



# THE OTTER

Newsletter of Friends of the Big Sioux River Winter, 2020

## Thinking holistically

# Portrait of a watershed

A river begins with snowfall that melted, or with raindrops that drizzled or pelted the earth on some faraway hillside or plain. Almost all headwaters are situated in sparsely populated places. It's only after a river gathers volume and force that human settlements dramatically transform its channel, shorelines, bluffs and floodplains.

In the case of the Big Sioux River, that volume and force is delivered via numerous tributaries that drain all corners of a basin –or watershed- measuring about 8,500 square miles and touching three states. The Big Sioux begins in the high hills near the town of Summit, South Dakota. You can walk the windswept terrain of the Big Sioux's birthplace, and observe that early on the young river is merely a crease in prairie sod carrying flows from gently sloped headwater wetlands.

As the crow flies, the Big Sioux travels southward for a distance of about 200 miles, though its loopy, ever-growing channel meanders approximately 420 miles before merging with the Missouri River near Sioux City, Iowa.

Understanding the characteristics of a watershed helps you better understand the river that drains that watershed.

Much of the Big Sioux's watershed corresponds to the geological formation known as the Coteau des Prairies, a flatiron-shaped rolling plateau that rises from the flatlands of the James River valley on the west and the Minnesota River lowlands to the east. This plateau contains numerous lakes, ponds and potholes. It measures roughly 200 miles from north to south, and reaches up to 100 miles wide.

A river's length, scale and slope are the product of its geology and weather, and the Big Sioux's watershed includes varying landscapes, topographies and ecosystems. Study a watershed map, and you'll notice a lattice-like pattern of waterways feeding the Big Sioux's main channel. According to the U.S. Geological Survey (USGS), there are approximately 12,000 miles of streams, creeks and slow-flowing sloughs in the Big Sioux system, and like a family tree these tributaries are all related to the river.

How land is used within a watershed also influences a river. In recent decades, particularly in the upper region of the Big Sioux's watershed, many thousands of acres of perennial grasslands have been destroyed and converted to row-crop agriculture. Perennial prairie requires no fertilizers or pesticides, and prairie sod better holds rainfall and snow melt than land hosting annual crops like corn or soybeans. This land use transformation –and agriculture's overall impacts including increasing use of tile drains, more industrialized farming, and the impact of confined animal-raising operations- affects the river's chemistry and hydrology. Climate change is another factor,

*(Continued on page 2)*



adding significant storm events, including weather that now varies more radically within the seasons.

If you're studying a topographic map you'll notice the change in height of the land from where the river begins to where it ends. Watersheds tilt to the sea, toward sea level. The source of the Big Sioux is situated at an elevation of about 2015 feet above sea level. By the time the river enters the Missouri, its elevation is about 1060 feet. That's a drop of approximately 955 feet through a 420 mile-long channel. The swift and steady current you witness in the river is a product of that drop. All rivers flow downhill, even if the slope isn't easily perceived.

Rivers grow as they approach their mouth because tributaries contribute flows. Stray Horse Creek adds its modest volume to the upper Big Sioux near Castlewood, South Dakota. Hidewood Creek arrives with runoff from its namesake hills. Skunk Creek, a surprisingly large, fast-flowing stream, merges with the Big Sioux in central Sioux Falls. These and innumerable other streams throughout the watershed add water to the Big Sioux, connecting the Big Sioux to all of its watershed.

To illustrate the growth of the river, consider water flow/volume data at two locations; near Dell Rapids, South Dakota, and at the mouth of the river, near Sioux City, about 175 river miles downstream from Dell Rapids.

USGS instruments show that during 2016 river flow levels near Dell Rapids averaged 487.7 cubic feet per second (CFS). In 2017 the same measuring station showed flows averaging 686.9 CFS, and in 2018 that number jumped to 1,312 CFS.

CFS is a unit used to measure moving volumes of water. Think of a box containing water that is one foot square. Many "boxes" pass by a certain spot on the river during any given second. One CFS equals 448.83 gallons of water per minute.


Below the Dell Rapids location, and before the Big Sioux empties into the Missouri River, a number of tributaries enter the Big Sioux, including its two largest tributaries, Skunk Creek and the Rock River. This translates into a larger, more powerful Big Sioux River, with daily flows at the mouth during 2016 averaging 2,880 CFS, 2,797 CFS in 2017, and 5,703 CFS in 2018. Each of these numbers is more than four times the flow level recorded at Dell Rapids.

