Big Sioux River Action for Vitality and Optimization

Team 6

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Mission Statement

The *BRAVO* watershed plan will restore the Big Sioux River by improving the water quality and ensuring environmental and recreational use for future generations. To do this, we aim to get 100% of Big Sioux River segments to meet the beneficial use standard of limited contact recreation and restore 20,000 acres of grassland by 2035. Actionable solutions are needed to restore the Big Sioux River and surrounding ecosystems so that communities are provided with clean water and abundant wildlife.

02

Background & History

Background

Interstate Watershed:

- Drains ~ 8,282 square miles in eastern South Dakota, southwestern Minnesota, and northwestern Iowa
- River flows for ~420 miles starting in Summit, South Dakota and empties into the Missouri River near Sioux City, Iowa

Background

Main Uses

Agriculture

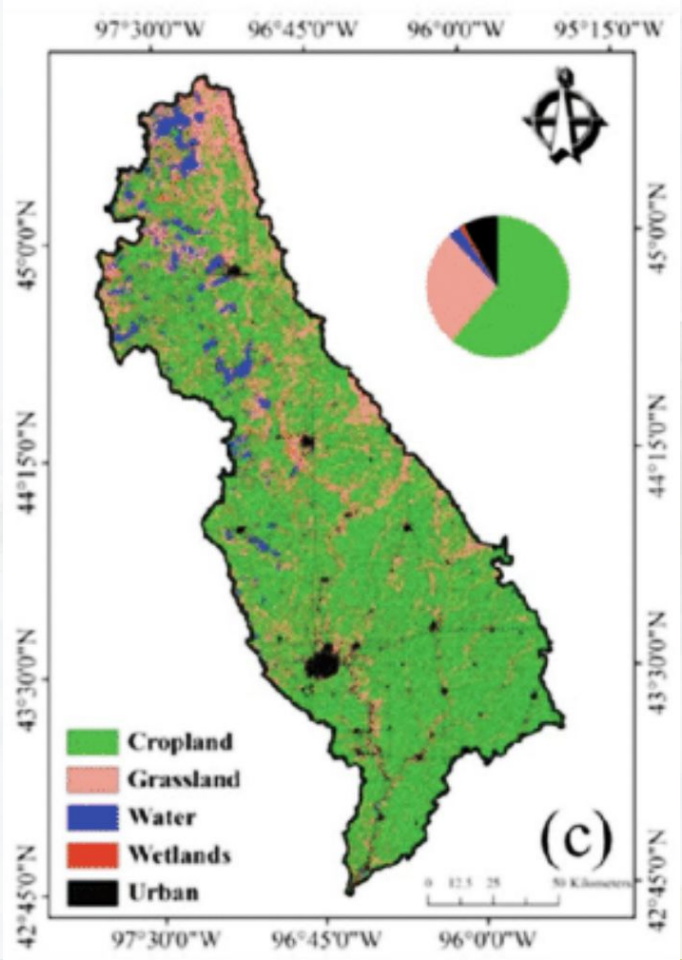
- Livestock, corn, soybeans

Municipal and Industry use

- Drinking water for ~350,000 people

Recreation

- Kayaking, wildlife observation



History

13th Century

Rich soil and wild game in the area attracted the Santee and Yankton Sioux Tribes to settle along the Big Sioux River.

History

19th Century

American settlers explore Dakotas, white settlement leads to violent conflicts and displacement of the Sioux tribes.

Government granted homesteading rights to Native people, allowing the Flandreau (Santee) people to acquire farmland titles.

History

Today

The watershed now supports agricultural and rural communities as well as growing urban centers like Sioux Falls and Brookings.

20th Century

Homesteaders introduced livestock and large-scale farming techniques. Over tillage and loss of native prairie grass → conservation efforts

03
Policies & Mandates

Big Sioux River Project Programs

Older Policies

- Riparian Area Management Program (2008) – for cropland & pasture land
- Seasonal Riparian Area Management Program (2013) – for pastureland

Riparian Buffer Initiative (2021)

Administered by: South Dakota Department of Agriculture and Natural Resources (DANR)

Total funding: $3 million (must be spent by June 30, 2025)

Eligibility & Requirements:

- Land must be in the Big Sioux River watershed
- Buffer strips must be 50–120 feet wide
- Grass must be maintained at minimum 4 inches high
- 10-year minimum enrollment
- No cutting for hay during peak summer recreation months
- No livestock grazing until fall

2025 Legislative Agenda

Enforcing Total Maximum Daily Load (TMDL) Regulations

Push for stricter enforcement of pollutant limits within the Big Sioux River watershed.

