

# Water Quality Principles for the Red Cedar River Watershed

## Phosphorus Basics

- Runoff pollution --aka nonpoint source pollution-- is the biggest source of water pollution.
- Compared to point sources, runoff pollution is *much* harder to measure and manage.
- Water pollution comes from the land, specifically from human activities.
- The human managed landscape is exceptionally rich in phosphorus.
- Lakes, rivers and streams are naturally very low in phosphorus.
- A little extra phosphorus stimulates a lot of excess plant and algae growth.
- The vast majority of runoff --and therefore runoff pollution-- comes from a few major rain and snowmelts each year --typically less than six "runoff events" annually.
- Heavy rains & snowmelts = water pollution --*For proof go outside during a heavy rain!*

## Infiltration is the Key

- The opposite of runoff is infiltration. More infiltration = less runoff = less water pollution.
- Infiltration occurs when runoff is held or slowly flows across stable, permeable surfaces and the water can soak into the ground --*Slow it Down, Spread it Out, Soak it in!*
- If you can see soil erosion --e.g., small ephemeral gullies, soil deposition-- it is too much.
- When you see bare soil think soil erosion, think water pollution.
- Urban storm drains deliver all the runoff water from city streets and paved areas directly and untreated to the nearest river or lake. Pavement = 100% runoff = 0% treatment.
- When you see grass, leaves, soil, pet waste, etc. on pavement think water pollution.

## Fair Share: We're all in this together!

- We all live, work and play in a watershed.
- Runoff pollution comes from innumerable small sources.
- No single source contributes significantly to the problem.
- The sources of runoff pollution go unnoticed as they are widespread, familiar and common.
- Everyone should take responsibility for the water that runs off their property.
- Everyone can take action to reduce runoff pollution.

## The Long View

- A huge amount of phosphorus, and many other pollutants, are already in the sediment on lake bottoms, streambanks and streambeds --a "legacy" from decades of runoff pollution.
- Clean water will require significant, widespread, permanent changes in land management.
- Restoring the ecological health of the watershed will take a long time.  
*We can't solve problems by using the same kind of thinking we used when we created them. --A. Einstein*

## Disproportionality: Landscapes and land use practices vary greatly

- A minority of the watershed area produces a majority of the pollution.
- Cropland is the biggest source of runoff pollution in the watershed simply because it is a major land use and because it is intensively managed every year --tilled, manured, fertilized-- often when the risk of major runoff events is the greatest.
- A minority of farm fields contribute the majority of the runoff pollution from cropland depending on landscape features and how it is managed.
- Slope, slope length, soil type and proximity to lakes, rivers, streams and waterways are some of the main *landscape* determinants of runoff pollution risk from cropland.

## Individual Action

- Solving the runoff problem in the watershed will require the citizens in the watershed.
- Point source water pollution (e.g., industrial and municipal discharges) has been largely controlled by governmental regulation. Nonpoint source runoff pollution will largely be solved by citizen action.
- Crops grown, tillage, soil cover, soil test phosphorus levels and manure management are some of the major farm management determinants of runoff pollution from farm fields.
- To significantly reduce water pollution from farmland will require significantly less soil erosion than current standards --"Farming to T" is not a water quality standard.
- Topsoil, manure, fertilizer, pesticides and water are valuable resources --we should strive to keep every productive drop on the land where it belongs.
- In urban areas we need to keep grass, leaves, pet waste, fertilizer, soil (including construction site erosion), oil, trash -- and everything else -- off pavement, and direct runoff to, and create areas where, runoff water can soak into the ground.
- Our lakeshores, river and stream corridors should be stable (not eroding), and naturally vegetated to filter runoff, improve water quality, and provide quality wildlife habitat.

## Solutions Exist!

There are many farmers, homeowners, municipalities and other groups and individuals who are using technologies, practices and systems that significantly and profitably reduce runoff pollution. Let's learn from each other! Many solutions to water pollution are simple, like keeping grass and leaves off of streets!

## Farm and Country Solutions!

- ✓ no-till,
- ✓ cover crops,
- ✓ contour farming,
- ✓ grassed waterways,
- ✓ conservation tillage,
- ✓ manure management,
- ✓ streambank/lake shore buffers,
- ✓ nutrient management *planning*,
- ✓ grassed-based livestock systems,
- ✓ barnyard/farmstead runoff controls ... and many, many more.

## Urban and Suburban Solutions!

- ✓ rain gardens,
- ✓ street sweeping,
- ✓ porous pavement,
- ✓ mulching lawn mowers,
- ✓ composting grass and leaves,
- ✓ roof runoff detention ponds/swales,
- ✓ pavement runoff detention ponds/swales,
- ✓ plan for less paved area (i.e., unused parking lots),
- ✓ construction site erosion control ... and many, many more.

## Awareness -- Education -- Commitment -- Involvement -- Action!

You --and your friends and neighbors and colleagues and fellow citizens-- can make a difference!

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