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Abbott Run River Study

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Abbott Run River Study
North Attleboro
High School
10/25/06 – 10/26/06

Bridgewater State College

Purpose of Study

- **The purpose of our study is to research any physical, chemical or biological changes that may have occurred.**
- **Abbott Run river is a Class A river and a public water supply source for Pawtucket, RI.**
- **We checked the pH, dissolved oxygen, the river flow, specific conductivity, temperature, precipitation levels, benthic macro-invertebrates, fecal colony counts, and depth to see if the river met the standard of Massachusetts.**

Blackstone River Watershed

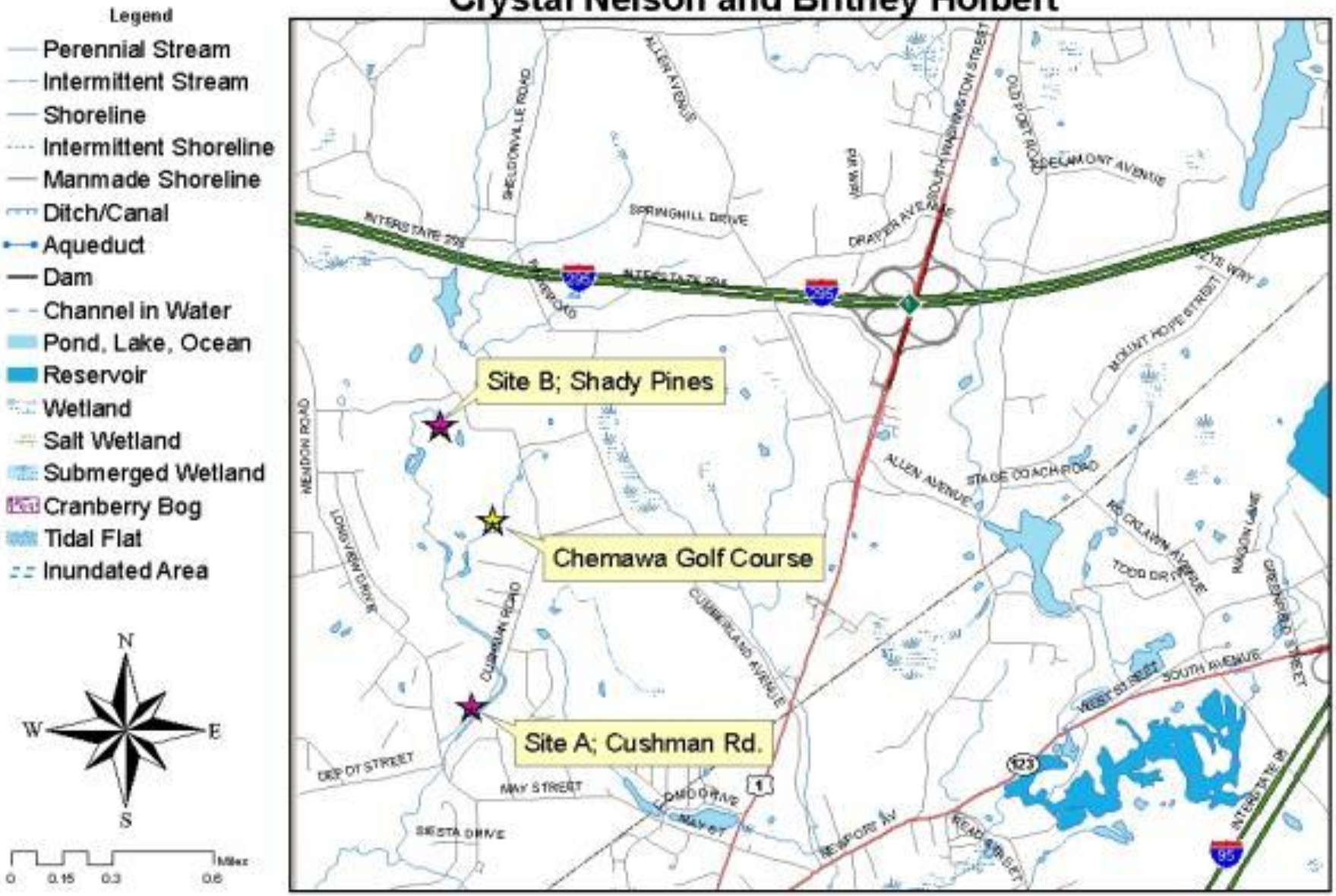
Blackstone River Watershed

Massachusetts

Rhode Island

Abbott Run River

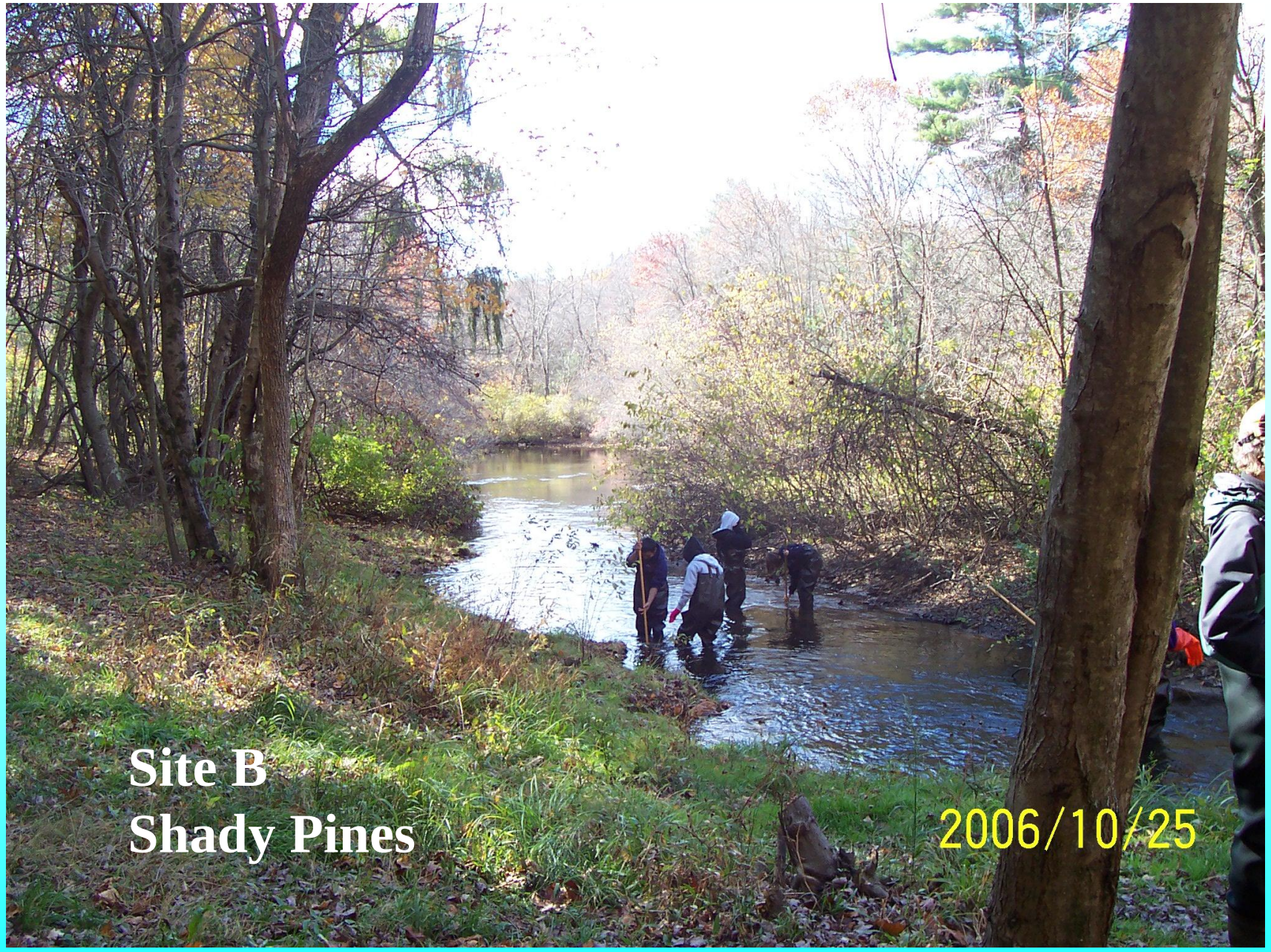
Abbott Run Site Map
October 25, 2006
Crystal Nelson and Britney Holbert