Incentivizing Conservation Programs

Advocate for funding programs that support farmers in adopting sustainable practices.

Transparency in Pollution Monitoring

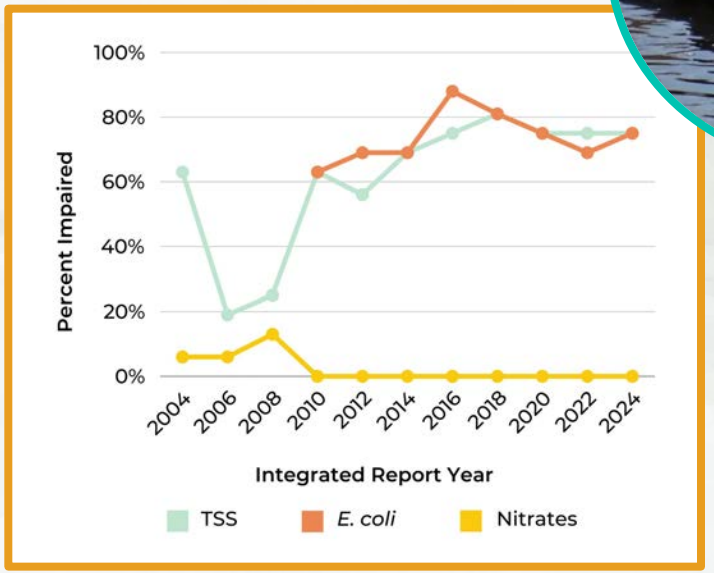
Promote policies requiring real-time water quality data that is accessible to the public.

04

Problems & Solutions

Problems of the Big Sioux River:

1. E. Coli Contamination
2. Total Suspended Solids (TSS)
3. Wildlife Habitat Destruction



Source: Friends of the Big Sioux

Problem 1: E. Coli

Only 25% of the Big Sioux River segments meet daily maximum coli levels acceptable for limited contact (1,178 CFU/100 mL) and/or immersion recreation*

- Communities lose safe recreational access to the river
- *Currently all segments designated for immersion recreation exceed daily maximum levels of E. coli (235 CFU/100mL)

<u>Sources of impairment:</u>

- Leaky sewage pipes, discharge from wastewater treatment plants, runoff from feedlots, manure from farms and ranches, and fecal waste from dogs and wildlife.
- Spike in E. coli impairment after a heavy rainfall event

E. Coli Solutions

Goal: Get 100 % of river segments to acceptable average E. coli levels for limited contact recreation by 2035.

Add riparian buffers for natural filtration of E. coli from livestock: Minimize grazing and mowing of planted vegetation during high rainfall season

Collaboration and incentives between states :support farmers through pooled funding

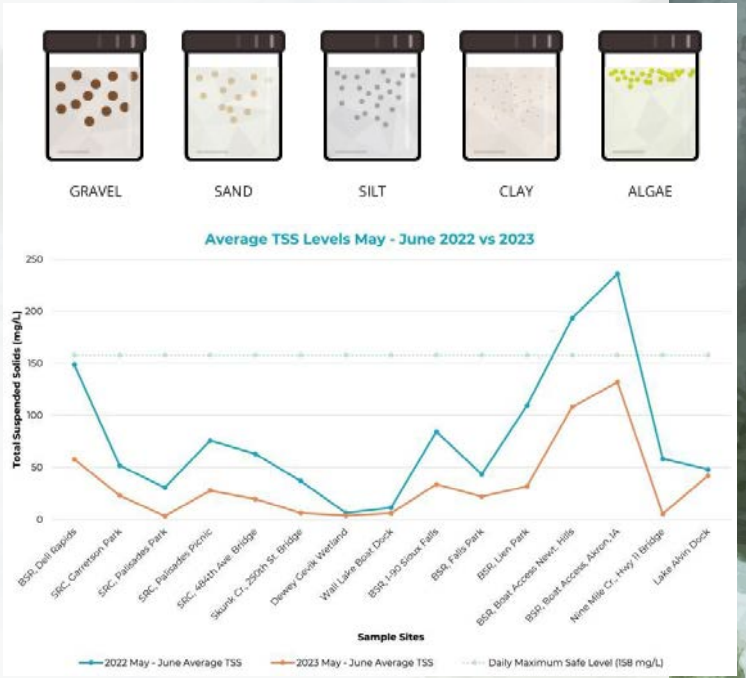
Community outreach: cleaning up after pets, check on septic systems, minimize mowing

