



# **James RiverWatch**

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# Introduction

## RiverWatch

- Allows students to monitor water quality
- This is our 2<sup>nd</sup> year in the program
- Our first year monitoring the James River

## James River

- Made up of the runoff of many streams and creeks in the area.
- Begins in Wells County, about 10 miles northwest of Fessenden, North Dakota.
- Ends in Yankton, South Dakota, where it runs into the Missouri River.
- Approximately 710 miles long and drains an area of about 20,653 square miles.
- The river plays a large role in the drainage of eastern ND and SD.



# James River Watershed





# Goals

- To see if water quality is affected by our local dam and the confluence with Cottonwood creek between sites.
- To see if our data/results is affected by the water level of the James.



# Site A



61

Highway 13 13

Highway 13

La Moure Rott



# Site B







80TH St SE

# Site C

101ST Ave SE

102ND Ave SE

81ST St SE

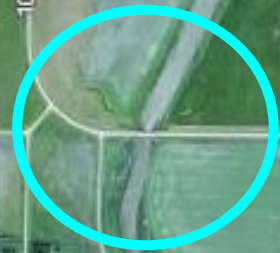
100TH Ave SE

102ND Ave SE

82ND St SE

Cr-a

82ND St SE







# Why Did We Choose These Sites?

- Easily accessible
  - Good bridges from which to sample
- Chose sites upstream and downstream of the dam
- Chose sites upstream and downstream of the confluence of the James River and Cottonwood Creek