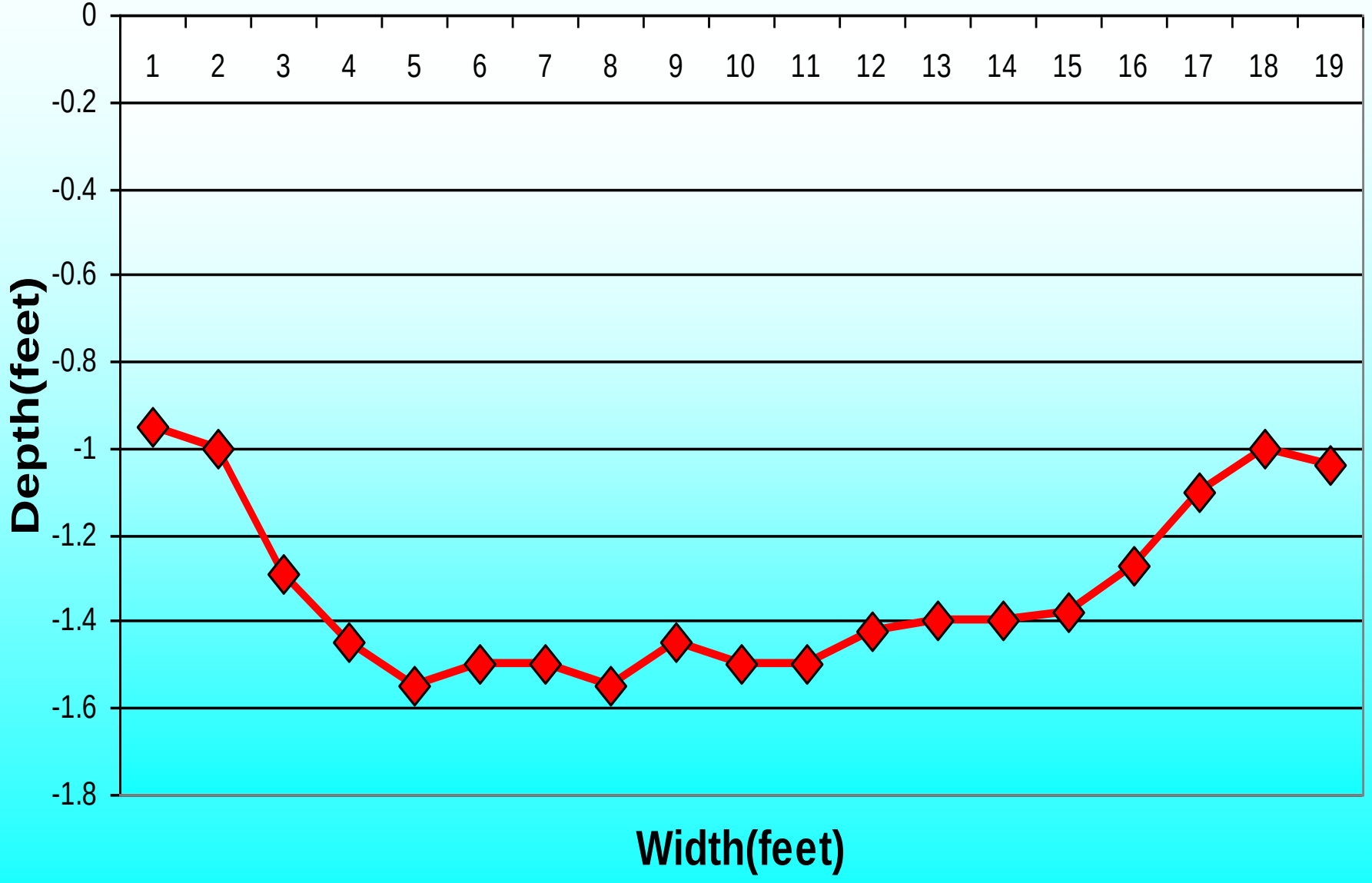
Cushman Rd. Site A

Site A –
Cushman Rd.
2006/10/25

Shady Pines Site B

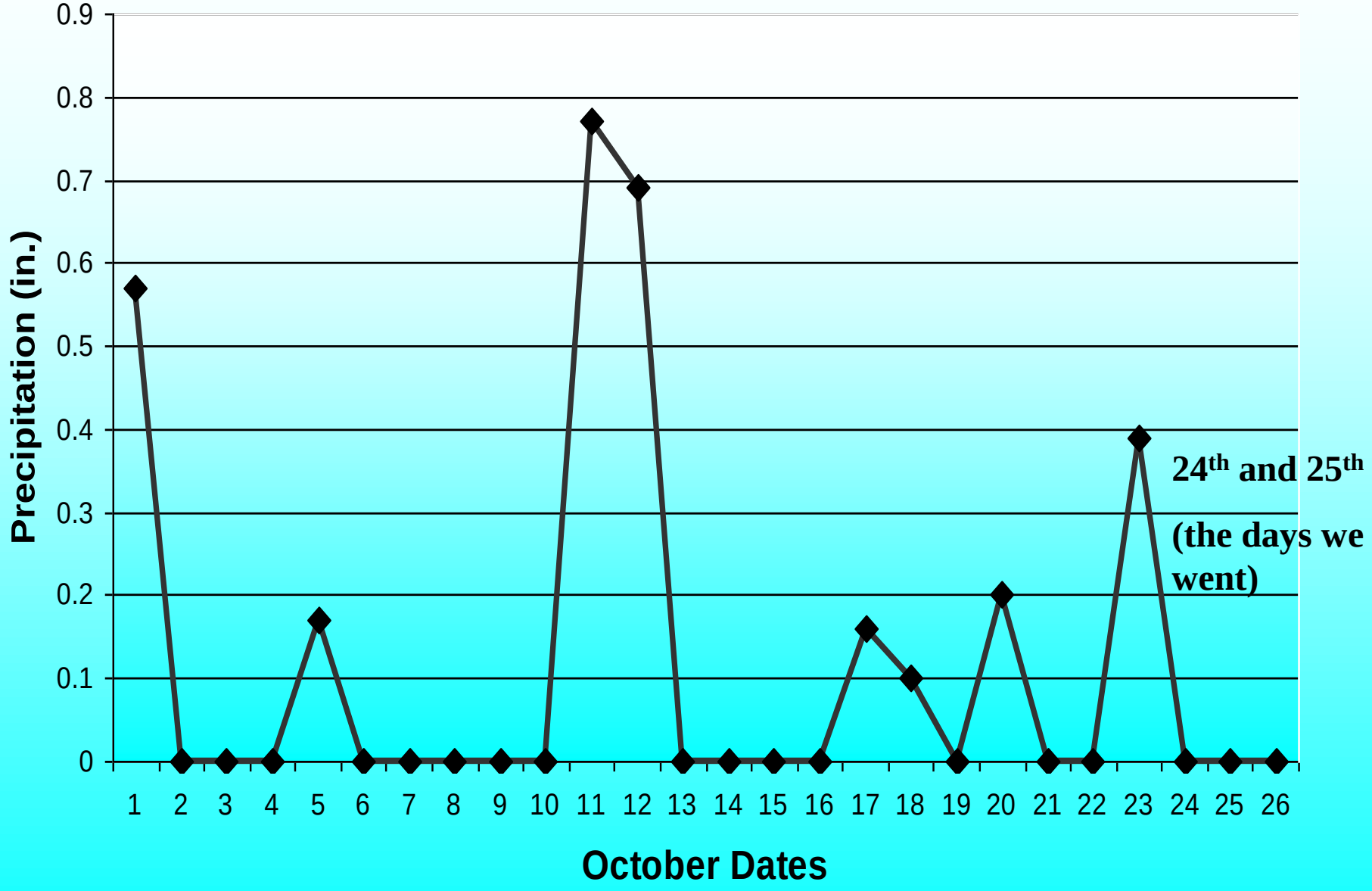

Site B
Shady Pines
2006/10/25

Stream Profile Cushman Road
10/25/06



Stream Profile Shady Pines
10/25/06

Precipitation Graph for North Attleboro
10/1/06 through 10/26/06



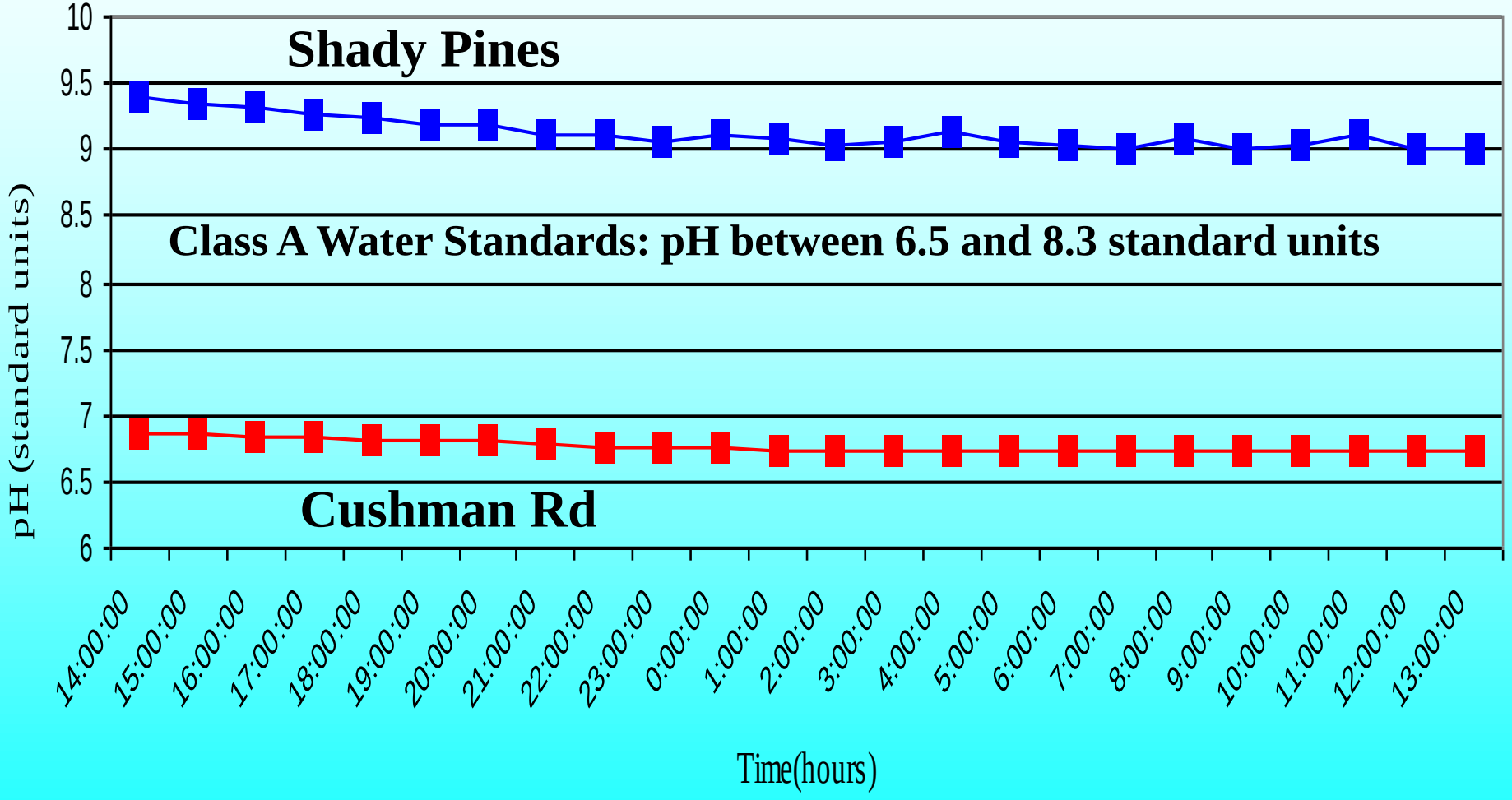
Average Flow, Total Discharge, Average Stream Width, Average Depth, Bottom Composition

Cushman Road		Shady Pines	
Average Flow	0.36 ft/sec	Average Flow	0.76 ft/sec
