Newsletter
Winter, 2019

Big Sioux River ADVOCATE

NEBRASKAland Magazine/Nebraska Game and Parks Commission

Wild Gracing Our River

Consider the affable, remarkable river otter. Consider "wild" as a noun.

If water quality can recover and be sustained in the Big Sioux River, and if ecological conditions within the channel's riparian corridor are improved the river will become increasingly hospitable for river otters. It is why **Friends of the Big Sioux River** chose the river otter –now scarce in our state- as our symbolic connection to a healthier river. Consider that there's so much more to be done regarding river recuperation, but river otters inspire.

A wildlife biologist will tell you river otters are a semiaquatic carnivore adapted to life in the water, including very cold water. The casual observer will say that river otters are a handsome, appealing creature displaying joyful, social comportment. Their dense, insulating fur is usually brown with a tan to silvery-white chin and chest. Not only is water quality a factor in their habitat, so is the year-round availability of open water and deep pools, features typically associated with larger rivers in our state.

They are a sizeable animal, with adults ranging in length from 35 to over 50 inches, and weighing between 10 and 30 pounds. Males are larger than females. When seen loping like a gliding slinky across the land their cylindrically shaped bodies appear sleek and clumsy simultaneously. But in water they move like agile, supple torpedoes, with a long, muscular tail for power and steering, and short, sturdy legs and webbed-clawed feet for propulsion and seizing their preferred diet of fish, frogs and aquatic invertebrates. A potent sense of smell and long whiskers help otters detect prey in dark or cloudy water, and an otter can stay submerged for up to eight minutes. They'll also snatch a meal on land, especially birds and small mammals. The river otter is an effective predator, a relevant trait for a mammal with a high metabolism requiring frequent dining.

Female river otters can become mothers starting at age two. Fatherhood cannot begin for males until they hit five years old or even older. Two to four young are born in early spring nearly a year after conception. Pups leave the natal den with their mother at two months of age, when they start to learn to swim, are weaned at three months, but may stay with mom until she next gives birth. River otters might live eight or nine years in the wild, but have lived up to 21 years in captivity.

Dens are along water in abandoned burrows or vacant hollows possessing multiple tunnels and entrances including at least one underwater entry for easy access from the water. River otters are playful, communal animals, residing in family

(Otters continued on page 2)

(Otters continued from page 1)

groups that consist of a mother and her offspring, and may blend family helpers who could be progeny from a previous year or sometimes unrelated adults. Adult males can be solitary or join a social group.

Not surprisingly, river otters have a commensal relationship with beavers, as beaver-built dams provide the open, deep water favored by otters, and beaver dens and lodges can be used by river otters as resting places and birthing and nursery sites. Natural predators in our part of world include bobcats, coyotes, and large raptors. In western South Dakota you can add cougars to that list.

River otters historically lived throughout South Dakota in appropriate habitat. Trapping, habitat destruction and wide-ranging waterway degradation contributed to wiping out most of the state's river otter population by the early 1900s. When a national survey was conducted in 1977, it speculated that there were no otters living in South Dakota. Passage of the initial Clean Water Act in 1972 aided the plight of the otter, but a modest comeback is now underway primarily because a handful of people pushed for it. One goal of this effort is to elevate otter numbers and cancel its scientific designation as a "threatened" species in the state.

In 1979, there was one otter sighting in South Dakota. Researchers define a sighting as seeing a live animal or a dead one, or finding sign such as scat or tracks. Annual records show that it wasn't until 1998 that the number of sightings in any given year exceeded one. In that year there were four sightings. By 2004 sightings climbed to 22, and in 2012 that number more than doubled to 46. Four years later 64 river otter sightings were recorded throughout the state.

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The semiaquatic river otter's anatomy is highly specialized. Eyes sit high on the head and small, rounded ears are set far back to allow a mostly submerged river otter to peer and hear above water. The flat skull and long narrow body are streamlined for underwater speed and agility. A potent sense of smell locates underwater fish -an otter's favorite quarry- at a surprising distance.

Much of that climb can be attributed to the release of 34 otters on the Big Sioux River near Flandreau, South Dakota in 1998 and 2000. This project was sponsored by the Flandreau Santee Sioux Tribe, and although follow-up science was not pursued by the tribe those pioneering otters are seen as the source of residents who continue to populate the Big Sioux River drainage and likely the lower James and Vermillion River drainages, as well. Otters are notable for their capacity to range and resettle, and the Flandreau reintroduction effort is viewed as a demonstration of how to spur otter recovery and expansion. Nebraska researchers restocking that state's otter population reported an animal tagged with a monitor in their state was tracked to near St. Louis. Apparently, that resourceful otter traveled more than 500 miles downriver in the industrialized Missouri River.