Monitoring water treatment plants: investment in more powerful filtration systems for growing cities

Monitoring and controlling overpopulation of geese, ducks, and other wildlife

Problem 2: Total Suspended Solids

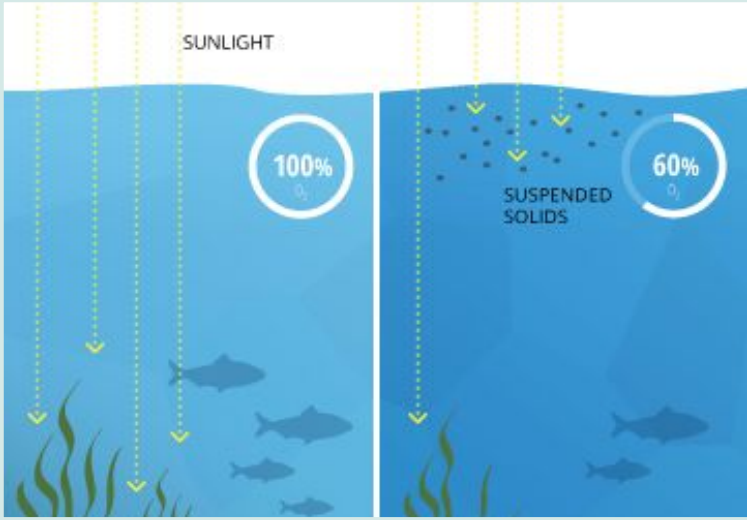
- 75% of Big Sioux River segments exceed safe levels of total suspended solids (TSS)
- Only 25% meet the fish habitat standard of 158 mg/L. TSS levels rise with heavy rainfall and drop during droughts.
- TSS includes silt, organic matter, waste, and sewage, which reduce water clarity and disrupt water chemistry and photosynthesis.



Source: Friends of the Big Sioux

TSS Solutions

<u>Goal</u>: Get 100% to the fish habitat standard of a maximum of 158 mg/L and a 30-day average of 90 mg/L by 2035



<u>Riparian Buffer Strips</u>

- Directly intercepts runoff before it reaches the river
- Filters out sediment, nutrients, and pathogens
- Proven to reduce TSS and improve habitat for fish and wildlife

<u>Cover Crops</u>

- Keeps soil covered year-round, reducing erosion
- Improves soil structure and water infiltration
- Reduces sediment runoff during vulnerable seasons (fall/winter)

<u>Retention Basins / Sediment Traps</u>

- Captures runoff during rain events
- Allows solids to settle before water enters the river
- Especially effective in areas with high surface runoff (both ag and urban)

Problem 3: Wildlife Habitat Destruction

- Grassland acreage in the Big Sioux River watershed has been reduced down to 17%, resulting in decreased wildlife populations.
- This is caused by the increase in agriculture in the area.
- 72% of the watershed is farmland as of 2015

WHD Solutions

<u>Goal:</u> Restore 20, 000 acres of grassland, wetland, and forest in the watershed by 2035

- Contribute to habitat conservation programs to prevent further damage
- Contribute to grassland restoration
- Plant vegetation on the riverbanks to protect fish populations
- Monitor wildlife populations and ensure they are stable

05

Conclusion &
Recommendations

Conclusion & Recommendations

The *BRAVO* Watershed plan aims to restore the Big Sioux River by solving the problems of E. coli impairment, TSS impairment, and wildlife habitat reduction. By 2035, we plan to restore 20, 000 acres of grassland, get 100% of river segments to acceptable E. coli levels, and ensure that TSS levels meet the beneficial use standard for fish life propagation. This will ensure that the Big Sioux River has clean water and abundant wildlife.

QUESTIONS

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