



# B I G S I O U X R I V E R A D V O C A T E

## Understanding the River

### New FBSR research project documents river conditions

Friends of the Big Sioux River is often asked to identify the leading threat to water quality in the Big Sioux River. It's an important question, a foundational question, really. We believe the best answer is to assert that the degraded health of the river is caused by multiple factors. But what exactly are those factors?

To help us learn more about the condition of the river, we have commenced a research effort unlike anything pursued and accomplished before. We are now in the midst of examining the entire length of the river, from its source near Summit, South Dakota to its confluence with the Missouri River, near Sioux City, Iowa, a distance of 421 miles.

When possible, we will be paddling by canoe and kayak along the river's course over the next several years to document what's in and what's along the river. We're looking for bank sloughs, tile drain outlets, fences across the channel, evidence of cattle in and along the river, feedlots, garbage deposits, storm sewer drains, log jams, effluent sources, riparian buffers, shoreline woodlands, grain fields growing to the river's edge, and many other conditions that influence the river and its flows. We fully understand that this is more than a one-time effort. This, in fact, must be a carefully planned ongoing endeavor.

Yes, this is an ambitious undertaking, but it is precisely the type of work that an organization like ours must do. Not only are we documenting conditions along the river, we are preparing maps showing what we encounter and where we encounter it, and we are revealing these discoveries to the public and to decision-makers in an easily accessible format on our website so everyone better understands the river and the problems facing those of us who desire a cleaner, safer waterway.

Board member Steven Dahlmeier is currently leading this project, and he and others are devoting considerable volunteer time to it. We also must acknowledge the financial assistance provided by a grant from Patagonia, Inc., that has aided us in this effort. We are grateful to local Sioux Falls retailer, The Great Outdoor Store, for connecting us to the financial assistance offered by Patagonia. Without Patagonia and the Great Outdoor Store this important project would not be happening.

According to Dahlmeier, the project's reconnaissance plan separates the river into four sections. Section one was completed in September, 2017. Completion of the first examination of the entire river is targeted for the fall of 2018.

Section one included the stretch of river between Flandreau and Sioux Falls. This stretch was first mapped out via Google Earth. We used aerial imagery to determine the types of land use: grazing, forest, cropland, buffer, urban, park, residential, etc. This gave us a starting point to later verify by first-hand observation.

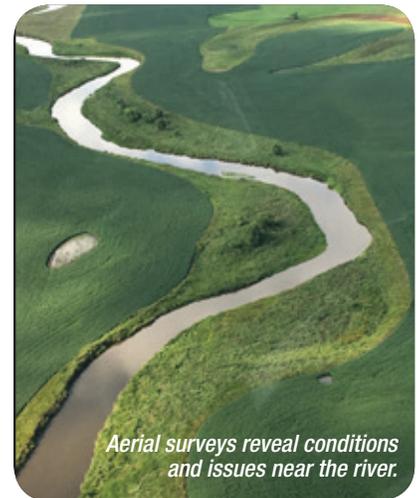
Utilizing the South Dakota Canoe & Kayak Association, we sought and identified volunteers with canoes and kayaks to travel on the river and carefully cross check what we viewed in Google Earth, and, equally important, to provide eye witness accounts of river conditions. Armed with maps, cameras and good spirits, our flotillas paddled and examined specific, assigned stretches of the river. We also noted different wildlife along the river. We were pleasantly surprised to see that some landowners are actually maintaining parallel fences along the river, to keep cattle out of the river.

We also worked with an aviation club to charter a plane and secure an aerial view of the river. This birds-eye view was especially useful observing the drainage patterns of several feedlots near the river, the width and location of buffer strips and forested habitats, and cattle paths to the river.

*(Continued on page 3)*



*Volunteers paddle the river and hike the shoreline to document conditions.*



*Aerial surveys reveal conditions and issues near the river.*

# FBSR board member profile Dana Loseke, founder & chair



The origin of this organization –Friends of the Big Sioux River- can be traced to a specific moment. Dana Loseke (rhymes with Close-key) had retired in 2011 after a productive career in the food industry, and he was volunteering at the yet-to-open Blood Run State Park (now called Good Earth State Park), southeast of Sioux Falls. For many hours each week Dana did field work across the sprawling property as park officials prepared for their public opening. There were miles of barbed wire fences to take down, and countless invasive cedar trees to eliminate, and Dana was tasked with those assignments. “It was great work,” he remembered. “I loved being outdoors, and I enjoyed the physical work and helping get the park ready.”