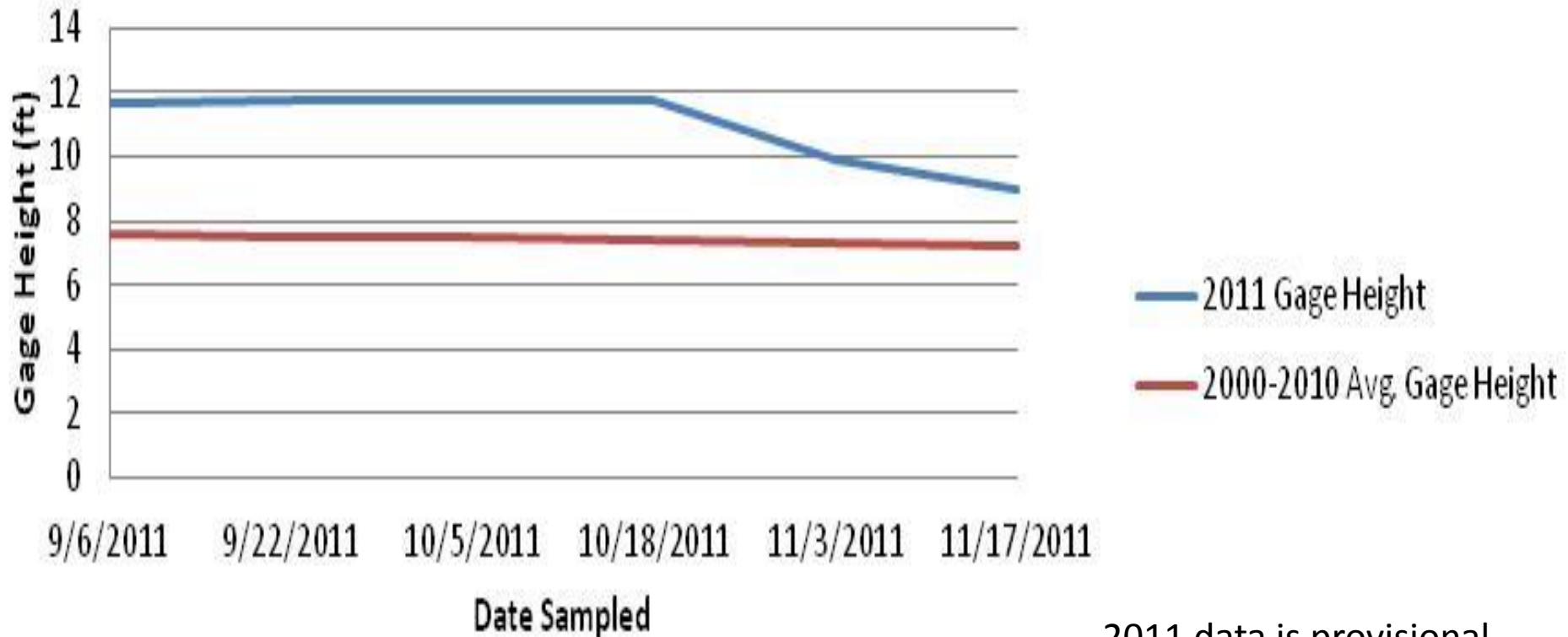
# Procedures

- Every two weeks we calibrated our YSI Sonde and turbidimeter just prior to sampling.
- We visited each of the three sites, sampling and recording data. We measured temperature, turbidity, pH, dissolved oxygen, and specific conductivity.