Total Discharge	18.77 CFS 531.68 L/s	Total Discharge	24.92 CFS 705.67 L/s
Average Width	38 feet	Average Width	22 feet
Average Depth	1.47 feet	Average Depth	1.59 feet
Bottom Composition	The bottom is solid and rocky	Bottom Composition	The bottom is sandy

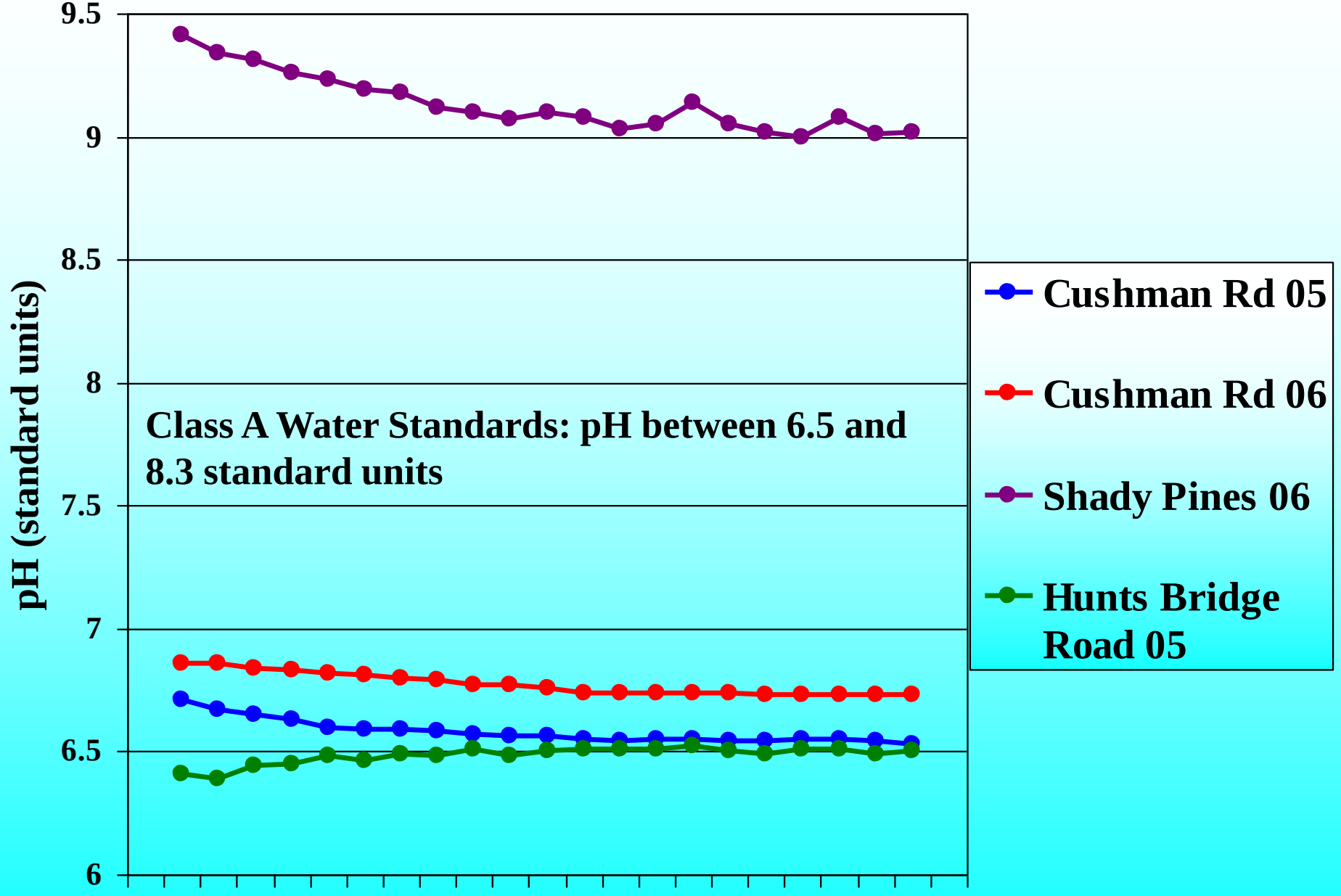
Shady Pines, 10/25/06

Hunts Bridge Road - Site B – Upstream 10/31/05

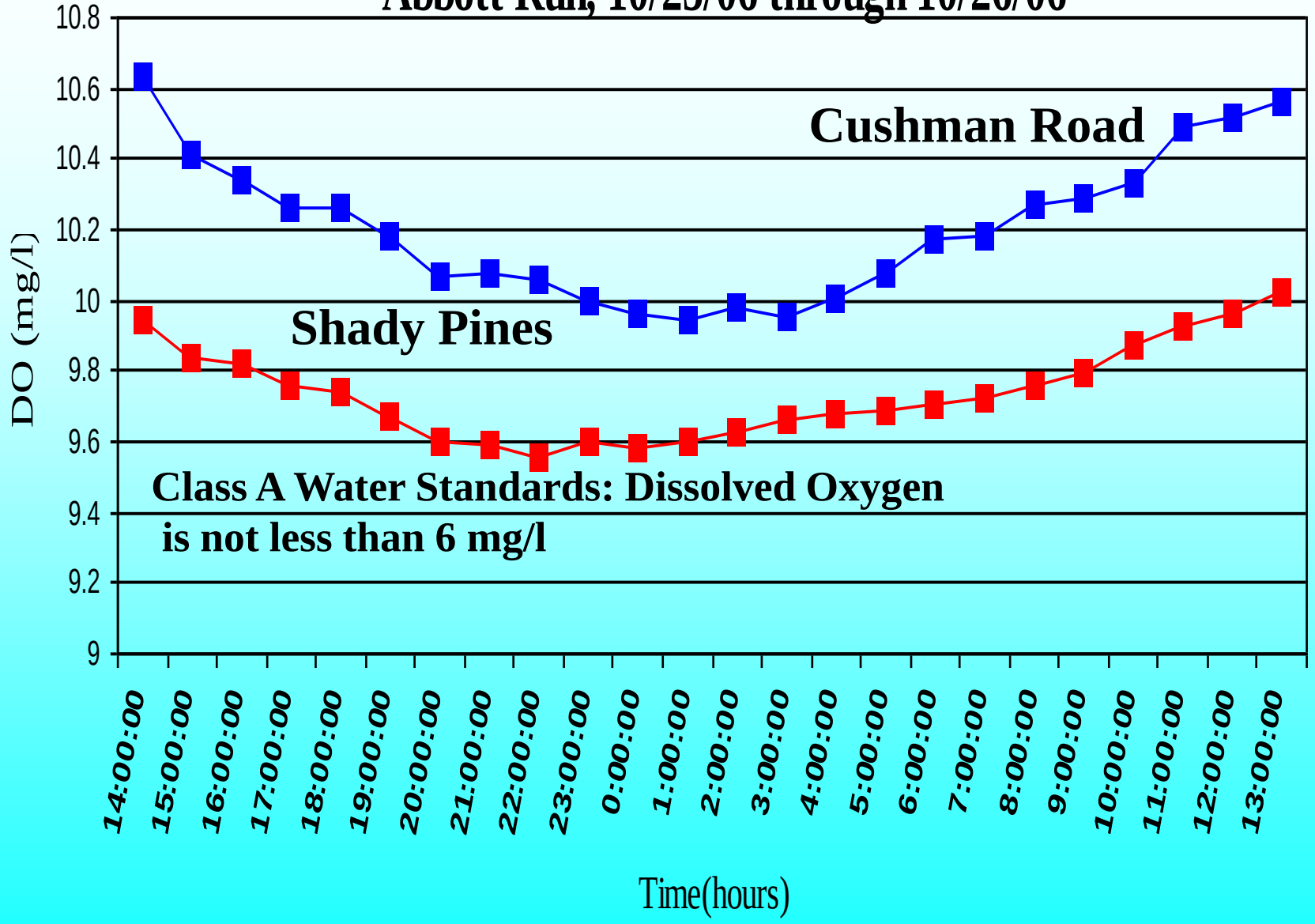
pH Comparison, Cushman Road, Shady Pines, Abbott Run, 10/25/06 through 10/26/06

