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My Voice: Compacted soils can lead to urban flooding

Mary Ellen Connelly • September 19, 2010

When asked what literally makes Sioux Falls beautiful, most people agree that overarching tree canopies and diverse, attractive shrubs and flowers are primary reasons. It is obvious people are passionate about their carbon-dioxide absorbing plants. Thank you, citizens of Sioux Falls.

This beauty is grounded in nature's mega and green infrastructure: our region's complex, voluminous, life-giving soils and their vast water-storing potential.

The crème de la crème of soil is topsoil, that valuable, nutrient-rich, upper part of soil endowed to the prairie by the decomposition of native plants during thousands of years. It took 500 years to lay down a single inch of topsoil. Average topsoil depths in Minnehaha County are 10 to 20 inches (depths range from more than 4 feet on bottom land to a few inches on highest ground). Topsoil is the county's most important natural resource.

Natural soils are permeable. They also are reservoirs. Like a sponge, soils seize precipitation for groundwater recharge and moisture reserves that sustain record crop yields and pastures through droughts (in normal years, that is).

Modern development wreaks havoc on natural-soil infrastructure. Today, and for the past several decades, heavy machinery skims off thousands of years' worth of valuable topsoil, the cream, and compacts subsoil to a hardness that is almost impermeable to water and air.

Euphemisms such as "altered" and "modified" don't come close to describing post-construction soils. "Impaired" and "devalued" better describe them.

The city of Sioux Falls requires no minimum topsoil depths or restoration of compacted subsoil following construction. Unless quantities are prearranged, property owners might get back only three or four inches of valuable topsoil, almost the thickness of a driveway, a fraction of what might have been there before. Homeowners often do not realize the extent of hidden problems with thin

topsoil and underlying compacted subsoil.

Impaired soils function poorly as reservoirs and contribute to a host of urban dilemmas such as excess runoff of storm water along with polluting fertilizers, herbicides and pesticides; low oxygen saturation (roots can't grow where air can't go); shallow root systems; excess artificial irrigation; impeded groundwater recharge; and limited diversity and health of trees and all other plants.

Ash trees (and now autumn blaze maple) have been the default deciduous shade trees of damaged soils. In several states east of South Dakota, millions of ash trees are dying because of an insect from Asia. Though not yet discovered in South Dakota, experts predict that the emerald ash borer eventually will kill our ash trees, too. Almost 40 percent of Sioux Falls' shade trees are ash.

Lawns and other landscaped areas, which grow on shallow topsoil and compacted subsoil, are the least acknowledged contributors to excess storm water runoff. Lawns are like green concrete and capture little storm water beyond a half-inch rain, and if artificial irrigation already has saturated these sites, it would be even less. Once glutted, green surfaces dump almost the same volume of water as do hardscapes such as streets and parking lots.

"Urban-soil stewardship" is an oxymoron, yet across the road from Sioux Falls developments, stewardship translates to livelihood. Rural landowners prioritize topsoil quantity and quality

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and minimize compaction. Why and when did it become acceptable that urban soils be of major poorer quality than the soils in fields across the road?

Older Sioux Falls neighborhoods generally have deeper topsoil and greater permeability than post-1960s and 1970s developments. We've sometimes encouraged Realtors to promote the topsoil depths of older neighborhoods as selling features for homes there. They tell us the average person doesn't care about soil or what they cannot see. But we're convinced if city residents were aware of the long-term benefits of urban-soil stewardship - water conservation, fewer polluting lawn chemicals, diverse trees and other plants that are able to thrive, storm water retention and groundwater recharge - they would value healthy, functioning soils as much as rural residents do.

Perhaps the emerald ash borer crisis will be the teaching moment, or maybe, more immediately, it will be this summer's difficult-to-manage storm water runoff. Regardless, a permeable, healthy soil infrastructure should be a vital part of storm water management, water conservation and sustaining the health and diversity of the urban forest.

Sioux Falls Beautiful urges city leaders to finally give soils a place at the table when promised talks get underway about this year's flooding. Soil is the most important natural resource of our region. When will we quit treating it like dirt?

MY VOICE

Mary Ellen Connelly, 65, of Sioux Falls has worked as microbiologist, plant advocate and landscape designer. She has submitted this My Voice column on behalf of Sioux Falls Beautiful, which seeks to beautify and improve areas of the community and acts as liaison, resource and partner for organizations, city government, businesses, schools and individuals.. My Voice guest columns should be 500-700 words. Submissions should include a portrait-type photograph of the author. Authors also should include their full name, age, address, occupation and relevant organizational memberships.

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