# 2011 River Levels

## 2011 USGS (06470500) James River at LaMoure Gage Height vs. Average

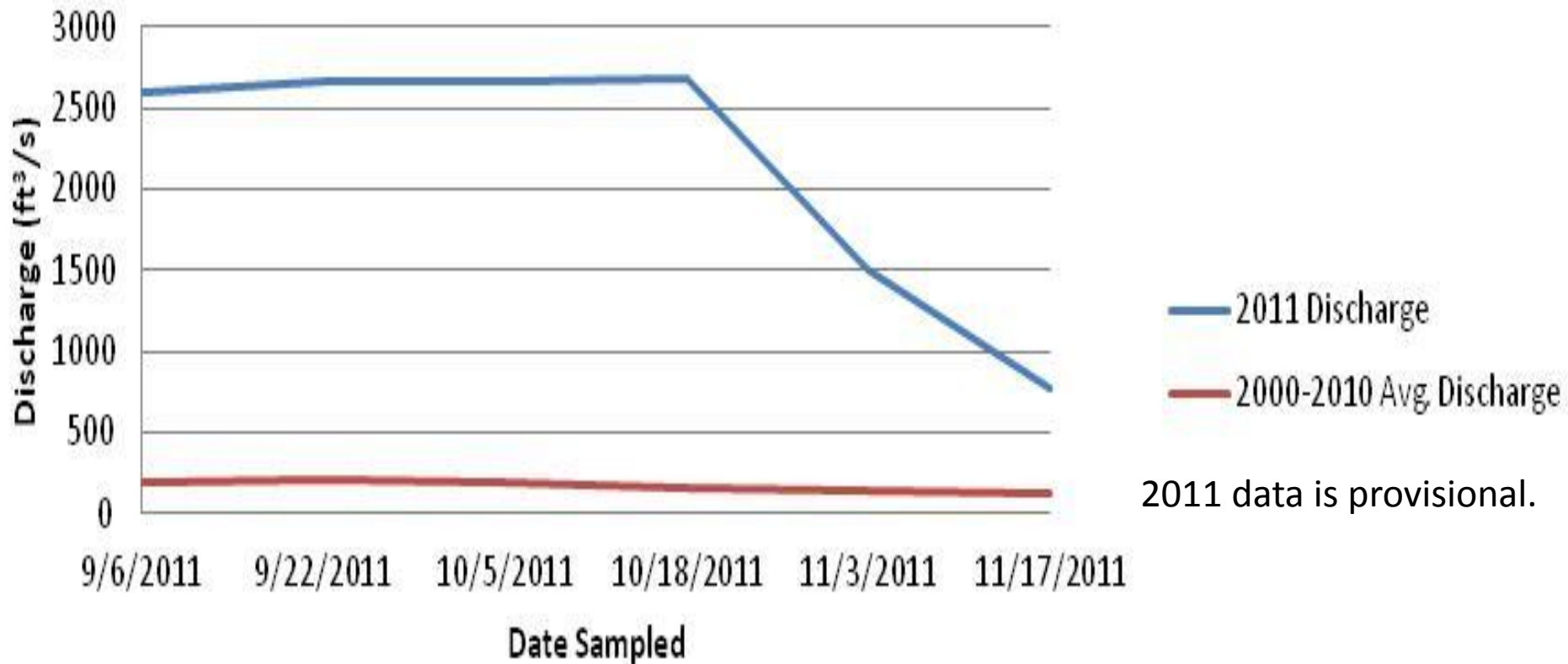


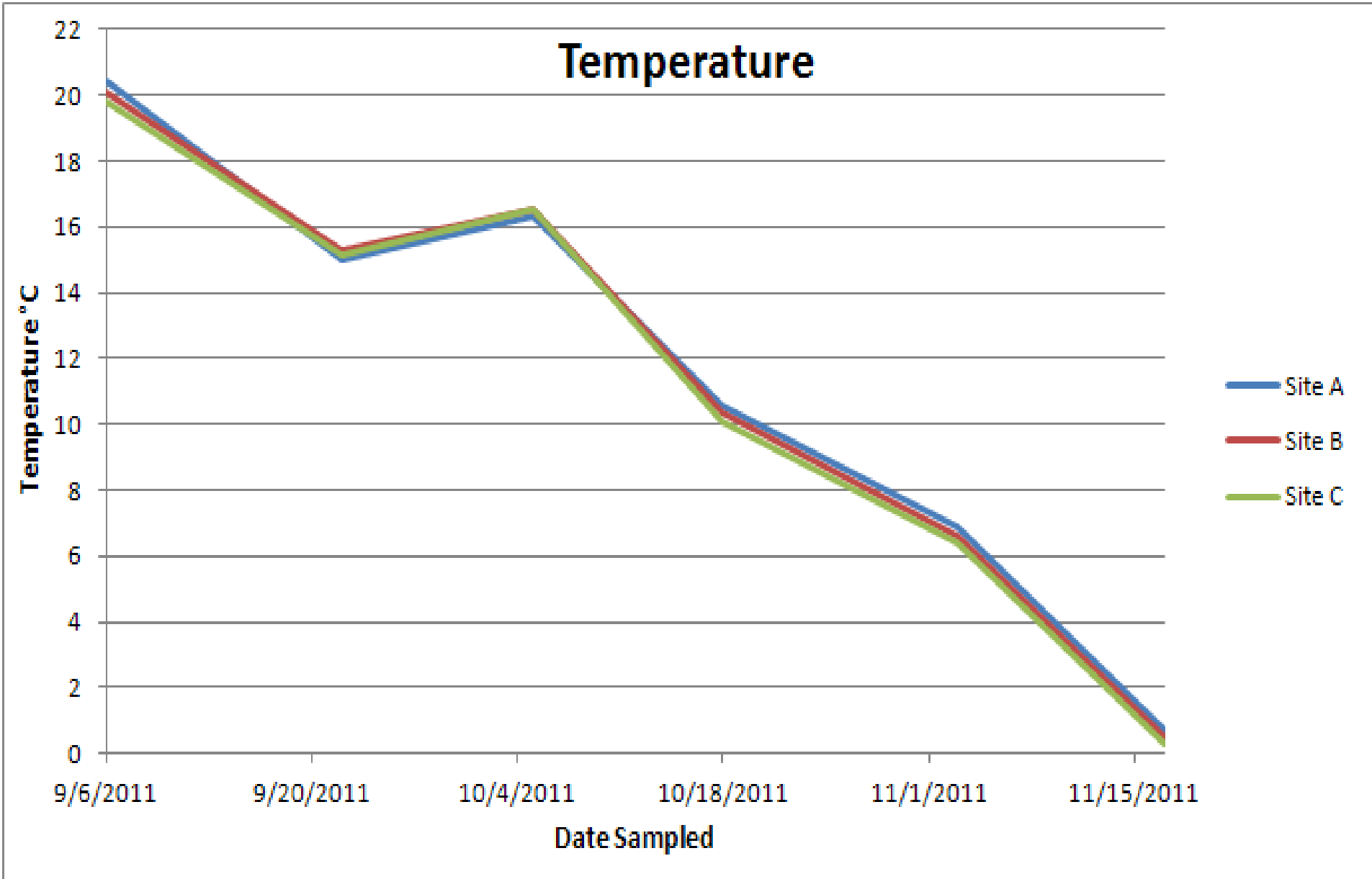
2011 data is provisional.