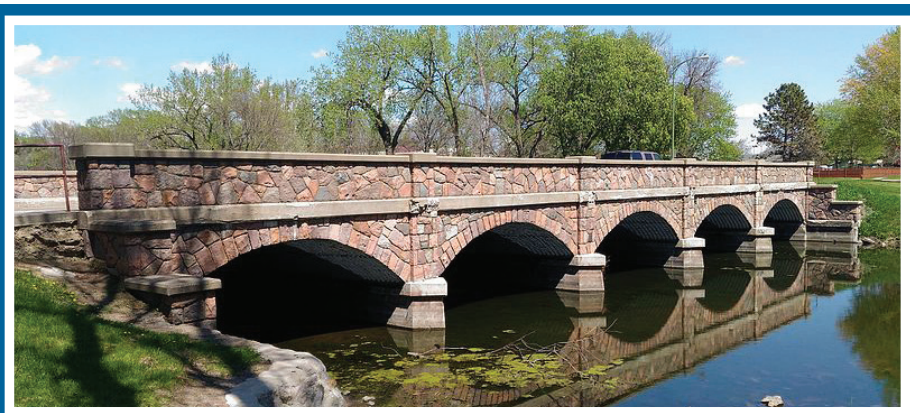
A critical threat to otters is trapping activity targeting beavers. A more specific trapping problem is that South Dakota allows beaver trapping into early spring, when mother otters are busy seeking food for their young and are especially vulnerable to trapping. Of 117 reported river otters killed in South Dakota from 1979 through 2016, 73 percent died because of legal trapping activities.

Studies by South Dakota's Game, Fish and Parks department indicate that the Big Sioux River contains some of the best river otter habitat in South Dakota. **Friends of the Big Sioux River** pledge to continue working to improve our river for river otters and people. We believe the needs of these animals and human inhabitants of the river basin overlap, with much in common. A river with a thriving otter population is a healthier river.

River Quiz

Can you identify this Big Sioux River location?

See page 3 for the answer.



FBSR board member profile

Nels Granholm, Ph.D.

In the Admiralty Mountains of Victoria Land, Antarctica, is an 8,000 foot ice-covered peak named Mount Granholm. No one on the **Friends of the Big Sioux River** board of directors has a geographic feature on this earth named after them, except Nels Granholm.

Granholm was born in 1941 and raised in Weston, Massachusetts, the son of a veterinarian who'd grown up in Iowa, earned his vet science degree at Iowa State University, and settled in Massachusetts to join a friend running an animal health clinic. Young Nels loved to help his father tend to animals, and by the time he'd entered high school he'd helped on surgeries and aided families with their pet health problems.

After graduating with a biology degree from the University of Massachusetts/Amherst, Nels traveled west to enroll in the developmental biology doctorate program at his father's alma mater. During his studies at Iowa State, Granholm accompanied a team of researchers to Antarctica to investigate penguin embryology. It was because of his work as a scientist in Antarctica that his name joined a list of eligible names for which Antarctica's topographical characteristics would be christened.

For forty-one years the now-retired Granholm taught at South Dakota State University, with forty years of that coming after he completed a two-year post-doctorate fellowship at Yale. "My wife is from Britton, South Dakota," said Granholm, "and that's one reason we came back to South Dakota and took the job in Brookings."

Nels was one of South Dakota's early environmentalists, serving pioneering environmental organizations and their causes in the eastern part of the state. He was elected to consecutive four-year terms on the board of the East River Conservancy Sub-district during the 1970s, and he learned much about water issues in that capacity. He was one of the brave scientists who publically opposed construction of the Oahe irrigation project. That project rallied farmers and environmentalists to collectively combat this massive proposal that would have channelized rivers and streams and ruined soils in a large area of the James River basin in northern South Dakota. In 1982 the project was officially abandoned by the federal Bureau of Reclamation, marking an end to the most tumultuous environmental issue ever to face South Dakotans. "It was important to stop that destructive project," explained Granholm. "We need productive farming, but we need to preserve natural resources, too."

At South Dakota State Granholm was an instructor in the zoology and entomology department before taking on other courses such as philosophy and bio-ethics. He taught in the university's Honors College for 25 years, and concluded his teaching career by coordinating for six years the newly organized Global Studies program. He is now recognized by SDSU as a Distinguished Professor Emeritus of Biology, Microbiology and Global Studies.

