West Fargo High School Study of Urban Influences on the Lower Sheyenne River

19th Ave. North Bridge site "TEST SITE B"



Sheyenne River Connections



- North Dakota's longest river: 581 miles!
- Class IA waterway
- Drains an area
 7,810 square miles
 of land
- 800 ft drop in elevation from headwaters to connection with Red River
- ► 53 species of Fish!

(ND Water Science Center, USGS, 2016)

Concerns in Red River Watershed Sediment Loads- Turbidity **Eutrophication of lake Winnipeg Sulfates from Devils Lake Outlet**



WFHS Citizen Science Program

- 5 classes: Field Biology and Env. Science Juniors and Seniors
- Student groups become "Experts" on parameters: pH, DO, TDS, Conductivity, Arsenic, Phosphates, Nitrates, Turbidity, Coliforms and BOD
- Mini-research poster session presented to staff and students
- Research includes land use recommendations to improve parameter at sites

Example: Mini-research posters





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Materials and Methods

- YSI Pro-plus sonde: Temp, conductivity, TDS, pH and Dissolved Oxygen lowered to 6/10th depth, upstream side of bridge
- HACH Turbidmeter
- HACH chemical kits for B.O.D. and arsenic
- CHEMets ampule kits for total phosphate and nitrates
- *Van Dorn sampler lowered to the 6/10th depth where possible at all three sites for water collection









Sheyenne River Watershed Concerns:

- Sediment Load

 (Turbidity =
 ND Dept. of Health
 Greatest Impairment)
- Urban influences
- Nutrient Load (N and P)
- Sulfates from Devils Lake Outlet



TEST SITES: SITE A 12th Ave NW of city



Study Site B, 7 19th Ave., NW of city



Sewage Lagoon Effluence Biannually, Diversion water added in (previous map)

Study Site C, 🛧 Bridge, further NW of city

FLOW



TEST SITE RESULTS

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Parameter	12 th Ave	19 th Ave	40 th Ave
	Site A	Site B	Site C
рН	8.64	8.67	8.67
Nitrates ppm	0	0	0
Phosphates	0.2	0.1	0.4
ppm			
Dissolved	10.89	10.79	10.84
Oxygen mg/L			
Turbidity	80.6	88.4	88.7
NTU			
TDS in mg/L	1430	1436.5	1443
Conductivity	1539	1536	1539
microseimens			
Arsenic ppb	0	0	10

A: Closest to Town, Influences: Storm Drain runoff

> B: Down stream of Site A, Influences: Sewage lagoons and Sheyenne Diversion tieback

C: Down stream of Site B, Influences: Maple River confluence

Lake Winnipeg Nutrient issue:

WFHS Tested sites for nitrates and total phosphates using CHEMets K-6904 (N= 0-4.5 mg/L sensitivity) And CHEMets K-8510 (P, 0-10 mg/L sensitivity) RESULTS: Nitrates: Negligible Phosphates: Sites A and C significant amounts

> Lake Winnipeg Eutrophication





100% *© CLEAN

Seventh generation

Many Thanks

- Dr. Andre Delorme and Bonita Roswick of Prairie Waters Education Center for training, financial support and chest waders
- ND Water Conference Staff
- West Fargo Public Schools
- River Watch staff
- EPA Environmental Educators awards program
- National Env. Ed.
 Foundation



References

- Google maps
- ► NRCS map May, 2012
- ► USGS

Climatology and Potential Effects of an Emergency Outlet, Devils Lake Basin, North Dakota By G. J. Wiche, A. V. Vecchia, *and* Leon Osborne Report: U.S. Geological Survey Fact Sheet FS-089-00, 2000 <u>http://nd.water.usgs.gov/pubs/fs/fs08900/htdocs/</u>

- ► EPA Map My Water
- Red River Fisheries Management Plan, 2008-2012
- YSI equipment
- Red River Basin Initiative
- Savethesheyenne.org
- State of Lake Winnipeg: 1999 to 2007 HighlightsPublic Works and Government Services of Canada, 2007

Thank you! Questions?