# 2011 River Discharge

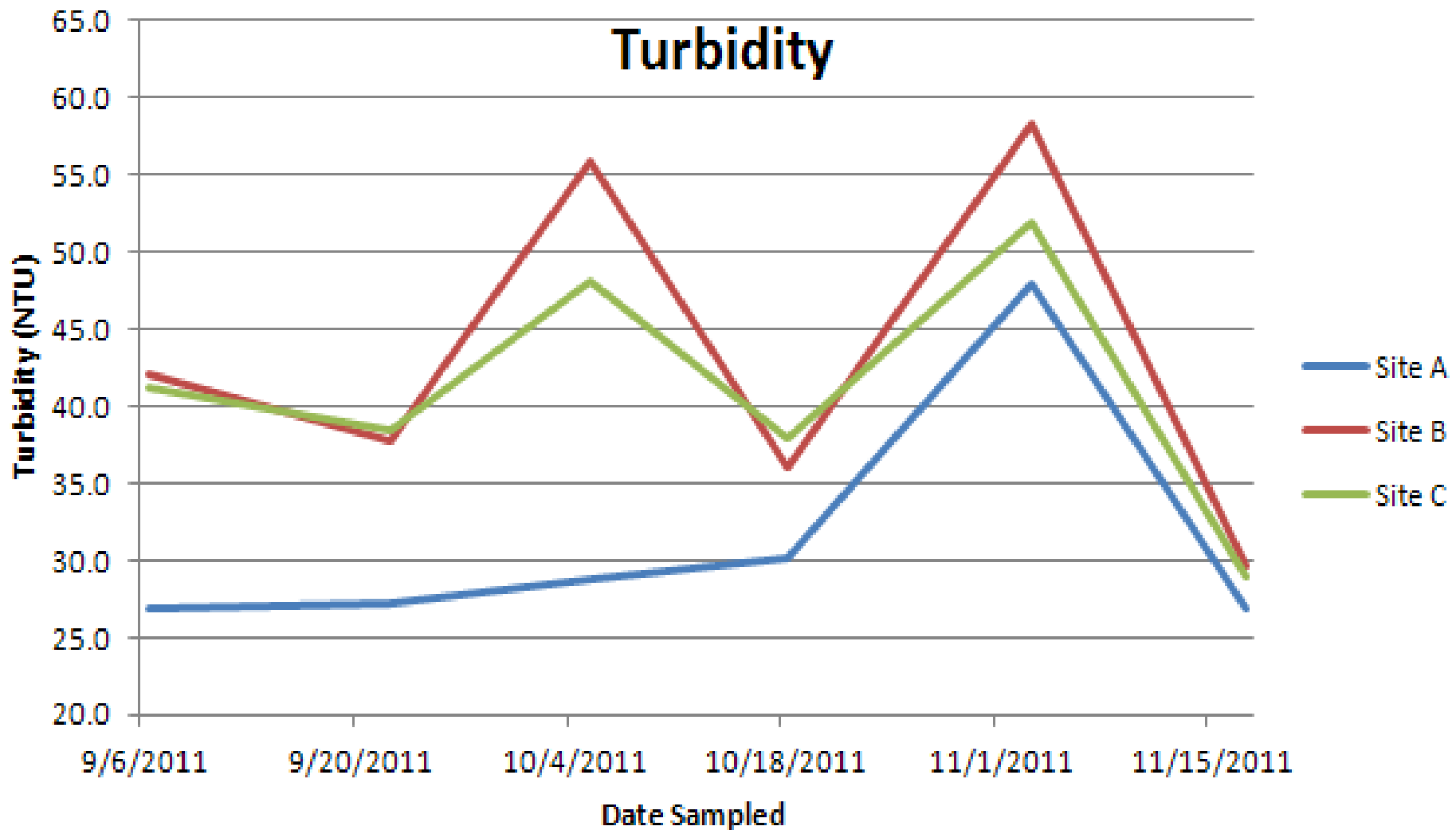
## 2011 USGS (06470500) James River at LaMoure Discharge vs. Average