Granholm, who continues to reside in Brookings, views protection of the Big Sioux River and its water quality as vital for residents of our region. "We haven't treated the river very well," he declared. "We're making progress but we need to develop a position of greater respect for the river and its flows."

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make friends with your river

River Quiz Answer

Bridges can be beautiful, like this gem that spans the Big Sioux River in Watertown, South Dakota. Known as the Kemp Avenue Bridge, it has provided passage over the Big Sioux on one of Watertown's busiest streets since 1935. Watertown effectively utilizes the river for recreation and leisure, with four parks, a walking trail and a nature sanctuary along the river within city limits. The Kemp Avenue Bridge –a steel arch structure with a decorative stone façade- beautifies Riverside Park, situated in the heart of the city. The 110-foot long bridge was added to the National Register of Historic Places in 1993.

Why worry about Nitrates?

The application of synthetic nitrate fertilizers to grain fields continues to be a popular practice by many farmers. But is this safe for the environment and for public health? There is mounting evidence it is not.

In 2010, a research effort examining the dangers of nitrates in drinking water was publicized by the Mayo Clinic. Scientists investigated thyroid cancer risks related to nitrate intake from public water supplies.

Their conclusion? The researchers wrote: "We found an increased risk of thyroid cancer with higher average nitrate levels in public water supplies and with longer consumption of water exceeding 5 mg/L nitrate – N."

To reiterate: Investigators stated that consumption of water with nitrates content exceeding five parts per million increased one's chances of being afflicted by thyroid cancer.

Reminder: The federal standard of nitrates in drinking water is twice as high -10 parts per million- as the danger level identified by scientists researching thyroid cancer.

There was this notation in the Journal of Alzheimer's Disease: Researchers at Rhode Island Hospital have found a substantial link between increased levels of nitrates in our environment and food with increased deaths from diseases, including Alzheimer's, diabetes mellitus and Parkinson's.

It's been common knowledge that consuming nitrates in drinking water can harm infants. What's less discussed are other health threats, not to mention the environmental/ecological threats posed by synthetic nitrates applied on land and migrating to water.

Tom Philpott, an agricultural writer-researcher, wrote the following:

"Industrial agriculture's reliance on plentiful synthetic nitrogen brings with it a whole bevy of environmental liabilities: excess nitrogen that seeps into streams and eventually into the Mississippi River, feeding a massive annual algae bloom that blots out sea life; emissions of nitrous oxide, a greenhouse gas 300 times more potent than carbon; and the destruction of organic matter in soil."

Philpott's statement –supported by extensive research- that using nitrate fertilizers degrades soil health seemingly contradicts the very reason synthetic fertilizers are used in the first place. But nitrate fertilizers aren't intended to enrich soils. They are applied to prompt growth by specific plants like corn. We now know that synthetic nitrate fertilizers actually destroy microbes and harm organic matter in soils, diminishing, not improving, overall soil health.

Proponents of synthetic nitrogen fertilizers claim that without nitrate fertilizers farmers can't grow the food needed by the world. However, an Iowa State University study and advocates for regenerative agriculture have found that by shifting to more diverse crop rotations farmers can dramatically reduce their reliance on fertilizers while maintaining current levels of overall food production.

Ag research group says nitrates standard is sub-standard.

According to the Environmental Working Group: "The current enforceable drinking water standard (Maximum Contaminant Level or MCL) for nitrate as nitrogen (N) of ten parts per million (ppm) is unique for at least two reasons: (1) unlike most MCL's, which are based on the results of animal studies, the nitrate standard was set based on data from infants reported in a 1951 study of methemoglobinemia occurrence published in the American Journal of Public Health, and (2) unlike virtually all other water and food standards based on human data, which use at least a 10 fold safety factor to account for differences in human susceptibility to the toxicant in question, the 10 ppm standard for nitrate has no safety factor at all."

Fertilizer runoff from Midwest farm fields, including the Big Sioux River watershed, moves downriver in waterways large and small, eventually collecting in the Mississippi River and emptying into the Gulf of Mexico. There, a vast aquatic wasteland –called a Dead Zone- measuring 6,000 to 7,000 square miles is created by that runoff each spring and summer. Dead Zones destroy aquatic ecosystems, threaten established fishing and seafood businesses, and impact prices for seafood paid by consumers. Problems associated with fertilizer runoff have been exacerbated in recent years by increasing heavy rainfall events.

