

STORMWATER RUNOFF

ENVIRONMENTAL HEALTH ISSUE PROFILE

Community Action for a Renewed Environment (CARE)
Environmental Sustainability for the Salina Community

Issue: Stormwater runoff impact on the Smoky Hill River in Salina, Kansas

Background:

Rain and melting snow constitute “stormwater.” As stormwater flows across asphalt roads and parking lots, agricultural croplands and livestock pastures and feedlots, dog parks, golf courses, and residential lawns, it can be contaminated by a variety of pollutants. These are non-point sources (NPSs) of pollution because they don’t come from a specific pipe or easily identifiable source. Non-point source pollutants may be soil and silt from land erosion, trash and leaves or grass clippings, pesticides and fertilizers, oils from leaking motors, improperly constructed or maintained septic systems, or spills of fuels and chemicals.

The runoff, with its contaminants, goes to streams and rivers without being treated, contaminating rivers, lakes, or reservoirs that are public drinking water supplies and recreational areas for many Kansas citizens. Additionally, these contaminants also impact local ecosystems, resulting in detrimental impacts to wildlife and fisheries dependent upon that water supply. In some instances, these bodies of water become so polluted that it is not safe for human contact or cannot be used for drinking water.

Stormwater also picks up contaminants such as chlorides, fluoride, selenium, calcium, and magnesium from the limestone and other subsurfaces in contact with the stormwater runoff.

Standards:

The Clean Water Act requires the state to assign designated uses to its surface waters and adopt criteria designed to protect those uses. The Act further requires that degradation of those waters be allowed to occur only under very limited circumstances. With oversight by EPA, states have the authority to designate uses of their surface waters, establish protective water quality criteria for each water body, and adopt an anti-degradation policy to protect existing levels of water quality.

The standards are for uses of aquatic life, water supply, and recreation connected with fishing, boating, and wading. The standards were assigned in accordance with the Clean Water Act and are considered attainable, except possibly chloride and sulfate due to natural conditions. The standards include limits on pollutants such as bacteria, suspended sediment, many chemicals, and physical conditions (temperature, turbidity, pH).

Definitions:

TMDL	Total Maximum Daily Load
BMP	Best Management Practice
NPDES	National Pollutant Discharge Elimination System
WRAPS	Watershed Restoration And Protection Strategy
EPA	United States Environmental Protection Agency
KDHE	Kansas Department of Health and Environment
NPS	Non-Point Source
USDA	United States Department of Agriculture
NRCS	USDA Natural Resources Conservation Service
BAC	Basin Advisory Committee
NRDC	Natural Resources Defense Council (a non-governmental organization)
CAFO	Confined Animal Feeding Operation

Community-specific indicators:

What does the data say?

Current data on the quality of the old river channel was not found. Rather than a natural flow, it receives only urban stormwater runoff, so contaminants may “build up” in the river bed if the storm event isn’t great enough to establish flowing water to carry it downstream. According to EPA, urban stormwater runoff can be expected to contain such pollutants as lawn fertilizer and pesticides, bacteria and nutrients from pet droppings, petroleum products, detergent and other household chemicals, construction site soil, and decaying leaves and lawn clippings. It appears that trash, the most visible pollutant, may be perceived as the main problem; however, further studies may reveal other pollutants.

KDHE is the lead agency in Kansas to evaluate, report, and plan improvement measures for surface water quality. It is responsible for managing NPDES permits—permits which allow an industry or city wastewater treatment plants to discharge its treated water to a local stream or river (these are known as “point sources” because they come from a pipe or easily identifiable place). KDHE also sets TMDLs, for all the surface waters in the state, in the framework provided by the Clean Water Act, to try to achieve the standards established for specified uses such as swimming, aquatic life, public drinking supply, and agriculture. KDHE works with a team of entities in order to address water issues. In 2005, widespread non-compliance with surface water quality criteria was reported. NPS pollution in stormwater runoff is thought to be the major factor affecting surface water quality, whether urban or rural. Recreation, aquatic life, and water supply uses continue to be impaired in the Smoky Hill-Salina River basin and specifically in the Salina area. KDHE reports show fecal coliform bacteria levels in the Smoky Hill River sometimes breach the standard. High bacteria levels may be associated with low flows and high sediment levels, and agricultural practices along with stormwater runoff during seasonal rains contribute to high bacteria. Other significant pollutants include suspended sediment, nitrate and phosphorus, sulfate and chloride, and low-dissolved oxygen.