To add appreciation about Big Sioux River flow volumes, understand that the average discharge of the Big Sioux into the Missouri River during 2018 was approximately 2,559,677 gallons per minute. Friends of the Big Sioux River can work to purify those flows, or we can inactively watch as those flows are continually degraded, and their massive detrimental impact moves downstream on the Missouri River.

It would be difficult to identify a single citizen-activist specializing in environmental protections who doesn't advocate for expanding and strengthening the federal Clean Water Act (CWA). Much of the impetus for this perspective hinges on a recognition that rivers are intimately linked to ALL of their tributaries and the entire watershed. We can't protect and heal a river without protecting and healing its tributaries.

But the CWA does not protect many small tributaries, especially headwater streams, nor does it protect some important wetlands. This exposes thousands of miles of streams and other surface waters within the Big Sioux watershed to pollution.

Another shortcoming is the CWA's failure to regulate non-point pollution, the pollution entering rivers and streams through the landscape rather than a specific discharge outlet or pipe. Non-point pollution is the source of much agricultural pollution in our rivers. CWA weaknesses have been exacerbated by new provisions promoted by the Trump administration. How can we resurrect the Big Sioux River if we're slipping backwards, not moving forward, regarding regulations protecting water resources?

Gaze at the Big Sioux River, and realize its flows smoothly sweeping by have come through time from some distant place. They passed by meadows and seeped from springs. In summer, on a gravel beach far upstream, a child waded in the shallows. Or in winter, on some snowy stretch with a deep, stable pool of icy water, an otter family played. This river comes from many settings and locales. It shapes lives with its water and with its unpredictable might. It surges and it sleeps. It speaks a language unique to other natural features on this earth. We are listening, and we are watching. Rivers and their tributaries connect the here and now to the there and then. 

## River Quiz

Can you identify this  
Big Sioux River location?

See page 3 for the answer.

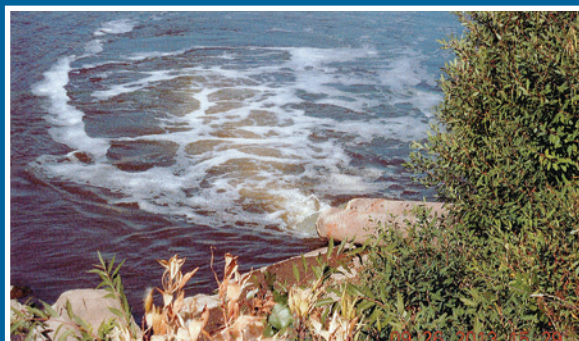


Photo Courtesy of  
S.D. DENR

# Farewell, John Davidson

South Dakota lost its foremost environmental scholar and a long-time leader in the state's environmental-conservation community with the passing of John Davidson. Friends of the Big Sioux River lost an important advisor and an engaged champion of our cause.

John died at his home in rural Vermillion last November 16. Immediate family are his beloved wife, Cathy Beard, their two sons and their son's families. He was 77 years old.

John was a relocated Pennsylvanian and a graduate of Wake Forest University and the University of Pittsburgh School of Law who'd arrived in Vermillion in 1971 to teach at the University of South Dakota's law school. He and Cathy discovered they loved the natural elements of their new region, especially the land's openness and surviving prairie. John began to learn about South Dakota's land,

rivers, and sloughs, and he became an expert at laws related to agriculture, water, natural resources and wildlife. He wrote a textbook about farm law that was used for a decade in law schools across the nation, and he donated his legal skills and knowledge to benefit many natural resource initiatives and much stewardship, often working closely with governments, farm groups and conservation/environmental organizations to protect resources and advance an environmental ethic. But most of all, despite many passions, he was a teacher. He retired from USD in 2006, and was honored as an emeritus professor.

In the final months of John's life an arrangement was crafted to formally connect an organization he founded in 1999 called the Northern Prairies Land Trust (NPLT) with our organization, Friends of the Big Sioux River. It was a strategically advantageous merger of two ambitious and area-focused conservation outfits that are relatively young. We now share a manager and an office. This is a big deal in the history of our organization, and we owe John a debt of gratitude for encouraging and supporting this constructive marriage.

He revered and valued nature, and he restored perennial prairie on his own place and –through programs offered by NPLT- on farms and ranches across the region. NPLT has also been helping expand buffers along the Big Sioux River.

