West Fargo High School Water Testing
The Lower Sheyenne 2013

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Project History

- Testing on Site A began 2003
  - Limited data, varying equipment

Site B added in 2006

Site C Added in 2008

Early Funding and HACH kits purchased by Moorhead State University Science Program

(Courtesy Dr. George Davis)

Current Research Supported by

- Valley City State University: Dr. Andre Delorme
- Bonita Roswick; Prairie Waters Education Center
- F-M River Watch and WF Public Schools
- International Water Institute

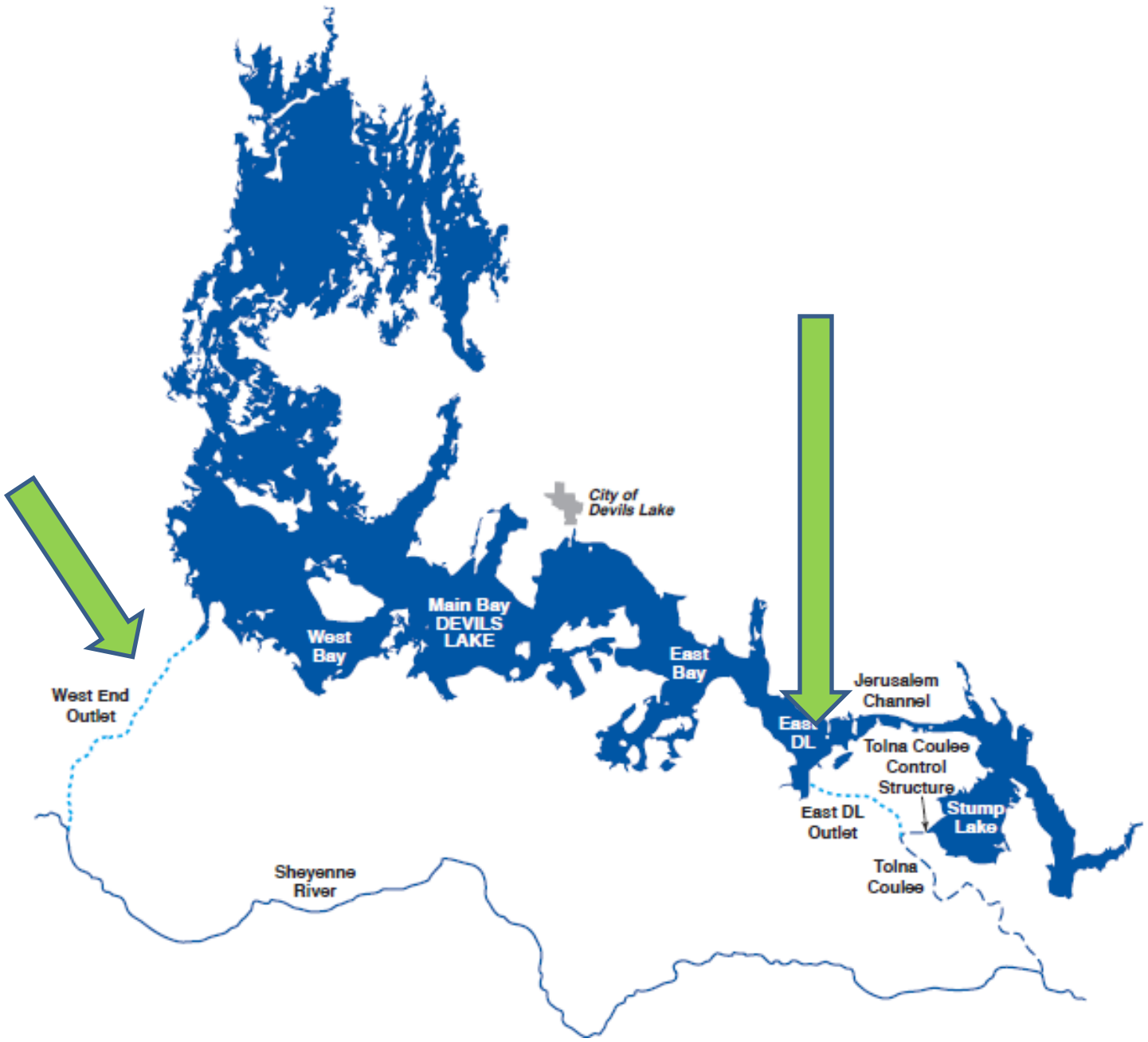
Prairie Waters
Education & Research Center
◆Valley City State University◆

Introduction

1. Sheyenne River flows from central North Dakota to the Red River
2. Devils Lake : Higher in sulfates and conductivity
3. Up to 600 cfs discharge from West end and East Devils Lake outlets (ND State Water Commission, 2012)
4. Devils lake water: higher sulfates than Sheyenne river
5. High salinities limit fish hatch
6. Survival to hatching (SH) lower ($P < 0.05$) in sodium-sulfate type waters (Peterka and Koel, 2011).