One afternoon, while laboring alongside a park employee in a bluff-top forest near the Big Sioux River, he watched a group of kayakers beach their boats on the shoreline below. Dana had never traveled on the river before, and he and his work mate hiked down the slope to visit the paddlers. “My partner started the conversation by warning the boaters that the water in the river was dangerous, and they needed to be careful about exposure to it,” Dana recalled. “Hearing him say that was startling. I’d looked at the Big Sioux many times from different vantages at the park, and it never occurred to me that this pretty river was badly polluted.” Dana also remembered that the park employee went on to say that there were five state parks within 30 miles of Sioux Falls, and the water in the streams and river in each park was polluted.

His partner suggested that an effort to clean up and protect the Big Sioux River might be a worthwhile volunteer pursuit for Dana. Immediately, reported Dana, the idea made sense, and he embraced it.

“East Dakota Water Development District trained me to perform water quality testing,” Dana explained, “and I started collecting water samples from the river as a volunteer for the Sierra Club.” He began talking with friends and acquaintances about the river, about Sioux Falls’ relationship to the river, about the river’s poor condition and its potential. Soon there was a small group casually led by Dana. “We realized we needed to formally organize if we were going to have an impact,” Dana said. What followed was the creation of this organization, named Friends of the Big Sioux River from the start, and legally incorporated as a 501 (c) (3) outfit in March, 2015.

Dana Loseke was born and raised in Columbus, Nebraska, not far from the Platte River. The river’s bountiful floodplain of braided channels, riparian woodlands and brushy backwaters was a natural playground for Dana. There was hunting, fishing and lots of places to explore. Then it was off to college, and he earned a degree in geography at the University of Nebraska, Omaha.

Dana had worked at a grocery store in Omaha while attending college, and his experience there opened the doors to his first job after graduation. Dana and his wife moved to Des Moines where he began work as a salesman for food giant, Carnation. Other moves followed, to Milwaukee, Chicago and Minneapolis. When he landed in Sioux Falls in 1991 it was to head sales and marketing for Land of Lakes, a dairy cooperative that was acquired by Dean Foods in 1999. Dana stayed on with the company, and by 2003 he’d risen to general manager of the office and plant, a position he held until retirement in 2011.

During his leadership role with Dean Foods, Dana and his management team added a variety of sustainability programs, shrinking the company’s eco-impacts and lifting profits.

That experience transitioned into his retirement, where his avocation is now conservation and environmental matters. In addition to serving as chair of Friends of the Big Sioux River, Dana also has a seat on the board for East Dakota Water Development District (EDWDD), representing an urban area of Sioux Falls.

Dana’s life is busy, often hectic, as he leads and builds FBSR and fulfills his duties with EDWDD. His days are filled with meetings and conversations with elected officials, constituents, and fellow board members. He travels periodically to Pierre during the legislative session to follow and advocate for natural resource protections. He has been married to his wife, Michelle, for 45 years, and she has been an enthusiastic supporter of his conservation efforts. They have two children, Rachel, who is a concert violinist, and Joshua, who will complete a master’s degree in sustainability this spring.

“I’m intimidated, sometimes, by the seriousness of the issues, and by what we face as we try to accomplish our goal of cleaning up the river,” Dana declared. “But we have good people involved, and we’re seeing more and more involved all the time. I’m happy to report that progress is happening, and I’m optimistic that it will continue to happen.”

## River Quiz

Can you identify this scenic location on the Big Sioux River?  
See page 3 for the answer.



*("River Research" Continued from page 1)*

Over the next year we'll continue with this project, including seeking volunteers, and eventually releasing a full map for all to view. Once completed, our hope is that we can work with municipalities, landowners and agricultural producers to help everyone realize that each of us has a role to play as we improve the river's water quality.



## **S.D. should require buffer strips along all rivers and streams**

*By John H. Davidson, FBSR Board Advisor*

Wise use of the land can prevent runoff pollution in our waterways.

