rashes, ear aches, stomach ailments, sinus infections and other problems were the norm. She discovered that many of San Diego's incredible surf spots received influxes of polluted runoff from numerous storm drains year-round, but especially during rain events. Bacteria and chemicals discharged into the ocean sickened Donna's husband, her surfing friends, and her customers.

PHOTO:DONNAFRYE

Donna launched a vocal campaign that resulted in the posting of warning signs at storm drain outfalls, statewide water quality monitoring, enforceable pollution prevention measures and storm drain diversion projects that connected some drains to sewage plants where the polluted water could be treated.

Today, Donna's crusade has carried her all the way to the San Diego City Council where she is a voice for clean water. Donna says, " We all have a right to clean water. But with that right, comes personal responsibility. Speaking out and taking an active role in the 'politics of pollution', is the surest way to achieve the basic 'fishable/swimmable' goals of the Clean Water Act."

# Clean Water for Farmers and Rural Communities

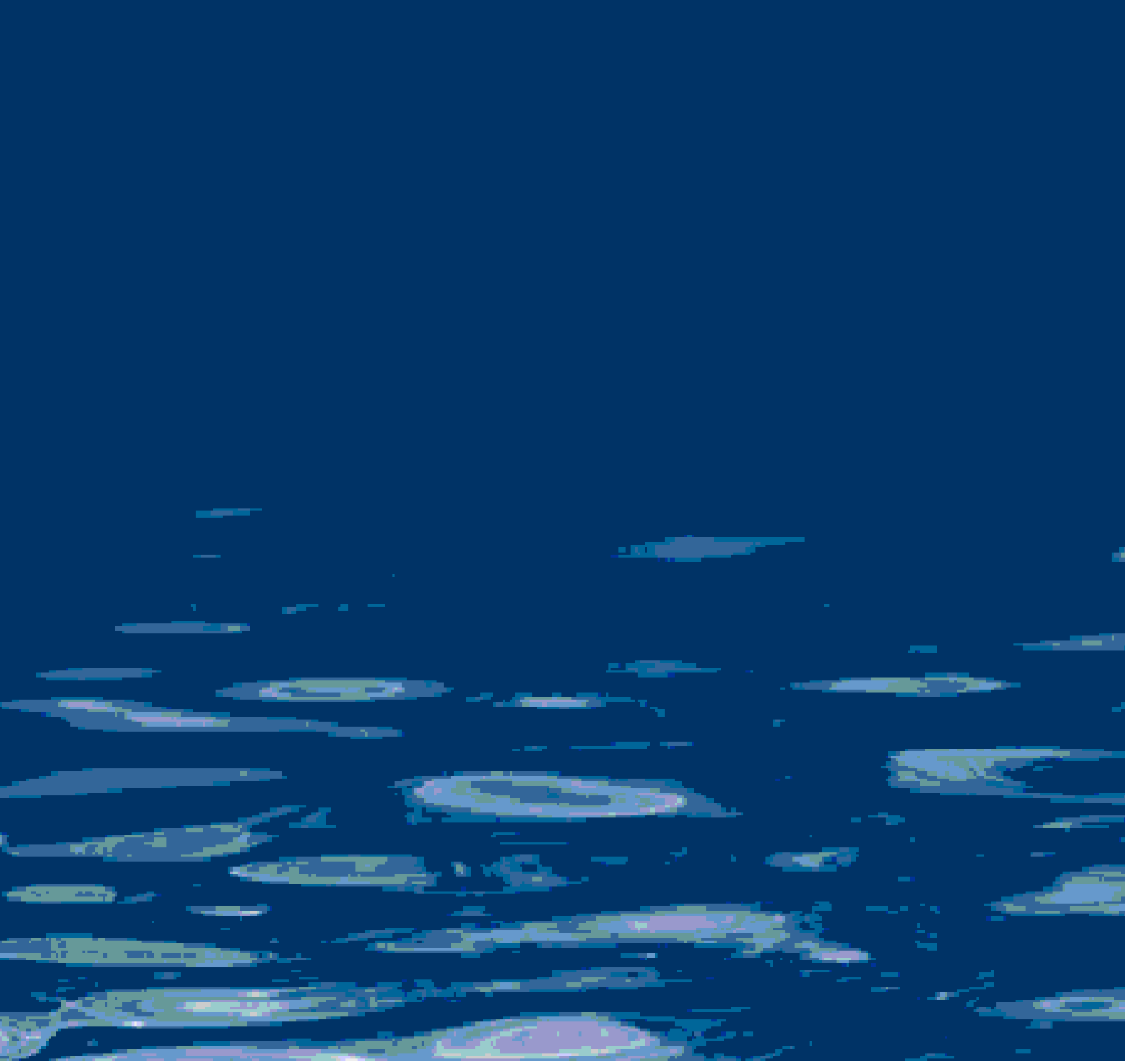
PHOTO:TERRY SPENCE

Terry Spence has lived and worked on his 400-acre farm in rural northern Missouri for fifty-two years. Before Terry purchased the homestead in 1967, his parents and family ran the farm. Today Terry and his wife Linda raise beef cattle.

Terry knows the importance of clean and safe water first-hand. Huge hog factories owned by Premium Standard Farms (PSF) are within two miles of his farm. The pollution created by the influx of hog factories in the 90's has devastated the lifestyle in rural communities. The hog factories spill manure into the creeks and pollute the air with toxic gases and odors. In 1999 alone, PSF factory farms in northern Missouri spilled over 224,000 gallons of manure and wastewater in at least 25 spills.

But Terry won't be displaced. Instead he has taken up the fight for clean water and a healthy rural landscape. "I won't move an inch, although it has been a strain on my family to stay here and fight this fight," he says. "This farm is a God-given place. It is our home and our lifestyle. I'll do whatever it takes to fight for it so I can pass it on to my children and my grandchildren. I do wake up a lot of days and wonder why I stay, but I know exactly why."

Terry believes that farming is a sacred trust; to take only what is needed from the land and to use good stewardship, leaving and providing opportunities for future generations. He also believes the earth was created so that everything on it could live in harmony. In contrast, Terry feels current trends in agriculture could end the harmony and balance of nature.



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