

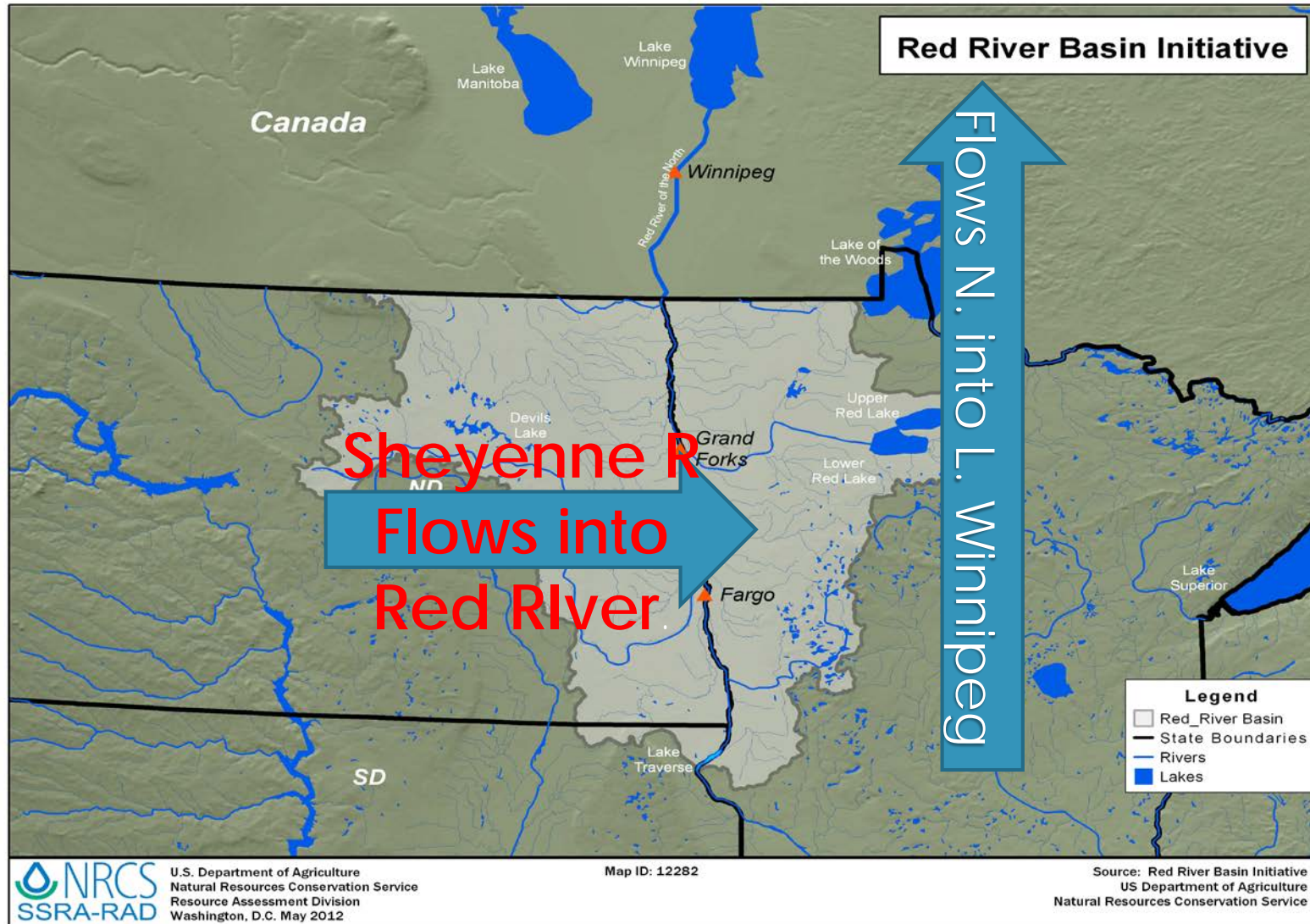
West Fargo High School

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

INTRODUCTION

TITLE and AUTHORS
The Levels of D.D. in the Great Lakes
 — Lisa Ferguson
 — Sarah Williams
 — Jenna Schmitt

RESULTS

CONCLUSION

RECOMMENDATIONS

REFERENCES

MATERIALS:

PROCEDURE

SITE REACTIONS

LEVEL OF D.D. in Great Lakes

LEVEL OF D.D. in Great Lakes

SITE	LEVEL OF D.D. in Great Lakes	LEVEL OF D.D. in Great Lakes
Site 1	3.72	3.72
Site 2	3.26	3.26
Site 3	3.58	3.58

1. When you are at the field, put two 100ml water bottles in each baggie, plug the top so there are no air leaks.

2. Put one bottle into the cooler, even give the dissolved oxygen kit.

3. Around the perimeter the D.D. kit, then record the date.

4. Follow steps on all sites.

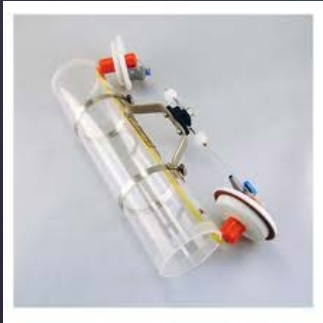
5. When you have the data, then use the formula: $100 \times \frac{D.O.}{D.O. \text{ sat}}$

REFERENCES

Watershed Assessment Criteria for Great Lakes
 Environmental Protection Agency
 Environmental Science & Technology
 Environmental Science & Technology

Materials and Methods

- ▶ YSI Pro-plus sonde: Temp, conductivity, TDS, pH and Dissolved Oxygen lowered to 6/10th depth, upstream side of bridge
 - ▶ HACH Turbidimeter
 - ▶ 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, ★ 19th Ave., NW of city



Sewage Lagoon
Effluence Bi-
annually,
Diversion water
added in (previous
map)

Study Site C, ★ Bridge, further NW of city



TEST SITE RESULTS

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

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



Take Aways:



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

<http://nd.water.usgs.gov/pubs/fs/fs08900/htdocs/>

- ▶ 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 Highlights Public Works and Government Services of Canada, 2007

Thank you! Questions?