It feels solemn and sad to bid farewell to this colleague, friend, and fellow conservationist. We live in a time when John's wisdom and guidance is necessary. His intensity and wry humor will be missed, and so will his deep expertise and his willingness to share what he learned and knew. 🌱



Photo courtesy of the University of South Dakota



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## River Quiz Answer

*One of the largest and most problematic single contributors of pollution to the Big Sioux River is Smithfield Foods, formerly called John Morrell & Company. The company's wastewater outlet discharges into the Big Sioux River, and it is pictured. Smithfield's Sioux Falls slaughterhouse and meat processing facility necessitates using large quantities of chemicals –such as dixichlor max, magnesium hydroxide and sodium bisulfite- as well as nearly three million gallons of freshwater taken daily from the river. On an average working day 19,500 hogs are killed and transformed into saleable meat products at this sprawling plant, located a short distance downriver (north and east) from Falls Park. Smithfield operates its own onsite wastewater facility that treats polluted water and liquids from plant activities before discharging them into the river. The discharged liquids do not always conform to the facility's pollution permit. Indeed, from spring 2000 to summer 2019, this facility was guilty of the following discharge violations: 26 violations of fecal coliform; 17 violations of ammonia-nitrogen; eight violations of total residual chlorine; and 10 violations of total suspended solids. Recent water violations include excessive ammonia releases in August 2018, and excessive releases of total dissolved solids, ammonia, and fecal coliform, along with toxicity and biochemical oxygen issues between February 1, 2019 and July 31, 2019. Those violations resulted in two fines totaling \$99,642. Smithfield's parent company, a Chinese multinational named WH Group, recorded 2018 sales totaling \$22.6 billion. The State of South Dakota is revising Smithfield's pollution permit.*

## Friends of the Big Sioux River and Northern Prairies Land Trust Join Forces

Friends of the Big Sioux River has agreed to form an organizational partnership with Northern Prairies Land Trust (NPLT), allowing these two 501 (c) (3) nonprofit conservation entities to work together to more effectively advance their common goals of land and water conservation and stewardship, while maintaining their separate boards, goals, and identities.

Travis Entenman has been hired as director of both organizations. The partnership will develop and advocate local policy, increase fundraising efforts (memberships, donations, and grants), land protection (easements and conservation toolkit), water protection projects, and overall awareness and education on how land and water environments are interlinked and are impacted by agriculture, economic development and climate change. This new relationship will also help maximize the administrative efficiencies of both organizations, including a new joint office space –located at 201 N. Weber Street, Suite 1 near downtown Sioux Falls- where the two organizations will be headquartered.

Since 1999, NPLT has endeavored to facilitate and encourage land and water conservation practices by private landowners in both South Dakota and Nebraska. NPLT is organized as a land trust in order to accept and hold conservation easements when private landowners choose that tool, but the activities go beyond those of a simple land trust. NPLT is committed to the proposition that private lands can be managed in a way that achieves the goals of private landowners while simultaneously serving the public need to conserve and protect natural resources and sustain rural and agricultural communities. Among its numerous pursuits, NPLT has promoted and managed a program of developing riparian buffers along the Big Sioux River.

FBSR seeks to make the Big Sioux River and its tributaries swimmable and healthy, for the well-being and enjoyment of everyone. Community involvement is critical to achieving this vision, and FBSR seeks win-win solutions through partnerships and coalitions, involving broad aspects of the community, government, and other stakeholders.

For more information regarding each organization, visit [www.friendsofthebigsiouxriver.org](http://www.friendsofthebigsiouxriver.org) and [www.northernprairies.org](http://www.northernprairies.org). 




The FBSR and NPLT partnership offers opportunities to protect land and water in the Big Sioux River watershed.

Photo courtesy of John Pearson  
Iowa Department of Natural Resources

### FBSR leadership changes



Dana Loseke

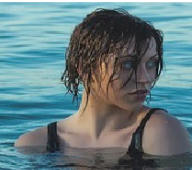
FBSR's founder, Dana Loseke, also served as chairman of the FBSR board for the first 4 ½ years of its existence. In late 2019, Loseke retired as board chair, and Steven Dahlmeier ascended to that position. As chair, Loseke successfully grew the organization, and he devoted time, talent and energy to Big Sioux River protections. His influence on FBSR will be lasting and positive. He remains on our board, and continues to provide important service in many capacities. Steven Dahlmeier adds FBSR board chair duties to an already busy life. In addition to the demands and joys of his family and his work in the local kayaking/paddling community, Dahlmeier serves as general manager of the State Theatre, in downtown Sioux Falls. 