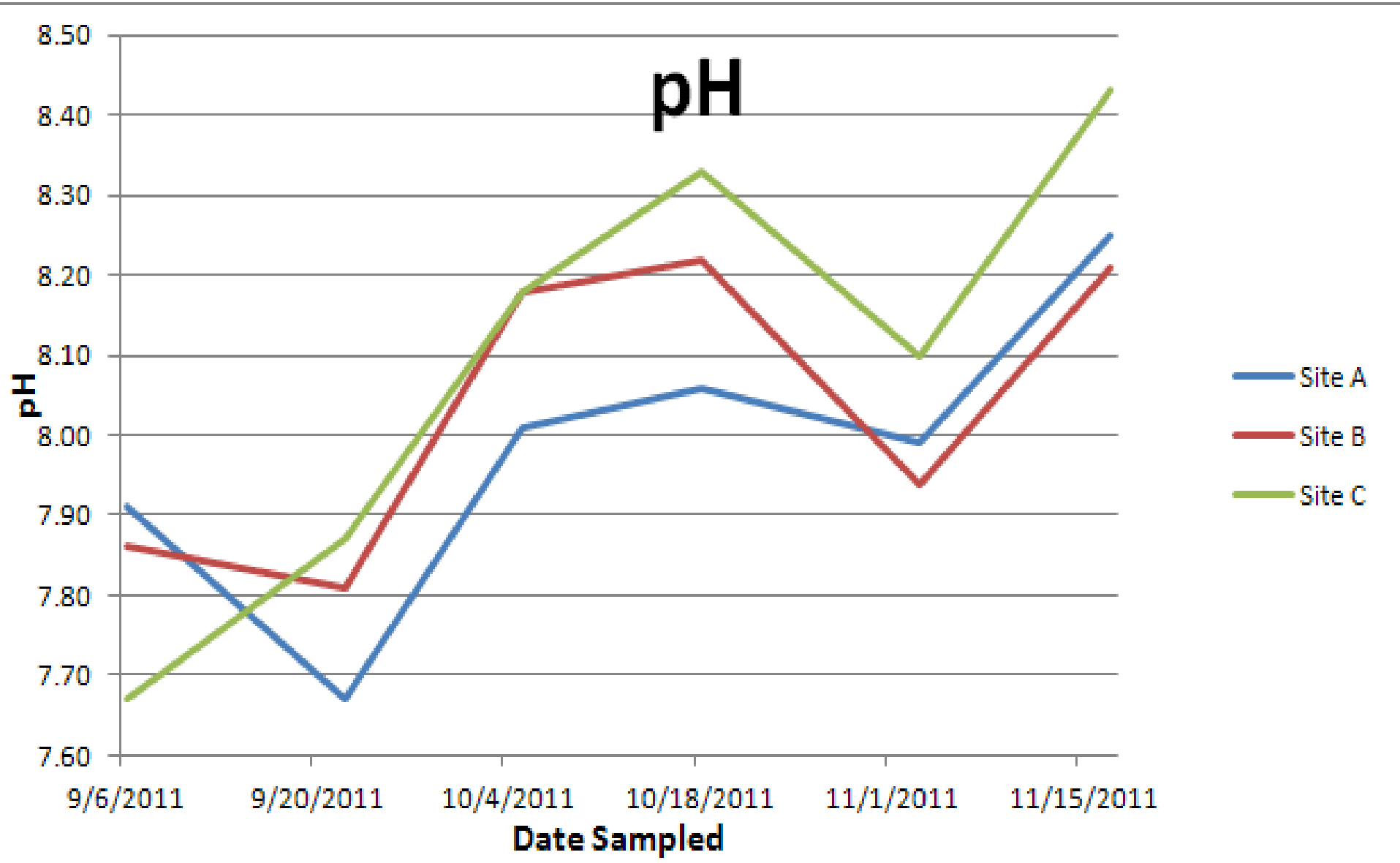


Different organisms prefer different temperature ranges. Generally, water temperatures are expected to be between 5 and 25 °C.