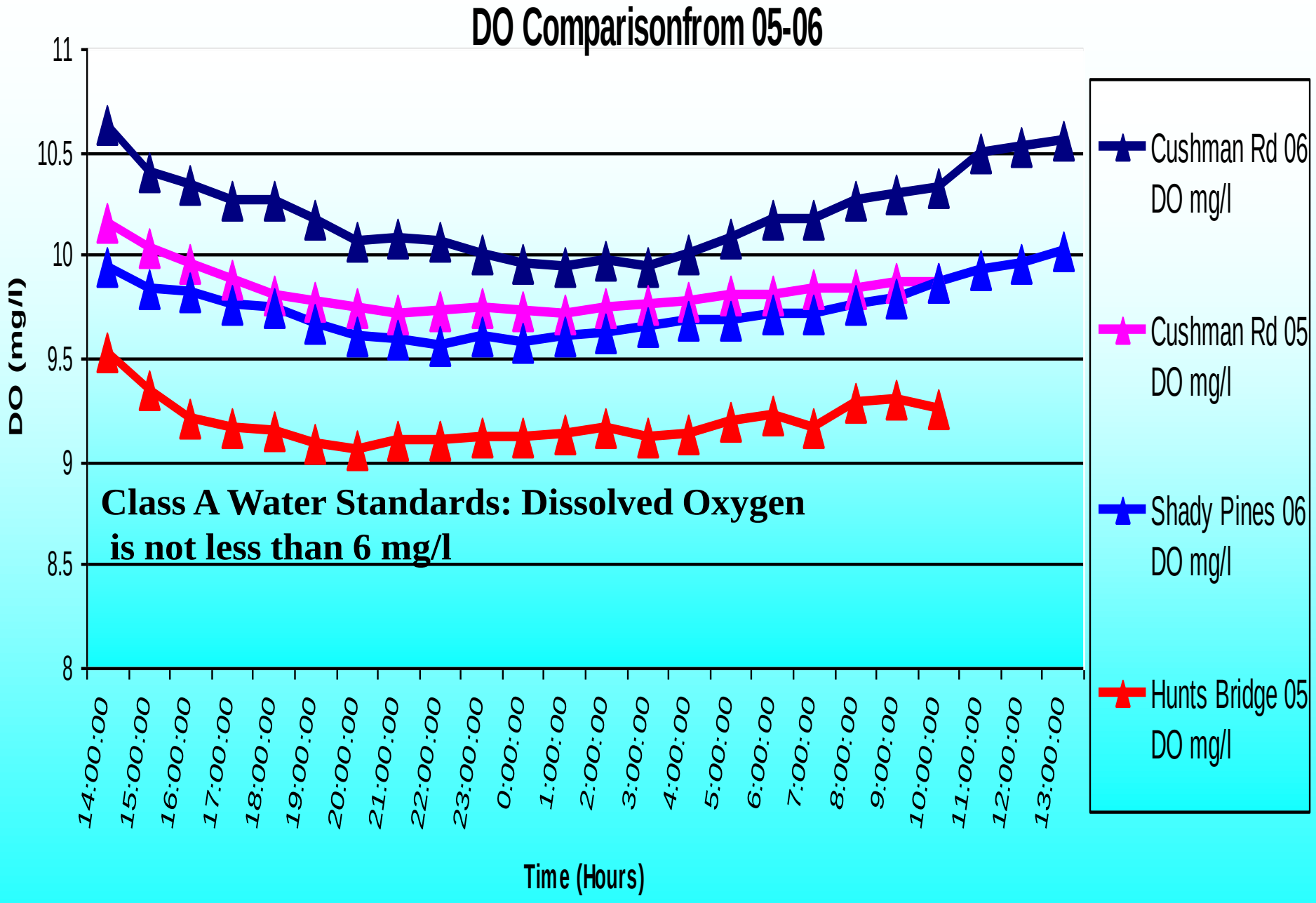


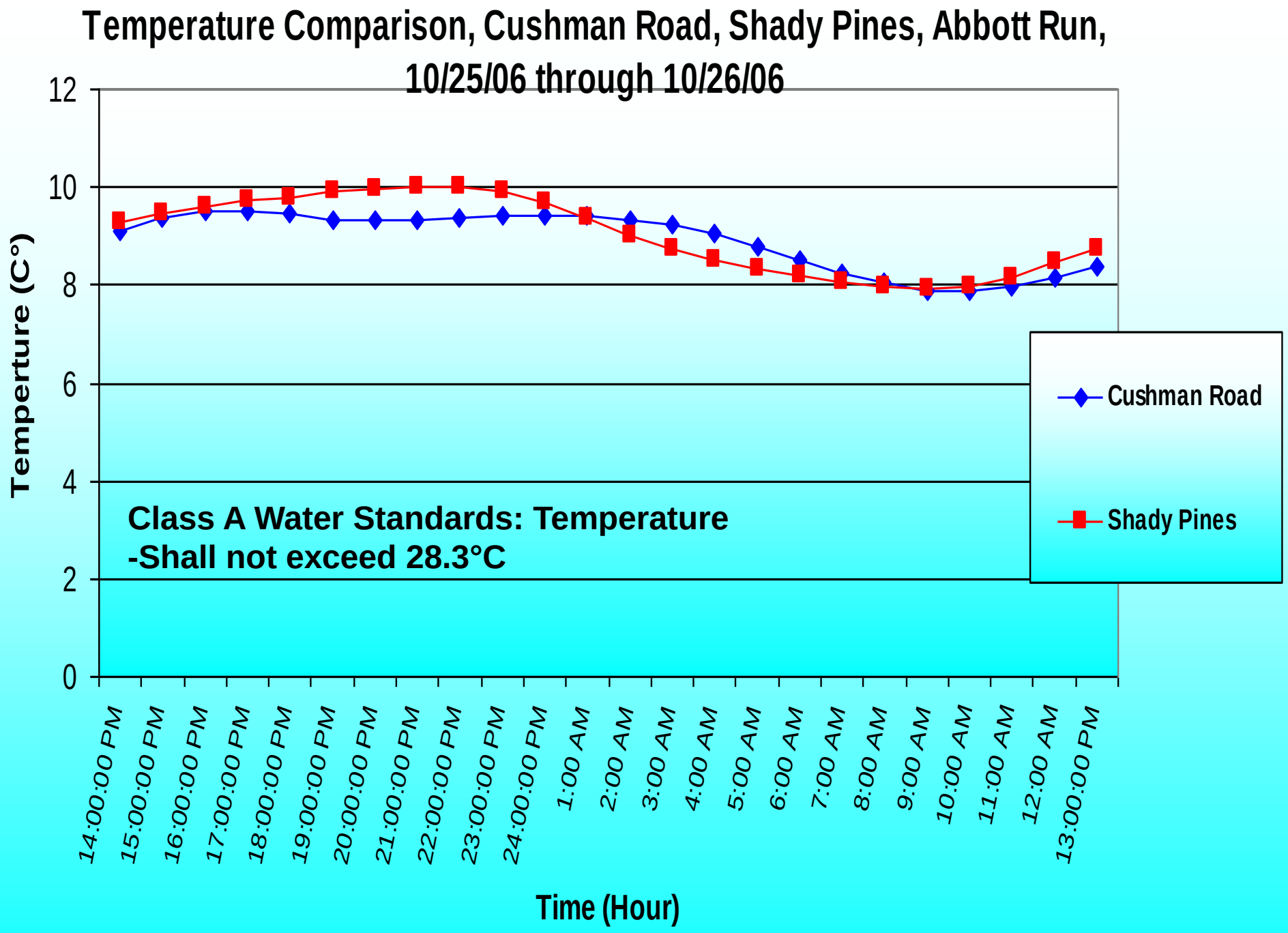
pH Comparison, Abbott Run, 05-06



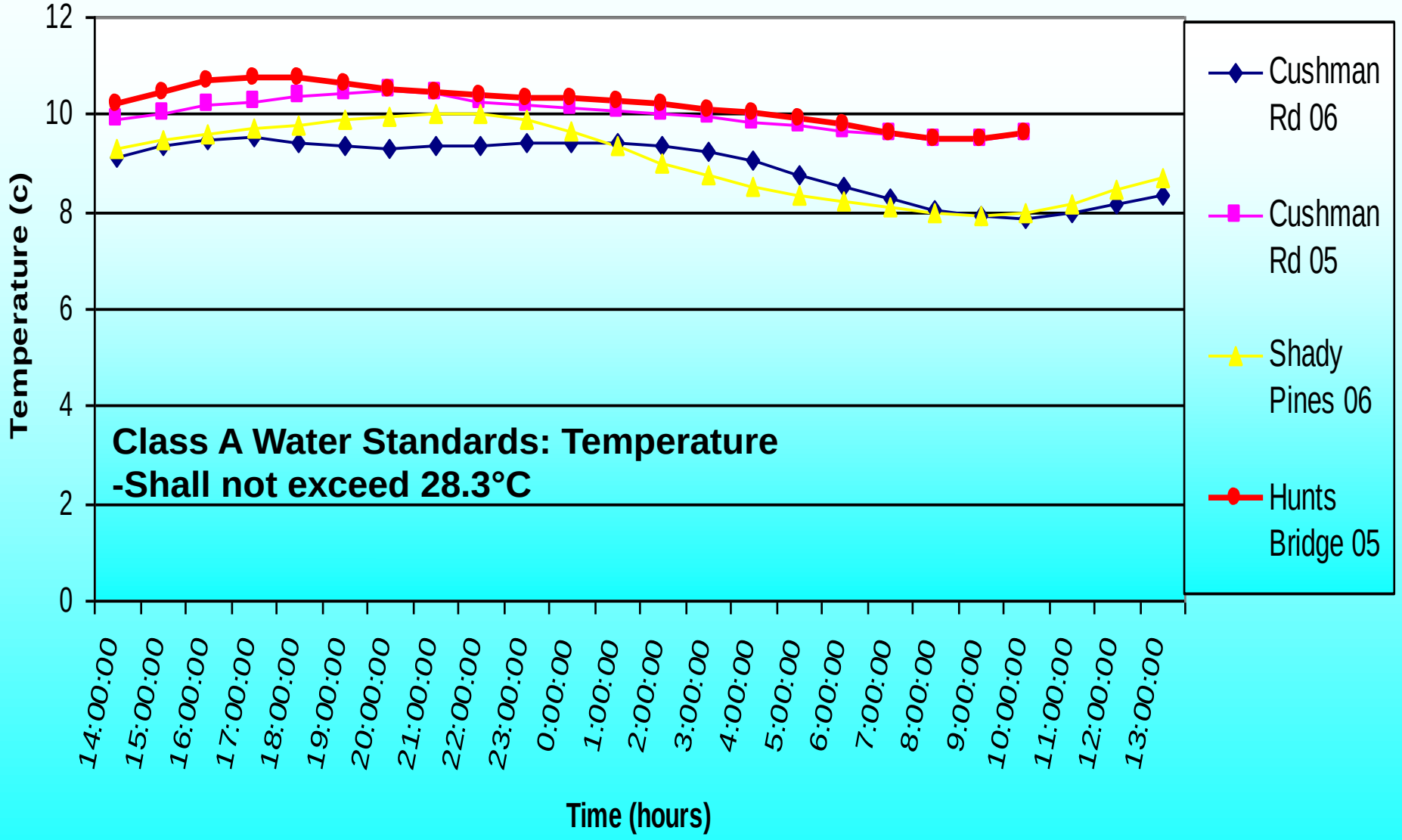
Dissolved Oxygen Comparison, Cushman Road, Shady Pines, Abbott Run, 10/25/06 through 10/26/06



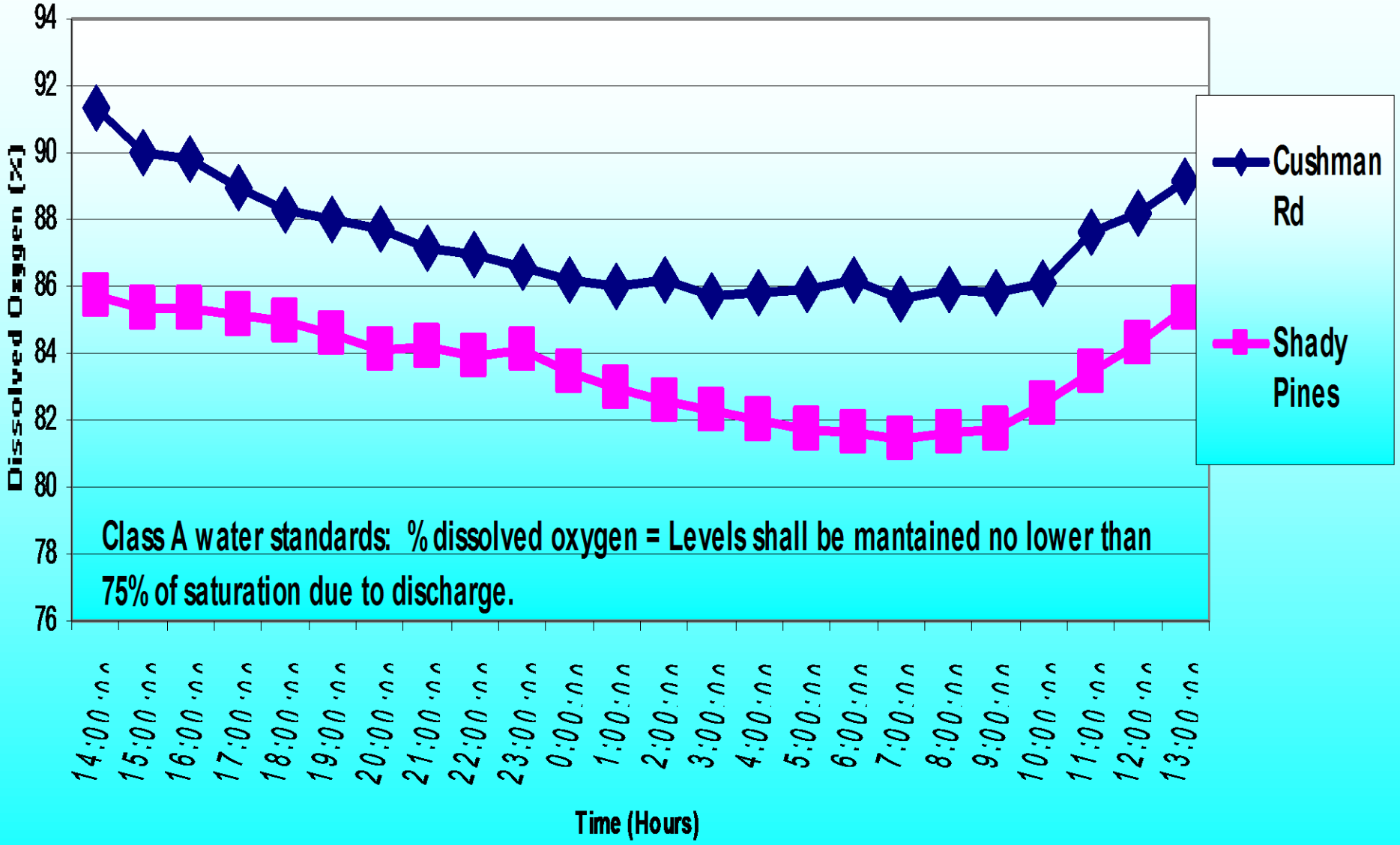

DO Comparisonfrom 05-06
11
10.5
10
9.5
9
8.5
8
DO (mg/l)
Class A Water Standards: Dissolved Oxygen is not less than 6 mg/l
14:00:00
15:00:00
16:00:00
17:00:00
18:00:00
19:00:00
20:00:00
21:00:00
22:00:00
23:00:00
0:00:00
1:00:00
2:00:00
3:00:00
4:00:00
5:00:00
6:00:00
7:00:00
8:00:00
9:00:00
10:00:00
11:00:00
12:00:00
13:00:00
Time (Hours)
Cushman Rd 06 DO mg/l
Cushman Rd 05 DO mg/l
Shady Pines 06 DO mg/l
Hunts Bridge 05 DO mg/l