Science has established that riparian buffer strips deter sediments, nutrients, chemical, pathogen and temperature pollution from affecting the hydrology and ecology of rivers, streams and lakes. They also provide habitat, bank stability and recreational benefits. In addition, buffer strips offer resilience to watersheds stressed increasingly by floods, drought and other extreme events.

Those who own and use land along our rivers and tributaries without maintaining vegetated buffer strips are using the water for waste disposal, while denying citizens fair use for consumption, recreation, wildlife habitat and aesthetics. At the same time, they are sending pollutants downstream where they are a burden to our fellow citizens in other states.

These compelling facts support the decision of the State of Minnesota to mandate buffer strips. It is time for South Dakota to follow this common-sense example.

There is a strong public policy stating that South Dakota has a vital interest in protecting its soil as the greatest and most valuable of its natural resources. This public policy has been codified by our legislature: "It is the policy of this state to provide for the conservation of the soil and soil resources of this state, and for the control and prevention of soil erosion and for the prevention of floodwater and sediment damage..." [SDCL 3807-1] By definition, tillage practices that expose soils to direct runoff into rivers and tributaries contravene this strong public policy, and private ownership of the land is not a

justification for practices which erode the soil resource.

Finally, landowners in South Dakota own their land subject to the public trust doctrine which provides that the waters belong to the people, and the state, as a trustee, controls the water for the benefit of the public. In the words of our state's highest court: "The public trust doctrine imposes an obligation on the state to preserve water for public use." The legislature has been more specific in declaring that there is a public trust in the "air, water, and other natural resources," and that the purpose of the public trust is the protection of these resources from "pollution, impairment, or destruction." Thus, when the state mandates buffer strips it is, in its role as trustee for all of the state's citizens, simply exercising a power and an obligation based on the public trust. When private individuals acquire land along rivers, tributaries and lakes, their title is subject to the limitations of the public trust. Requiring buffer strips is the most efficient and economical means of exercising the trust obligation.

John Davidson is Professor Emeritus at the University of South Dakota School of Law, and a member of the board of directors of the Northern Prairies Land Trust, a Sioux Falls-based land trust.

*Buffer strips protect waterways from sediment and chemical pollution.*



## **River Quiz Answer**

*In northern Minnehaha County the Big Sioux River flows for 1.25 miles through an outcrop of Sioux quartzite, an area known as the "Dells of the Big Sioux River". The walls of this scenic chasm rise as high as 40 feet above the river.*

*Formation of Sioux quartzite in what is now called "Siouxland" began as grains of quartz and silica delivered by ancient rivers and deposited layer after layer through a long passage of time. Compression over millions of years transformed these granular layers into a rigid, rocky formation hundreds of feet thick.*

*Today, exposed, visible quartzite registers only a small fraction of the overall geological formation that exists beneath this*

*region of southeast South Dakota, southwest Minnesota and northwest Iowa. Residents recognize Sioux quartzite as a popular and attractive building and landscaping stone. Though most commonly colored pink and red, there are richer, deeper hues due to the varying presence of iron oxide.*

*Quartzite cliffs in the Big Sioux River dells were created by a waterway's relentless currents slowly eroding deeper and deeper into the rock. What you witness as you paddle through this gorge is a land form evidencing the effects of natural processes that began some 1.8 billion years ago.*

We recognize threats to surface and underground waters posed by synthetic fertilizers applied to farm land. Other hazards to water, the environment and public health are broadly applied agricultural herbicides, including Monsanto's Roundup herbicide that contains an ingredient known as glyphosate. Glyphosate is the most heavily used chemical poison in the history of the world, and it generates lots of revenue for Monsanto. In 2015, the company earned some \$2 billion in gross profits from herbicide sales, and most of that came from glyphosate.

Carey Gillam's provocative new book, **Whitewash**, examines the history of Roundup and glyphosate. It is a hardboiled expose that traces Monsanto's efforts to not only promote Roundup, but also to repudiate mounting evidence that Roundup and glyphosate cause public health and ecological problems.

The saga of glyphosate began with its discovery in 1950, but it wasn't until 1967 that researchers at St. Louis-based Monsanto realized glyphosate inhibited plant growth. By 1974 the company had patented a new herbicide, containing glyphosate, and claimed it was completely safe for humans and animals. The world embraced Monsanto's chemical marvel, and believed the company's assertion of complete safety.