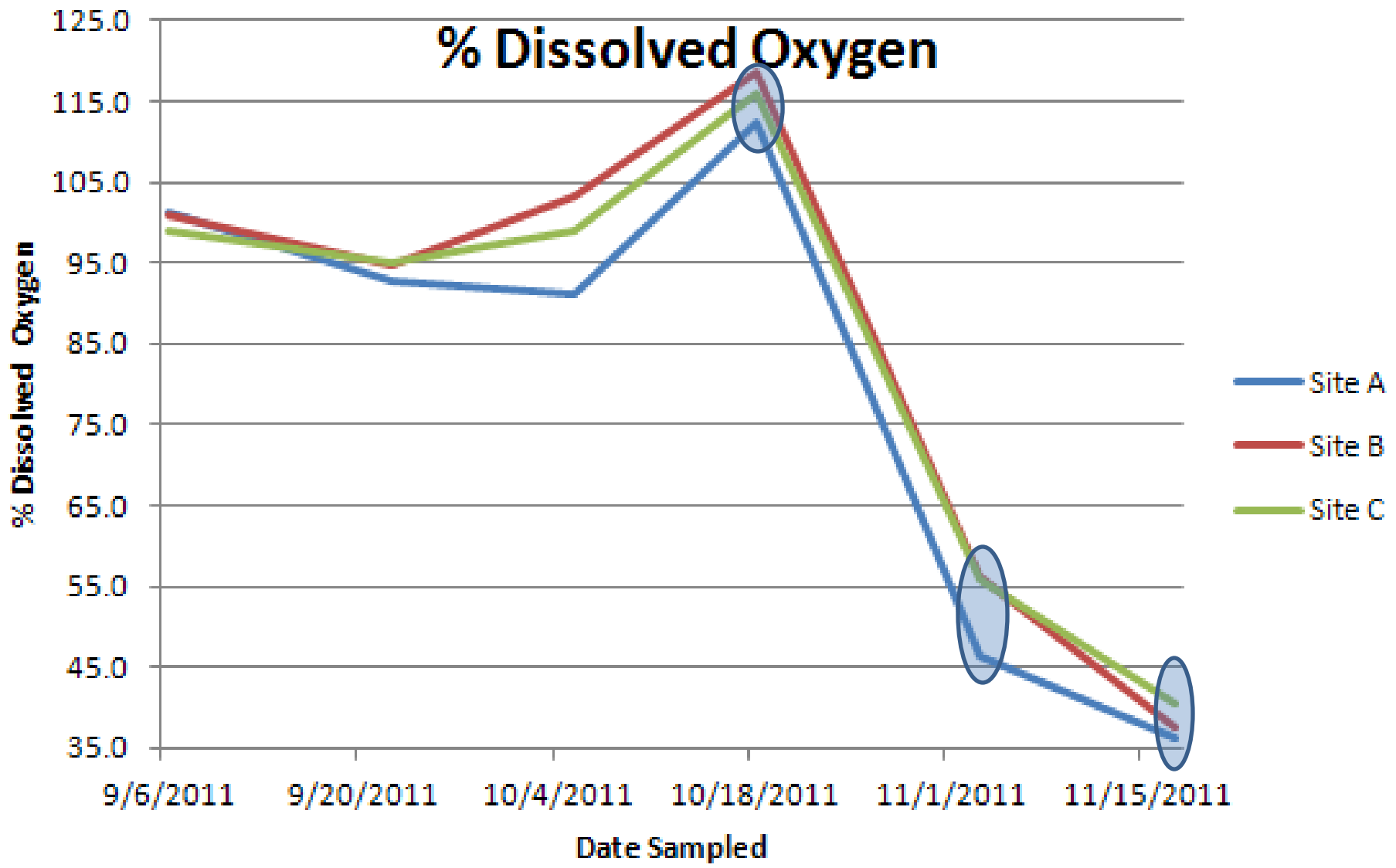


Moderately low levels of turbidity are ideal, but exactly what a moderate level is in North Dakota is debatable.