Temperature Comparison, Cushman Road, Shady Pines, Abbott Run, 10/25/06 through 10/26/06
Temperture (C°)
12
10
8
6
4
2
0
Class A Water Standards: Temperature
-Shall not exceed 28.3°C
Cushman Road
Shady Pines
14:00:00 PM
15:00:00 PM
16:00:00 PM
17:00:00 PM
18:00:00 PM
19:00:00 PM
20:00:00 PM
21:00:00 PM
22:00:00 PM
23:00:00 PM
24:00:00 PM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 AM
13:00:00 PM
Time (Hour)

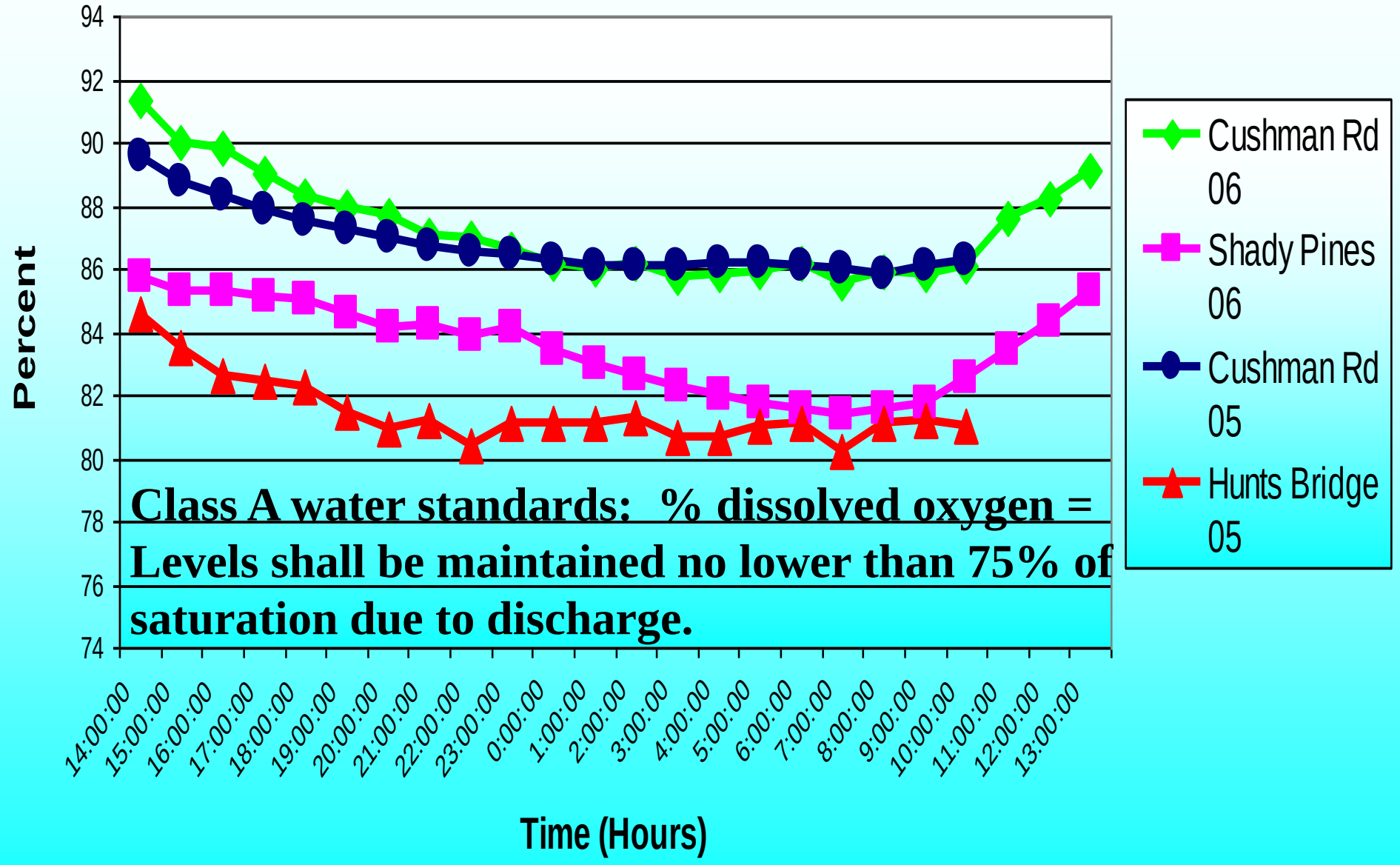
Temperature Comparison, Abbott Run, 05-06



% Dissolved Oxygen Comparison, Cushman Road and Shady Pines, Abbott Run, 10-25-06 through 10-26-06