Monsanto's historical track record is more than slightly worrisome, however, and that should have tempered excitement for the new herbicide.

Formed in 1901 to process food additives, Monsanto quickly advanced into more perilous chemistries, including sulfuric acid. In 1935 it began manufacturing and marketing polychlorinated biphenyls (PCBs), used in industrial applications. PCBs were eventually found to cause cancer, and in 1979 PCB production was banned in the United States. Critics claim Monsanto realized as early as 1953 that the chemical was dangerous.

In 2003, Monsanto and a Monsanto spin-off company reached a \$700 million settlement with the residents of Anniston, Alabama, where PCBs had been manufactured. Some 20,000 residents received payments and a cleanup fund was established.

Monsanto also sold the remarkably destructive insecticide DDT from 1944 to 1957. Research showed that the chemical devastated natural food chains and ecosystems. The chemical industry waged a fierce fight against DDT critics, but by 1963 most DDT use had been phased out.

Then there was Agent Orange, a defoliant sold by Monsanto to the U.S. government to destroy vegetation in Southeast Asia during the Vietnam War. Although Monsanto insisted Agent Orange was harmless to humans, it was later proven to be highly toxic and carcinogenic. During the war Agent Orange contaminated more than 3 million civilians and U.S. military servicemen, and an estimated 500,000 Vietnamese children were born with deformities attributed to Agent Orange.

With this historical back drop we now face conflicting information about Roundup and glyphosate. Monsanto is adamant about the herbicide's safety. But in early 2015 the World Health Organization's cancer agency determined that glyphosate was "probably carcinogenic." That ruling came on the heels of many other expressions of concern from countless independent scientists and public interest organizations. In 2017 California's Office of Environmental Health Hazard Assessment (OEHHA) added glyphosate to its list of cancer-causing chemicals. Monsanto objected to the OEHHA decision, and refuted the research that justified the designation.

Author Gillam bluntly presents her own position regarding the health impacts of glyphosate. "In study after study," she wrote, "exposure to glyphosate or Roundup has left laboratory rats and other experimental animals with a range of health problems..." She also reported that "Many researchers fear that one of the worst impacts of glyphosate on human health may be as an endocrine disruptor, a dreaded term for chemicals that interfere with hormones in the human body in ways that can cause cancerous tumors, birth defects and other developmental disorders."

Monsanto ad campaigns defended Roundup, describing glyphosate as "...less toxic to rats than table salt" and "practically non-toxic."

Since 1974 some ten million tons of glyphosate have been doused on land across the planet. That's enough to spray half a pound of Roundup on every acre of cultivated land in the world. In the U.S. about 300 million pounds of glyphosate are applied to farm fields each year.

Although federal regulators do not test for glyphosate in our food, public-spirited organizations have begun performing their own analyses. The results of these tests, as Gillam describes, are deeply troubling. "Americans are consuming glyphosate in common foods on a daily basis," warned a 2016 report authored by the Alliance for Natural Health. A partial list of items containing glyphosate includes popular cereals and snacks, infant formulas, and sandwich and salad fixings. Glyphosate has also been commonly detected in human breast milk and human urine. According to a pesticide tester called the Detox Project, "Every single study that has measured human contamination with glyphosate has found it..."

Gillam's story also explains the lack of interest in rigorously regulating Roundup by the federal EPA. It is a disappointing and disheartening tale, and in this capacity –explaining the cozy relationship linking EPA and Monsanto- Gillam's reporting skills shine.

The United States Geological Survey (USGS) has started monitoring America's air, soil and surface waters for glyphosate, including in South Dakota. According to the agency, glyphosate is found "widely in the environment" and "commonly in surface waters." Gillam writes that the agency found glyphosate in more than 50 percent of the soil samples and rivers, streams and ditches that were tested.

If you hunger for evidence about the dangers of agricultural chemicals, read Gillam's thoughtful and revealing journalistic endeavor. The sub-title of **Whitewash –The story of a Weed Killer, Cancer, and the Corruption of Science-** clearly discloses the author's proclivities regarding Roundup, glyphosate, and Monsanto's strategies to protect its glyphosate profits.

Peter Carrels has written two books, two traveling exhibits, and numerous articles and essays about natural resources and environmental topics.