According to the National Geographic Society, there are about 400 dead zones in the world, with a heavy concentration in the United States. This is an increase from about 10 dead zones worldwide in 1960. The dead zone at the mouth of the Mississippi River rates as one of the world's largest. About 85 percent of the fertilizer runoff causing the Gulf of Mexico dead zone is traced to farm field applications. The rest is attributed to urban sources such as lawns, golf courses and parks.

Editor's Pulpit *by Peter Carrels*

Friends of the Big Sioux River was pleased that a non-profit statewide news reporting service, South Dakota News Watch, recently received national recognition for a series of investigative articles about the worrisome condition of water flowing in our state's rivers.

The nine-part series, titled Rivers at Risk, covered an assortment of issues related to water and rivers, including the Big Sioux River. Articles appeared in numerous South Dakota newspapers, among them the Argus Leader.

The reporter responsible for researching and writing the series was Bart Pfankuch, former editor of the Rapid City Journal. He now serves as primary reporter for South Dakota News Watch.

Thanks to Pfankuch's reporting skills we learned that more than 75 percent of the river miles in South Dakota are classified as "impaired", meaning they contain certain contaminants at concerning levels.

We also learned that state-sponsored inspection of municipal and industrial facilities that discharge pollution into South Dakota rivers was reduced from 158 inspections in 2013 to only 80 in 2017. In 2017, Pfankuch reported, 127 treatment systems in South Dakota were in non-compliance with federal pollution control standards.

Pfankuch's research also revealed that pollution discharge permits issued by the State of South Dakota to businesses and communities have not been appropriately updated, including 121 such permits that have not been updated for at least five years. Several of the largest Big Sioux River pollution sources –the City of Sioux Falls wastewater plant and Smithfield Foods- have not had their permits revised for nearly two decades. Of the state's 20 largest cities, half are operating wastewater treatment facilities on lapsed permits.

In summarizing the results of their research, South Dakota News Watch included the following: "The reporting showed that South Dakota waterways are under siege from the impacts of human activity. From urban runoff and litter, to municipal and industrial wastewater facilities that release millions of gallons of treated sewage and other chemicals into rivers each day, to agricultural operations that send nutrients and dangerous bacteria into waterways in large quantities, most South Dakota rivers are impaired due to pollution. In some cases they are simply unsafe." News Watch added: "A look beneath the surface reveals that from east to west and north to south, almost every waterway in the state serves as a dumping ground for human, agricultural and industrial wastes with dangerous consequences for human health."

All of this is troubling news but a clarion call, to be sure. The effort to clean up and restore South Dakota's rivers and surface waters must involve a multitude of constituencies and lots of leadership, starting with state government.

Big Sioux River Archives

Photo courtesy of Sioux City Public Museum

In the 1890s and early twentieth century a Sioux City, Iowa resident named William Barnes trained two elk to dive into the Big Sioux River from a tall platform and chute he built along the river in Sioux City's Riverside Park. Barnes, a local musician, had trained animals for other purposes –mostly work-related- but he became especially fond of his "famous diving elks" and a horse that similarly performed. Barnes and his diving animals toured the United States and Europe, attracting enthusiastic crowds, including at his Sioux City home base on the Big Sioux River.

Bookshelf *a book review*

One Size Fits None by Stephanie Anderson

Farmers and farm organizations often observe that city folk don't understand how crops are grown and food is produced. Stephanie Anderson's book can change that, as she provides insight and information about farming that will engage and enrich non-farmer and farmer alike. One Size Fits None is Anderson's first book, and it is sprinkled with affective accounts describing the supportive upbringing she enjoyed on a South Dakota farm/ranch in rural Harding County. She earned an English degree at Augustana University in Sioux Falls, and took a job as a reporter and editor at a farm publication. While working for that newspaper she became disenchanted with chemical-oriented agriculture -the type of farming practiced by her dad- and this book chronicles her explorations to learn about better approaches to land management, stewardship and crop/food production while explaining the farming operation on her family's farm. Anderson, now an instructor of writing at Florida Atlantic University, where she earned an MFA in creative writing, profiles successful practitioners of regenerative farming and their strategies to protect soil and other natural resources. Her interview subjects pursue agriculture at disparate locations around the country, including a bison ranch in western South Dakota, and a large, diverse farm in central North Dakota. Anderson's articulate, compelling analysis won't please defenders of conventional grain-growing and feedlots, but she provides an informed look at agriculture that benefits any reader, especially those whose relationship to agriculture involves the consumption of food and water. In other words, all of us.