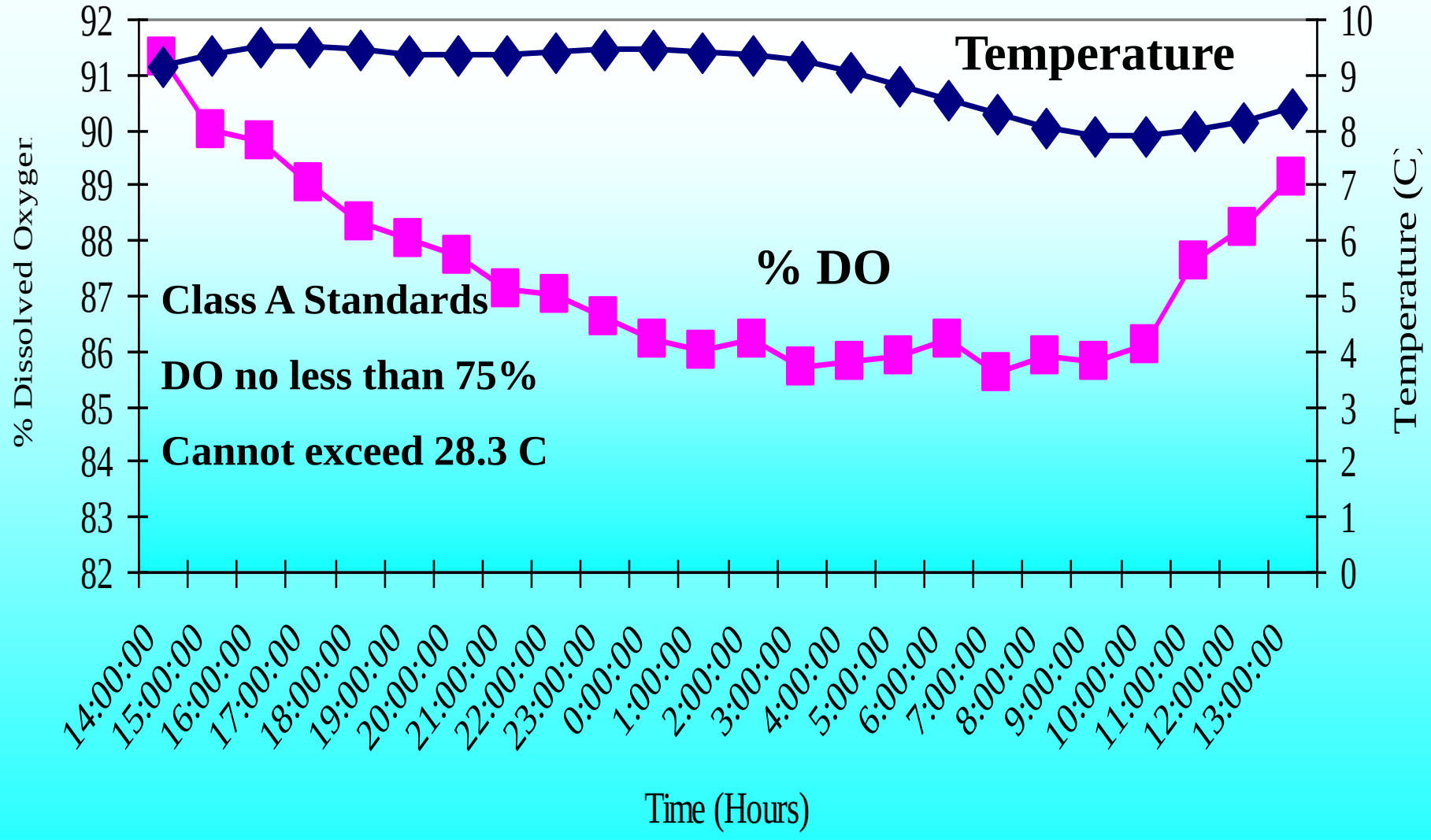


% DO Comparison, Abbott Run, 05-06

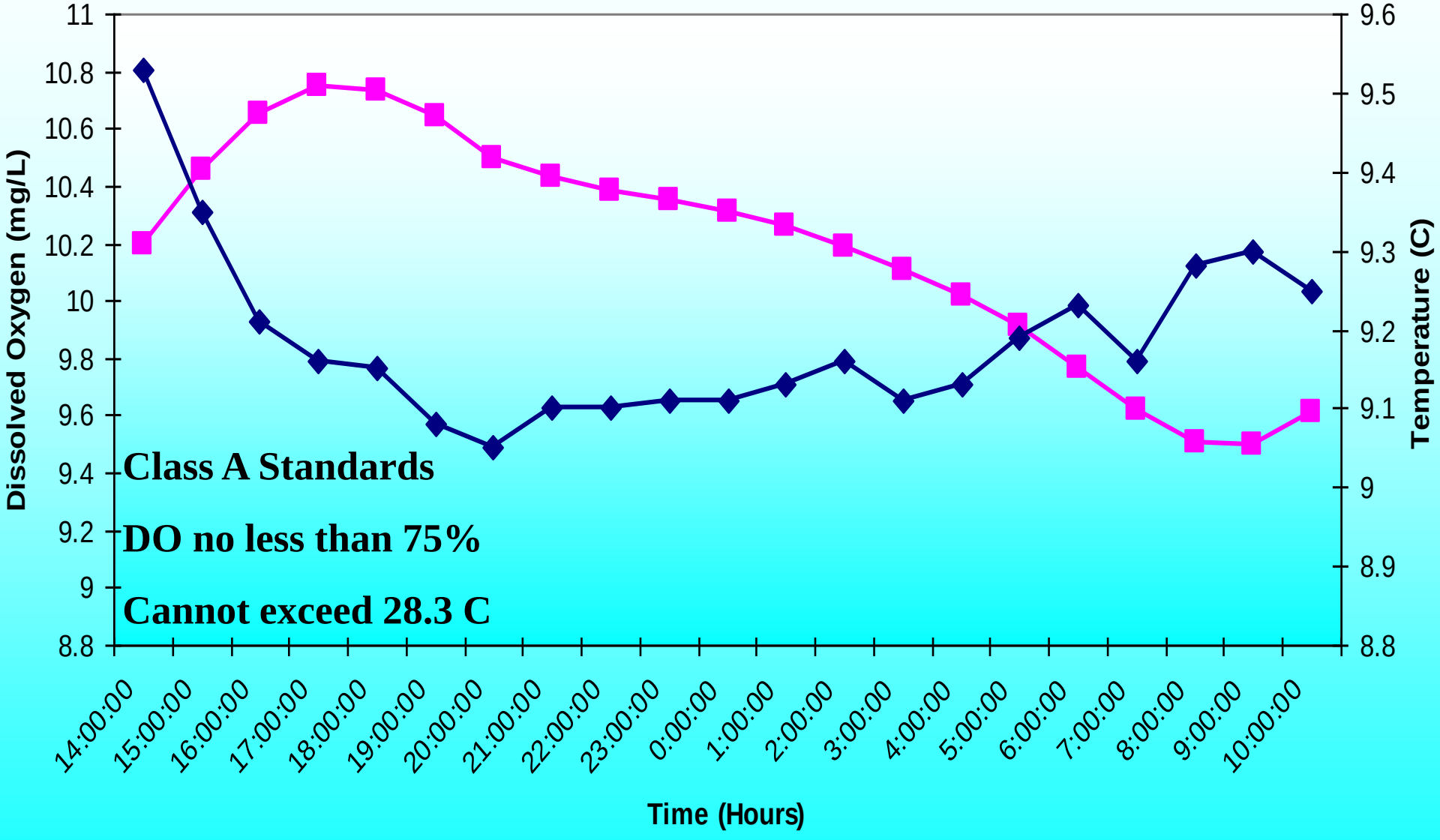


Class A water standards: % dissolved oxygen = Levels shall be maintained no lower than 75% of saturation due to discharge.

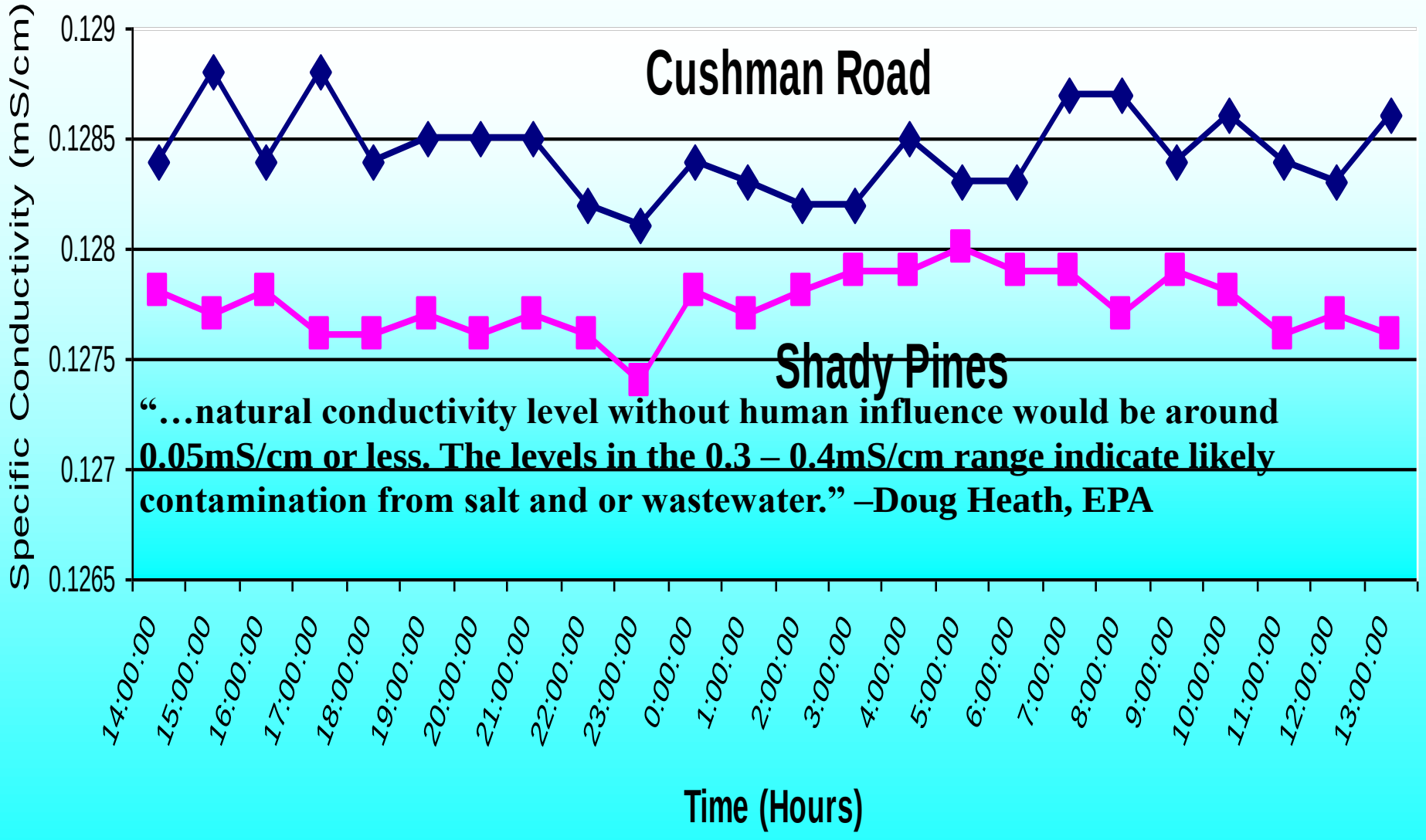
Temperature and % Dissolved Oxygen Comparison, Cushman Road, Abbott Run, 10/25/06