Who is affected?

Children of all ages, attracted to the river for recreation and nature study, may be made ill by contact with bacteria. The cutoff channel is perceived as trashy and lifeless. Environmental conditions such as low-dissolved oxygen or high sediment will not support a healthy aquatic ecosystem; bacteria and other contamination discourage recreation on or near the river. The city obtains a significant amount of its drinking water from the river. The more pollution, the more expensive treatment can be. The dissolved minerals, or excessive “hardness,” also cause plumbing problems.

What are the environmental conditions?

The Smoky Hill River flows generally from the southwest, through the east side of the city of Salina. The river has an alluvial aquifer roughly 10-30 feet below the city. Such a shallow aquifer can be assumed to be part of a system connected to surface water and vice versa. The primary land use in the watershed is agriculture. Saline County has a population of roughly 50,000, most of who live in Salina. The old river channel, also known as the original or cutoff channel, resulted from cutting off a meander of the river in about 1960 as a measure to reduce flooding in the city. The old channel winds approximately seven miles through town, including Oakdale Park, site of the immensely popular annual Smoky Hill River Festival, during which the gates are opened and the river flows. Approximately one fifth of Salina’s stormwater drains to the old channel via storm drains. The remaining main channel also borders residential and recreational areas along the east side of Salina before flowing on to the northeast.

Urban and agricultural development dominates the landscape in and around Salina. Construction of housing and other buildings often involves removal of the “groundcovers” of grass, shrubs, and trees that hold the soil in place. Construction land disturbances, some types of cropland practices, and collapsing stream banks result in large losses of soil that fill lakes and reservoirs, decreasing their

storage capacity. In addition, many chemical pollutants, such as herbicides and fertilizers, “stick” to soil particles contributing to even greater levels of pollutants in the water and lake sediments.

What are the contributing factors and behaviors of the community?

Engineering flood control practices include the cutoff channel in Salina and levee system protecting the city. Man-made factors, such as roofs and paving, contribute to pollution and high runoff volume. Farming and urban development has resulted in a reduction of filtering recharge areas such as wetlands and riparian areas that can help stabilize stream banks.

Natural factors include geology of the watershed, which affects the water chemistry. Clay soil becomes suspended sediment when washed into surface water. Seasonal rains and long dry periods in the Central Plains climate contribute to fluctuating surface water flows.

Community behaviors that may contribute to surface water pollution in the old channel include construction site runoff; excessive lawn chemicals on residential lawns and recreational areas; pet droppings; lawn irrigation and car washing; excessive water usage; litter; poorly maintained, leaking vehicles; and hosing down business and residential parking areas and sidewalks.

Near-community behaviors that may contribute to pollution in the main channel include failure to use agricultural BMPs such as protecting riparian and wetland areas, and grass buffers and cultivation practices to hold soil. Farming can be seen to occur to the edge of stream banks and road ditches, and cattle winter in drainages. Sources of stormwater runoff pollution may be found in animal confinement, manure fertilizer, potentially discharging municipal and CAFO lagoons, and recreational facilities such as parks and golf courses. Antiquated and failed private septic systems, or public lagoons, may also discharge sewage that ends up in the river. It was in years past a practice to discard a variety of materials in drainages, and illegal dumping sometimes may still occur.

How does the community protect itself?

The community is partly protected by limited USDA NRCS cost-share programs designed to help promote soil conservation and prevent sewage and livestock waste discharges. Surface and groundwater is treated at the Salina municipal drinking water plant prior to distribution for household use. The population may avoid the river, both main and old channels, simply because of its unattractiveness or lack of recreational opportunity. The community could establish an urban stormwater awareness program to educate citizens about water quality and how to protect their local water sources.

Data sources:

KDHE: Kansas Water Quality Monitoring and Assessment Strategy: 2006-2010 (2005)

KDHE: 303(d) report to EPA (2008)

KDHE: WRAPS (2008)

EPA: www.EPA.gov/nps/ information about NPS pollution

EPA: Region 7 TMDL Review (2004)

NRDC: Stormwater Strategies

Smoky Hill-Saline BAC: Draft meeting notes (2009)

Additional data needed?

Additional data may be needed to better identify the risks and then determine possible ways to address them. For instance, what are bacteria levels or other pollutants at local access points? Is construction site runoff adequately managed? Would it be feasible to maintain a minimum flow adequate to support aquatic life in the old channel?