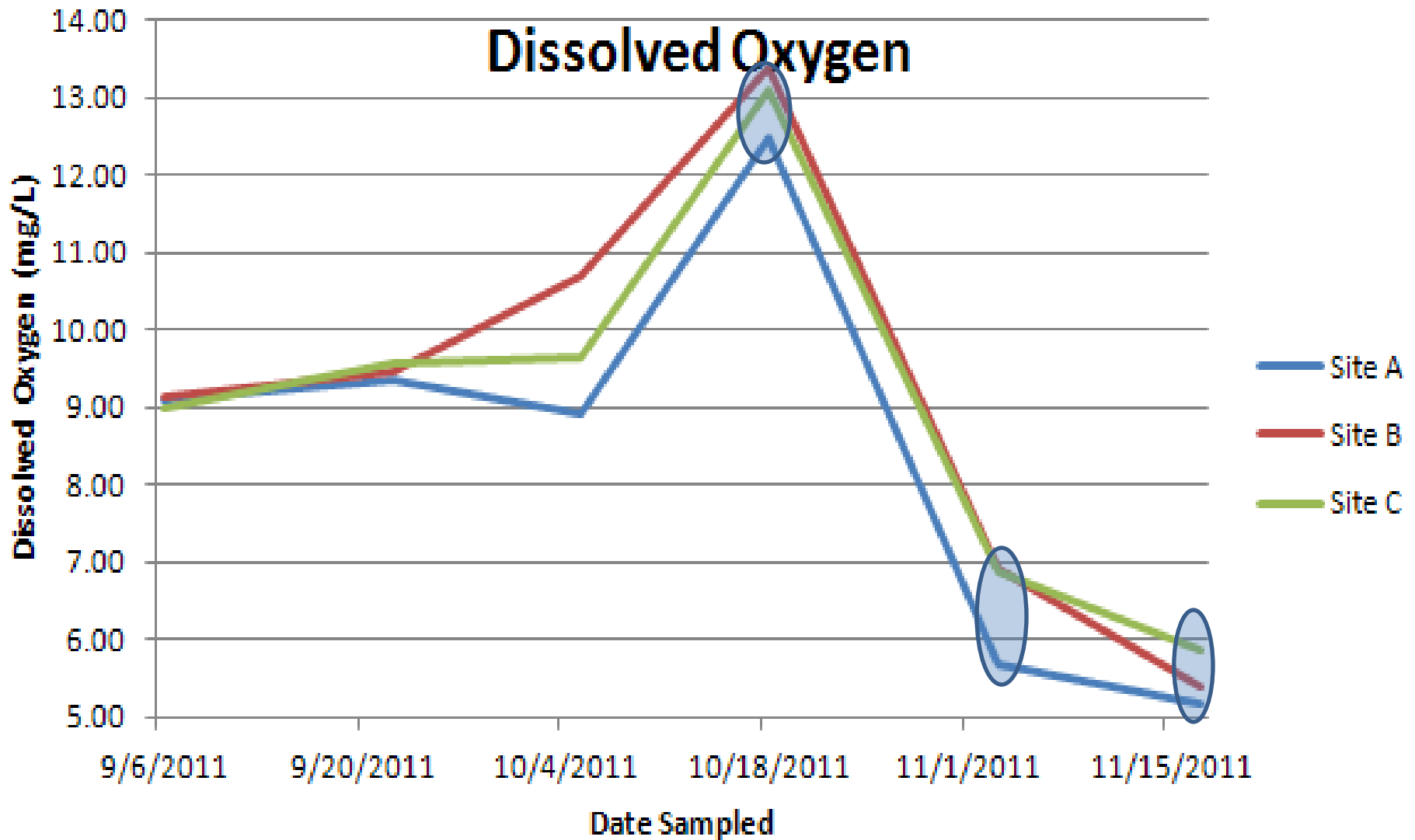
The optimal range for pH is between 6.5 and 8.2. Although, levels between 5 and 9 are safe for most species.

# % Dissolved Oxygen



A healthy range for percent of dissolved oxygen is around 90-100%. These odd measurements may be because of calibration errors.

# Dissolved Oxygen



Optimal levels of dissolved oxygen are between 7 and 9 mg/L.