Average Conductivity Levels	µS/cm
Deionized Water:	0-1
Healthy Stream:	150-500
Seawater:	50,000

Source- Red River Basin Water Quality Mounting Volunteer Manual


City of
Devils Lake
West
Bay
Main Bay
DEVILS
LAKE
East
Bay
Jerusalem
Channel
East
DL
Tolna Coulee
Control
Structure
Stump
Lake
East DL
Outlet
Tolna
Coulee
West End
Outlet
Sheyenne
River

Basin Study Area:

NW of the City of West Fargo,

Materials and Methods: YSI SONDE 650 MDS for Conductivity, 6/10th depth, upstream side of bridge, also D- nets to collect macros

SITE A: 12th Ave. LAND USE FACTORS

- ***Natural***
  - **Lack of Trees**
  - **Turbidity, soil/ rocks**
  - **No vegetation**
- ***Anthropogenic***
  - **Run- off from the houses on both sides of river**
  - **Storm drain**
  - **Fertilizer from grass**
  - **Run- off from road**
  - **Bug pesticides (during summer)**
  - **Salt in the winter**

SITE A: 12th Ave. NW


Newer housing development, outside of meander

SITE B: 19th Ave. LAND USE FACTORS

- ***Natural***
- **Lack of trees**
- **Little vegetation**

- ***Anthropogenic***
- **Run- off from road/ bridge**
- **Livestock/ animal waste**
- **Pesticides /fertilizers from farm lands**
- **Waste water lagoon effluence**

SITE B: 19th Ave. NW

SITE C: 40th Ave. LAND USE FACTORS

- ***Natural***
  - **Lack of trees**
  - **Maple river Tributary**
- ***Anthropogenic***
  - **Run off from bridge**
  - **Pesticides from farm land**
  - **Pollution from homes**
  - **Livestock/ animal waste**

SITE C: 40th Ave NW

Student Testing Groups

Arsenic, DO, BOD, pH, Nitrates, Phosphates,

Total Coliforms, E.Coli, Turbidity and Total Dissolved Solids/Conductivity

TIME FRAME: October and May

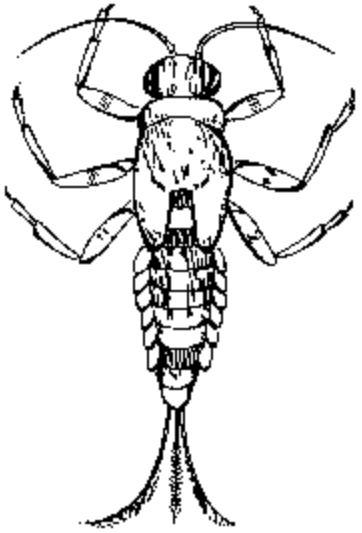
Main Focus : Conductivity (Devils Lake outlet effects)

Macros commonly found in the lower Sheyenne

Aquatic Worm

Leech

Lunged Snail




Prairie Waters #4


Checking out the
smectite-- bit o'
turbidity here, eh?