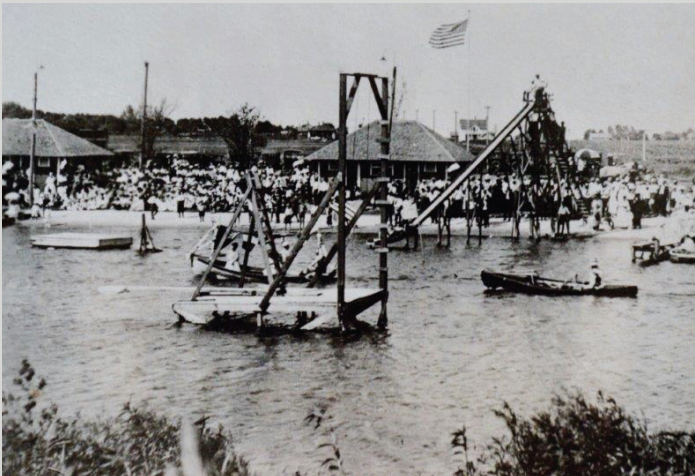
Steven Dahlmeier

# Swimmable by 2025!

Together, we can do it.



## A wildly popular park and beach



Before there were aquatic centers and community swimming pools those living near lakes or rivers gathered at the local beach, if they were lucky enough to have one. Pictured is the Big Sioux River and a public park in Dell Rapids, SD. Created in 1913, the park and its swimming beach were wildly popular, attracting people from a wide area for some fifty years. The Big Sioux River and its shady, riparian woods were the central attractions, and the channel was more than a dozen feet deep with a soft, sandy bottom. In 1934, a grand bathhouse constructed from quartzite was built, replacing plain wooden structures. It made the community proud. Slides, diving towers and other recreational amenities added to the beach's appeal. By 1960, Dell Rapids had opened a public swimming pool, and that ended the popularity of its beach. The beautiful stone bathhouse, long unused and vacant, now stands on a muddy shoreline serving only as a charming memory of a different time. Dell Rapids historian Craig Kumerfield, a retired teacher, has written extensively about Dell Rapids, including its relationship to the Big Sioux River. He provided the photos and information used in this article.



### Hold the salt!

Be mindful of overusing de-icer and salt on icy driveways, parking lots and sidewalks. Be careful not to use more salt than necessary in residential and commercial water softeners. Is your water softener necessary at all? Why these concerns? Because elevated levels of salt –specifically the sodium chloride part of salt- in our rivers and streams is destructive and unhealthy. One teaspoon of salt can pollute five gallons of water. And while there is no good way to remove chloride from water, we can reduce our impact on water resources. For example, after salting has melted ice, sweep up the remaining salt and dispose of it. Otherwise, it will be washed into the nearest storm drain and into a waterway.

### Liberalizing atrazine use

The Trump administration intends to weaken safeguards for atrazine, a weed-killing pesticide linked to birth defects and cancer in humans. The proposed change will increase by 50 percent the amount of atrazine allowed in U.S. waterways. Atrazine, the nation's second most-used pesticide after glyphosate, is banned in Europe but is widely present in U.S. waterways and drinking-water supplies. This more lenient approach reverses an earlier EPA plan to reduce atrazine levels threefold.

### Reversing progress

Rollbacks of key water protections for small creeks, tributaries and wetlands have been proposed by the Trump administration. Public interest advocates identified these small water bodies as significant components in the nation's water network, while mining, agricultural, oil and land development interests lobbied to eliminate protections. The new, pro-business approach exposes half the nation's wetlands and hundreds of thousands of miles of surface waterways to pollution. The finalized law will replace the Obama-era Waters of the U.S. (WOTUS) rule, which was repealed by the Trump administration last year.

### Dell Rapids protects the Big Sioux

Faced with an outdated wastewater treatment plant, the City of Dell Rapids choose to invest in a new facility that would release wastewater into the Big Sioux River that meets clean water standards. The project wasn't the cheapest option for the community, but it was pursued because of the protections it provides to the Big Sioux River. In recognition of its high-minded decision, EPA's Region 8 has honored Dell Rapids with the 2019 PISCES Exceptional Project Award. "We're doing our part to make sure we don't have a negative impact on the river," said Justin Weiland, Dell Raids city administrator. "We're proud that what we're discharging into the Big Sioux River isn't harming the river."



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the support  
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Big Sioux River, near Baltic, SD

Photo courtesy of Greg Latza

“When, in the early 1970s, Congress enacted the federal Clean Water Act, it did so only because of demand from citizens, backed by eloquent voices in science and journalism. The collective voice was sufficiently strong that national and state lawmakers began to respond, but only with the greatest reluctance. The “environmental law” which emerged placed limits on the worst forms of pollution, but did not challenge the underlying system which creates the pollution... Today, South Dakota’s rivers are little more than sinks for polluters, and that will continue to be the situation until a new citizen voice demands a new generation of environmental protection.”

John Davidson

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make friends with your river



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