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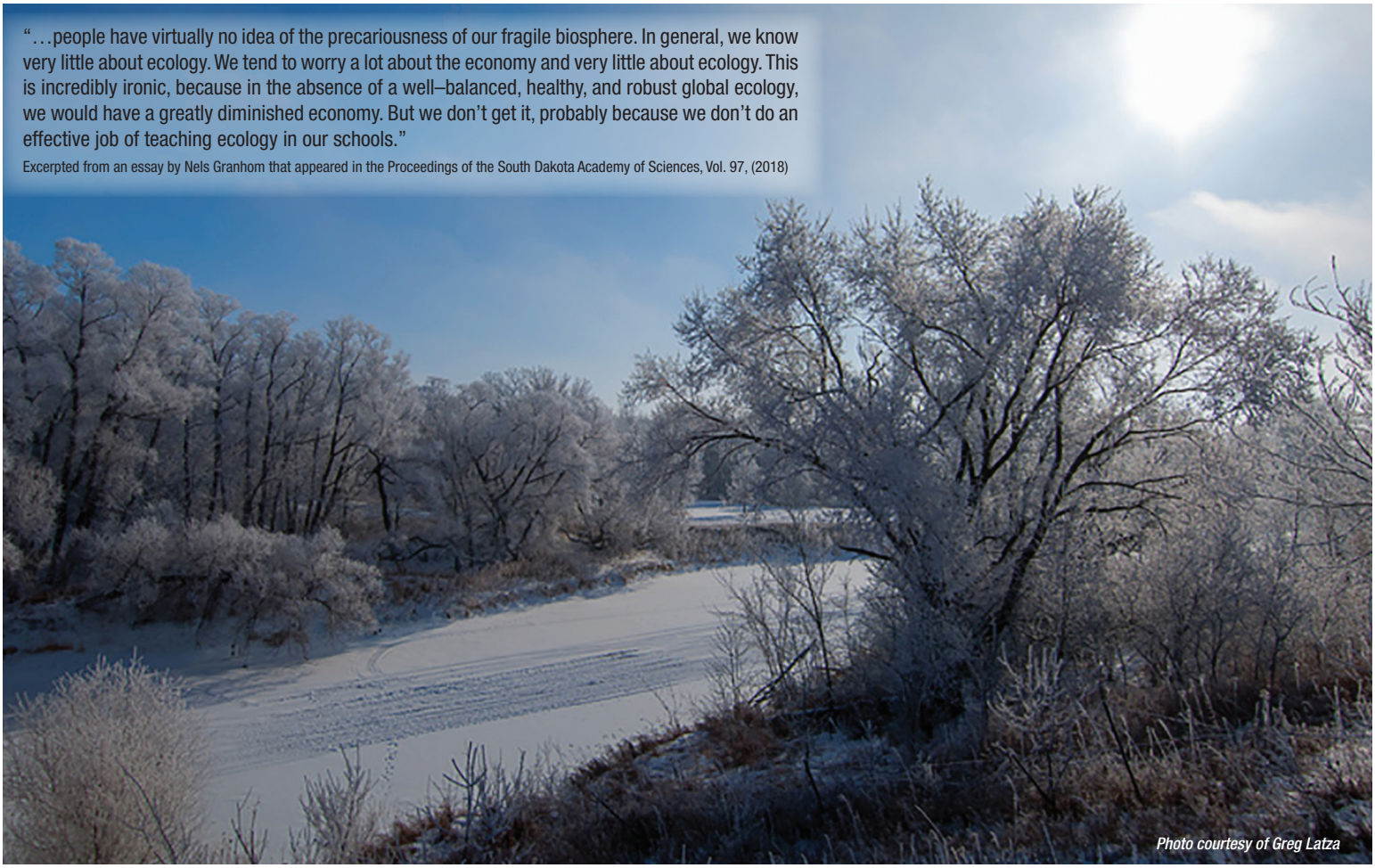

"…people have virtually no idea of the precariousness of our fragile biosphere. In general, we know very little about ecology. We tend to worry a lot about the economy and very little about ecology. This is incredibly ironic, because in the absence of a well–balanced, healthy, and robust global ecology, we would have a greatly diminished economy. But we don't get it, probably because we don't do an effective job of teaching ecology in our schools."

Excerpted from an essay by Nels Granhom that appeared in the Proceedings of the South Dakota Academy of Sciences, Vol. 97, (2018)

Photo courtesy of Greg Latza

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