Finding Average
Stream channel
Depth

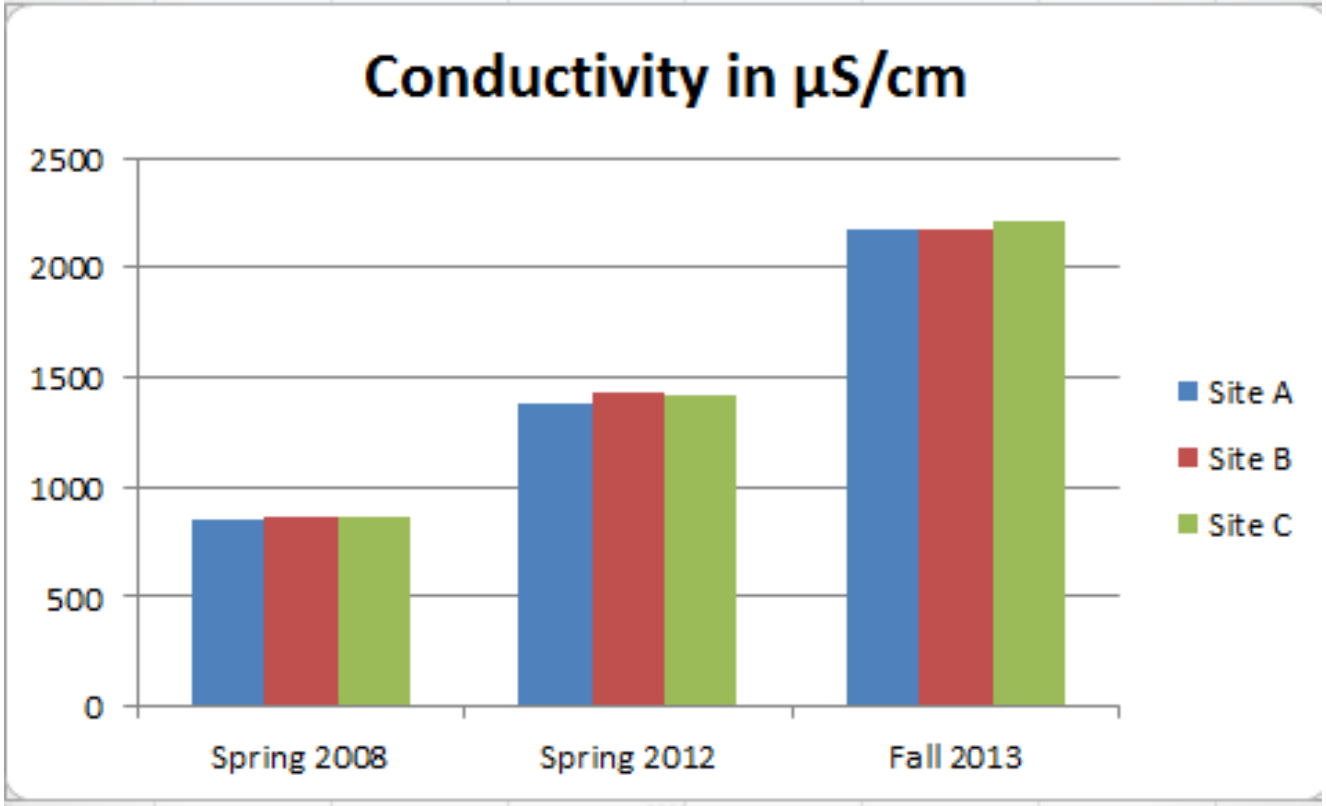
Van Dorn Sampler at 6/10th Depth


Dissolved
Oxygen
Hach Test
Kit


SONDE at 6/10th Depth

Difficult to get to 6/10th: Current high

RESULTS



CONDUCTIVITY	Spring 2008	Spring 2012	Fall 2013
Site A	853	1383	2174
Site B	866	1427	2178
Site C	870	1423	2207

CONCLUSION

- **Conductivity is greatly increased with Devils Lake water flow**
- **Discharge during some periods of river flow is made up of more Devils Lake water than Sheyenne River water**
- **Biodiversity of macro-invertebrates low in the lower Sheyenne river, reducing the variety of possible fish species**
  (Species Located: Crayfish, bloodworms, mayfly, leech)

TAKEAWAYS

- High Conductivity causes higher expenses for potable water treatment
- Studies on various populations need to be done so that sensitive organisms are not lost to due to the higher levels of conductivity

Possible Future Studies:

A)Test 19th Ave. Site directly after a sewage lagoon effluence dump

B)Count fish species populations in Lower Sheyenne

C)More Data is better data: will continue study!

References

- ND Red River Basin Water Quality Monitoring Volunteer Manual
- **ND State Water Commmission , Devils Lake Flood Fact Sheet 3/2013**
- Todd M. Koel, John J. Peterka, 2012
- Canadian Journal of Fisheries and Aquatic Sciences (Impact Factor: 2.32). 04/2011; 52(3):464-469. DOI:10.1139/f95-047


THANK YOU FOR YOUR TIME:
SEE YOU NEXT SEASON!