	Description	GPS North	GPS West
Site A	James River, Upstream of La Moure (site furthest upstream)	N 46°22.272'	W 098°18.602'
Site B	James River, Downstream of La Moure, La Moure Dam, and USGS Station	N 46°16.973'	W 098°14.469'
Site C	James River, Downstream of confluence with Cottonwood Creek (site furthest downstream)	N 46°14.419'	W 098°16.159'

Date	Site (Date Sampled)	Temperature (°C)	Specific Conductivity (mS/cm)	% Dissolved Oxygen	Dissolved Oxygen (mg/L)	pH	Turbidity (NTU)	Gage Height (ft)*	Discharge (ft <sup>3</sup> /s)*
9/6/2011	Site A	20.42	0.577	101.2	9.10	7.91	26.8	11.64	2600
9/6/2011	Site B	20.09	0.582	101.0	9.13	7.86	42.1		
9/6/2011	Site C	19.82	0.586	99.1	9.01	7.67	41.2		
9/22/2011	Site A	15.03	0.624	92.8	9.35	7.67	27.3	11.74	2660
9/22/2011	Site B	15.31	0.627	94.7	9.48	7.81	37.7		
9/22/2011	Site C	15.18	0.629	95.2	9.56	7.87	38.5		
10/5/2011	Site A	16.35	0.596	91.0	8.91	8.01	28.8	11.72	2670
10/5/2011	Site B	16.53	0.597	103.1	10.70	8.18	55.9		
10/5/2011	Site C	16.54	0.599	98.9	9.65	8.18	48.1		
10/18/2011	Site A	10.58	0.649	112.2	12.49	8.06	30.1	11.74	2680
10/18/2011	Site B	10.34	0.643	118.5	13.40	8.22	36.0		
10/18/2011	Site C	10.07	0.640	116.1	13.10	8.33	37.9		
11/3/2011	Site A	6.88	0.735	46.5	5.68	7.99	47.9	9.88	1510
11/3/2011	Site B	6.58	0.729	56.1	6.91	7.94	58.3		
11/3/2011	Site C	6.41	0.727	56.0	6.90	8.10	52.0		
11/17/2011	Site A	0.72	0.770	36.3	5.19	8.25	26.8	8.95	774
11/17/2011	Site B	0.48	0.775	37.6	5.40	8.21	29.6		
11/17/2011	Site C	0.29	0.776	40.5	5.85	8.43	29.0		

\* Data for River Height and Discharge taken from USGS site on James River at La Moure for that date



# Summary

- Water levels were very high throughout summer and early fall, but went down in late fall and winter
- As water levels dropped, specific conductivity rose
- pH is within an optimal range
- Turbidity seems normal for ND rivers
- The dissolved oxygen measures vary significantly, possibly due to equipment error.



# Conclusion

- After examining and analyzing our data, we have concluded that the water quality did not change significantly as it interacted with the dam and tributary.
- What we did find is that water levels do affect our water quality. Some trends we found as the water levels receded are that:
  - specific conductivity rose
  - dissolved oxygen dropped
  - pH remained in an optimal level



# Bibliography

- DeLorme, Andre. "RiverWatch Training." RiverWatch Fall Conference. Prairie Waters Education and Research Center. Kathryn, N.D.. 27 Oct 2011. Lecture.
- "Geology.com." *North Dakota State Map Collection*. Geology.com, n.d. Web. 07 Oct 2011.  
<<http://geology.com/state-map/north-dakota.shtml>>.
- Murdoch, Tom, Martha Cheo, and Kate O'Laughlin. *Streamkeeper's Field Guide*. 1st ed. Everett, WA: The Adopt-A-Stream Foundataion, 1991. 164-182. Print.
- North Dakota Data Support Team, . "James River at LaMoure, ND." *USGS Water Resources*. USGS, 21 002 2012. Web. 21 Feb 2012.



# 2011-2012 LaMoure RiverWatch Team



## Special Thanks

This project was made possible by a grant from the Environmental Protection Agency, the North Dakota Department of Health, and the Prairie Waters Education and Research Center. We appreciate the opportunity they have given us.