*300 million pounds of the chemical poison glyphosate are annually applied to U.S. farm fields. Glyphosate is so pervasive it is found in common foods, and has been detected in human breast milk and human urine.*





## Introducing our new Logo

Board member Travis Entenman was asked to coordinate the design and implementation of a new logo for our organization. Travis explained the rationale and the process: “With the growth of our member base and our continued community engagement, we felt it was time for an updated, refreshed brand. In developing the new logo, we worked with Molly O’Connor, a Sioux Falls graphic designer. We worked to incorporate the North American River Otter, which has been reintroduced to the Big Sioux River by the Flandreau Santee Sioux Tribe. The logo successfully instills the idea of a healthy ecosystem and provides a more approachable image.”

# Healthy urban soils equal a healthier Big Sioux River

Water quality in the Big Sioux River is intimately linked to the quality and permeability of soils in Sioux Falls.

By Mary Ellen Connelly, FBSR Board Member

We know the water quality impacts of urban pollution sources such as yard fertilizers, herbicides, pesticides and pet waste would be dramatically reduced by healthier and deeper topsoils and subsoils. Healthy soils also enhance the long-term fitness and diversity of the urban forest, and mitigate flooding from storm water during high precipitation events.

On the Great Plains, nature’s bounty is grounded in living, life-giving soil and its immense water storage potential. Healthy soils provide important fertility for growing vegetation, and they also serve as a colossal sponge to absorb rainfall, snow melt and runoff.

The crème de la crème of our prairie soil is topsoil. Organic and carbon-rich, it is the uppermost darker layer, endowed to our region by the decomposition of diverse native grasses and forbs over thousands of years. Topsoil is a valuable natural resource in Eastern South Dakota and provides some of the world’s finest cropland. The depth of topsoil varies in the landscape from several feet in low and level places to a very thin layer on hilly slopes.

This resource is vulnerable to degradation and loss. While there is much discussion about using conservation practices to preserve, protect and improve soils on our farms, the concept of “urban soil stewardship” is unfamiliar to many city residents. It is a topic worthy of our attention.

In many urban areas, commercial and residential development practices since the mid to late 1900s have harmed soils. During construction, heavy machinery strips away topsoil and compacts subsoil to such hardness that it is nearly impervious to water and air.

Some builders conclude construction by leaving a site with a scant few inches of topsoil spread over the compacted subsoil. People building new homes or businesses may not realize the extent of soil degradation accompanying construction. Lawns and other plantings are installed, but it’s like putting frosting on a brick. Even in upscale neighborhoods, the beauty of a landscape is often only skin deep.

Residential developments fringing Sioux Falls often lack the greater topsoil depths and tree diversity of the inner city. When a tree is planted in compacted soil, the planting hole is prone to waterlogging and young tree roots are denied access to air. Tree roots tend to grow in a circle, strangling the tree. Or the tree may literally drown because water accumulated in the planting hole and cannot easily move through compacted soil. This is the number one cause of tree death following new construction, a condition called the “bathtub effect.” That is why near-monocultures of ash and silver maple hybrids, such as ‘Autumn Blaze’, are so heavily planted in new residential and commercial developments. These species are better able to tolerate compacted, waterlogged soils. A less diverse urban forest is vulnerable to disease outbreaks. It is also less aesthetically pleasing than tree diversity.

Consider how compacted soil limits rainfall infiltration. When saturated by frequent lawn watering, shallow topsoil over hardened subsoil allows near the same volume of water to run off as does concrete and asphalt, and silt and yard chemicals end up in the Big Sioux River. A simple equation is this: Less storm water runoff = less pollution and less flooding. Healthier topsoils and subsoils are better for the river.

A permeable, healthy soil infrastructure will bring about positive, multiple “wins” for storm water mitigation, water quality in the Big Sioux River and for our urban forest. The water absorbent power of healthy soil should be an integral aspect of the Sioux Falls development discussion.

Soil is our gold, the most important natural resource of our region. When will we stop treating it like dirt?

Mary Ellen Connelly is the author of **How Our Garden Grows**. For many years she owned and managed a Sioux Falls nursery, and she is an expert regarding perennial plants and landscape practices.



Site construction can include stripping most topsoil from a location, and later selling that soil for use at a different location.

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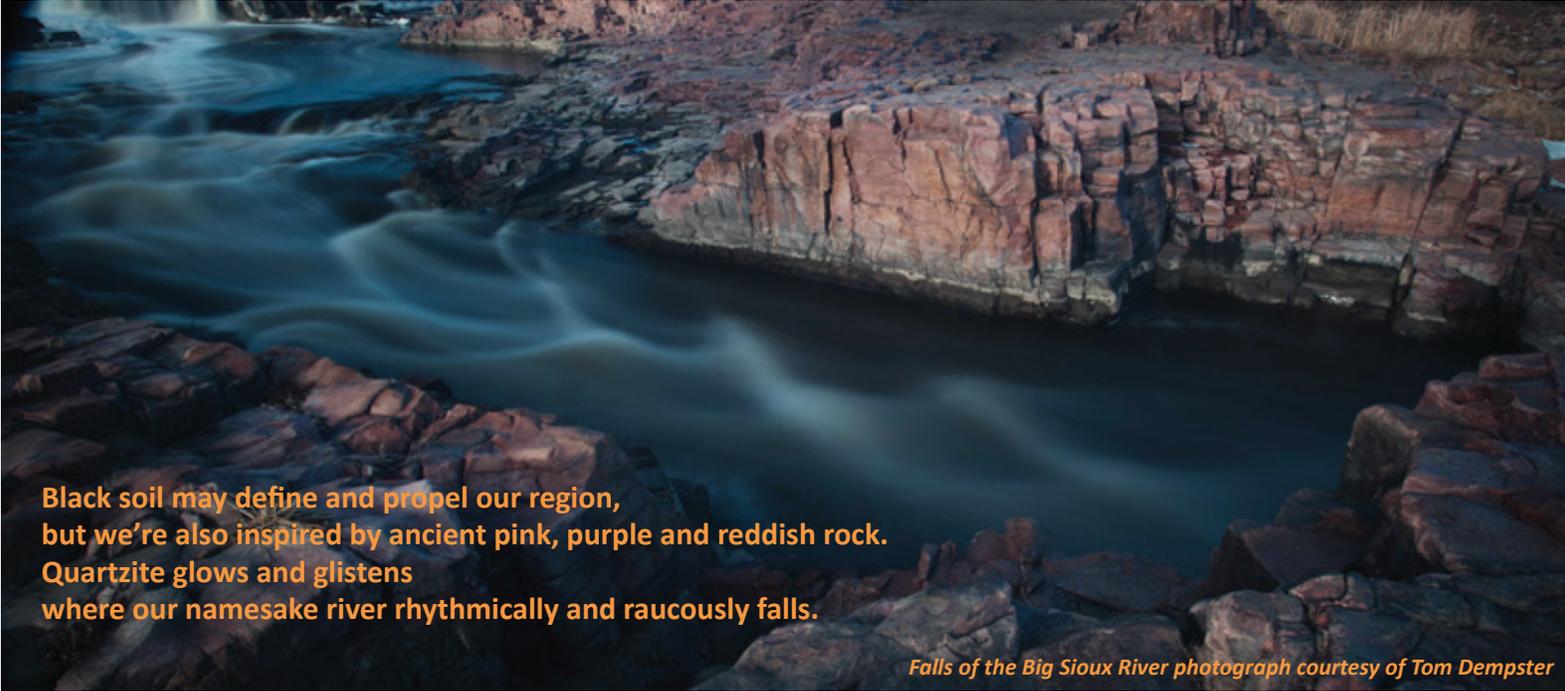
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## Event Calendar

- FBSR board meetings are held monthly. See website calendar for specifics.
- Sioux Empire Water Festival, University of Sioux Falls campus, **March 13 & 14.**
- Earth Day week-long celebration at the University of South Dakota, **April 16-22.**  
Keynote lecture at 7 pm, **April 17** at Farber Hall.
- Big Sioux Water Festival, South Dakota State University campus, **May 15.**



**Black soil may define and propel our region,  
but we're also inspired by ancient pink, purple and reddish rock.  
Quartzite glows and glistens  
where our namesake river rhythmically and raucously falls.**

*Falls of the Big Sioux River photograph courtesy of Tom Dempster*

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