Temperature and % Dissolved Oxygen Comparison, Shady Pines, Abbott Run, 10/25/06

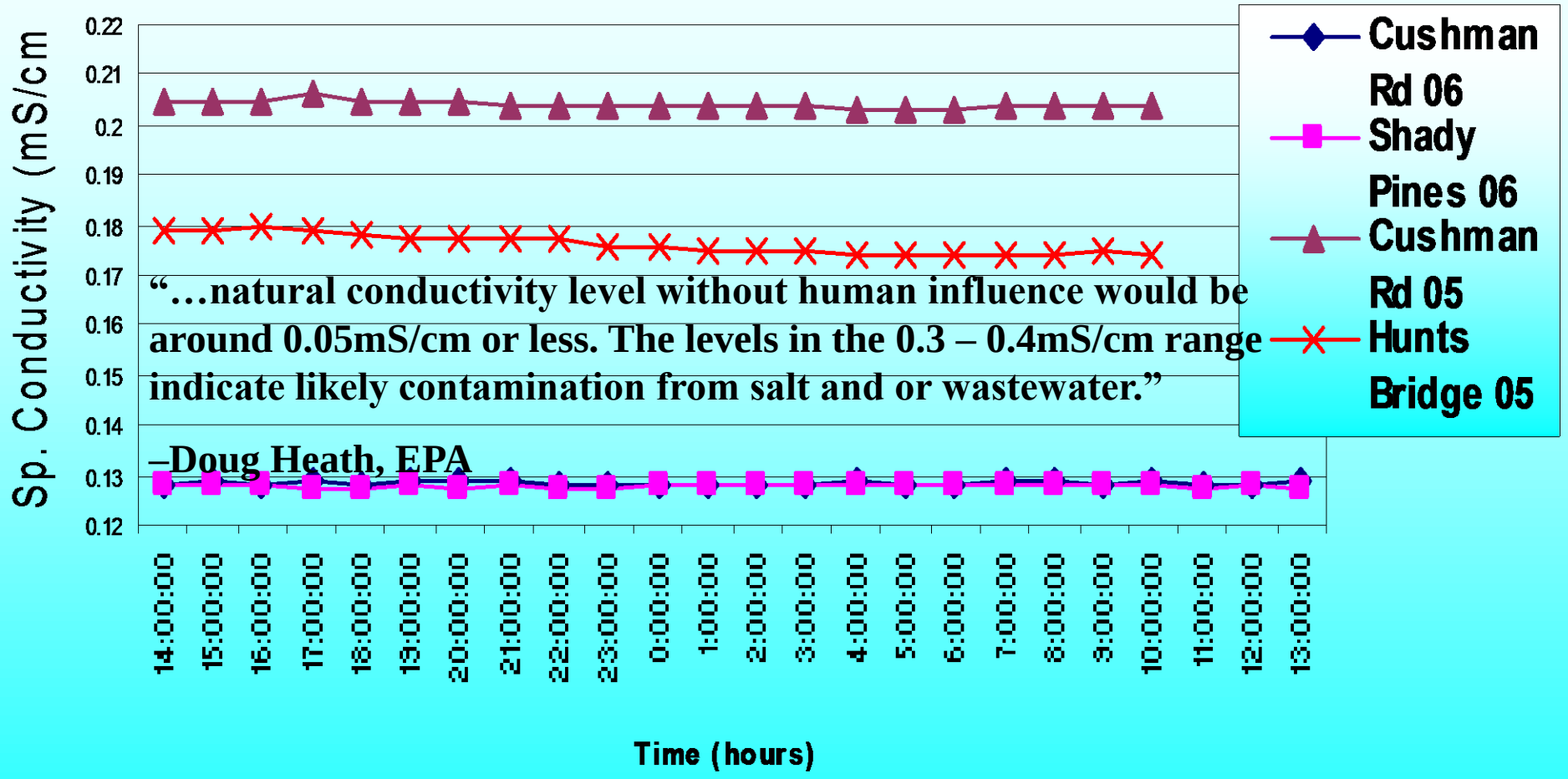


Specific Conductivity Comparison, Cushman Road and Shady Pines, Abbott Run,10/25-06 through 10/26/06



"…natural conductivity level without human influence would be around 0.05mS/cm or less. The levels in the 0.3 – 0.4mS/cm range indicate likely contamination from salt and or wastewater." –Doug Heath, EPA

Specific Conductivity Comparison Abbott Run 2005 and 2006



"…natural conductivity level without human influence would be around 0.05mS/cm or less. The levels in the 0.3 – 0.4mS/cm range indicate likely contamination from salt and or wastewater."

–Doug Heath, EPA

Cushman Road, Site A, Abbott Run, Averages and Ranges (10/25/06)

	Averages	Ranges
Temperature ©	8.92	9.52 – 7.86
pH Units	6.77	6.86 – 6.73
DO mg/l	10.21	10.63 – 9.94
DO% Sat.	87.30	91.3 – 85.6
Sp. Cond. mS/cm	0.13	0.1288 – 0.1281

Shady Pines, Site B, Abbott Run Averages and Ranges (10/25/06)

	Averages	Ranges
Temperature ©	9.04	10.03 – 7.94
pH Units	9.12	9.41 – 9.00
DO mg/l	9.74	10.02 – 9.56
DO% Sat.	83.50	85.7 – 81.4
Sp. Cond. mS/cm	0.13	0.1280 – 0.1274

Fecal Colony Counts

Abbott Run River

Site A Cushman Rd. 10/25/06

ml Filtered	Colonies
100ml	14
100ml	9
10ml	0
10ml	1

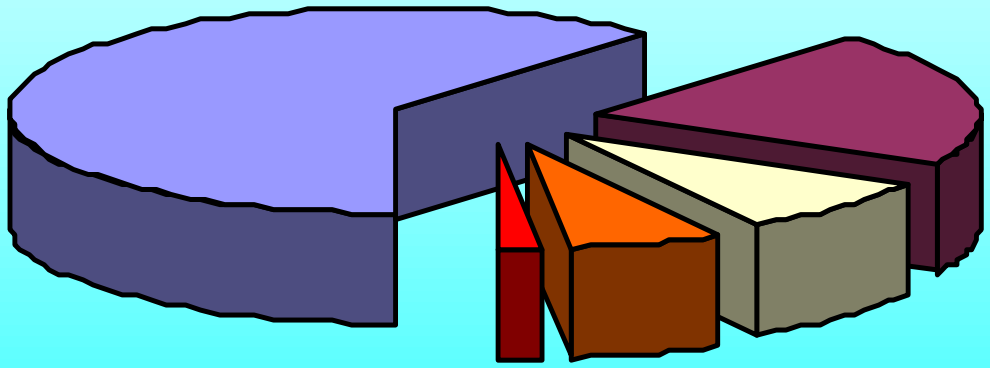
Class A standard say Fecal Levels should not Exceed 200 Colonies Per 100ml

Site B Shady Pines 10/25/06

ml Filtered	Colonies
100ml	11
100ml	10
10ml	2
10ml	0

Benthic Macro- Invertebrate
Top Five Percent, Cushman Rd, Site A, Abbott Run, 10/25/06

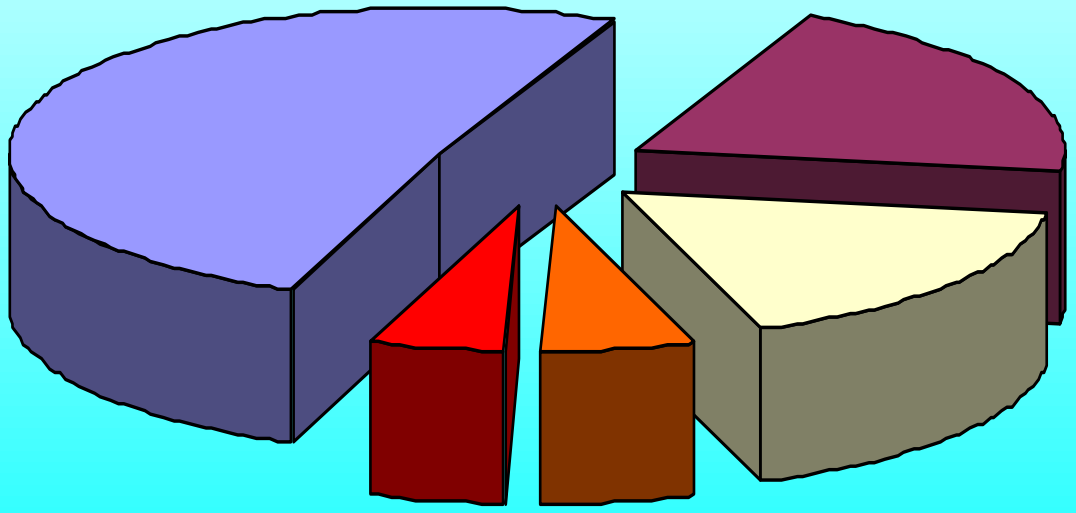
FBI= 3.7
Very Good



- Trichoptera Hydropsychidae 53%
- Trichoptera Polycentropodidae 19%
- Ephemeroptera Baetidae 7.6%
- Diptera Simuliidae 5.5%
- Trichoptera Philopotamidae 1.8%

Cushman Rd, Site A, Abbott Run, 10/31/05
Benthic Macro-Inverebrates
Top Five Percent

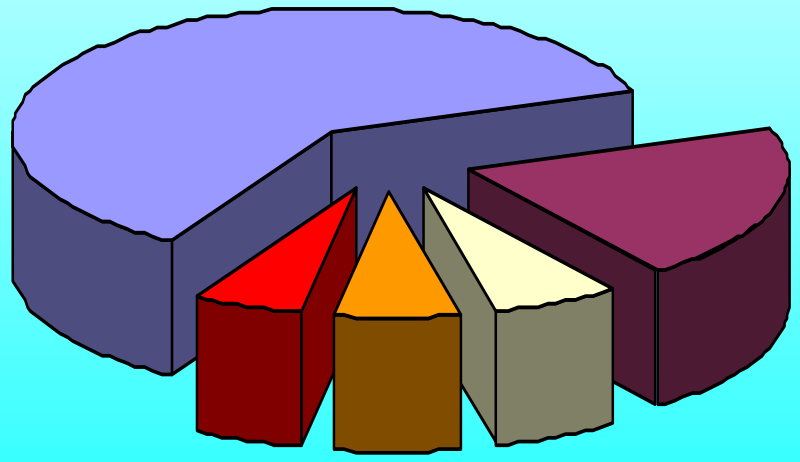
FBI=3.2
Excellent



- Trichoptera Hydropsychidae 51%
- Ephemeroptera Heptageniida 21%
- Oligochaeta 17%
- Diptera Chironomidae 6%
- Diptera Simuliidae 5%

Benthic Macro-Invertebrates
Top Five Percent,
Shady Pines, Site B 10/25/06

FBI= 3.4
Excellent



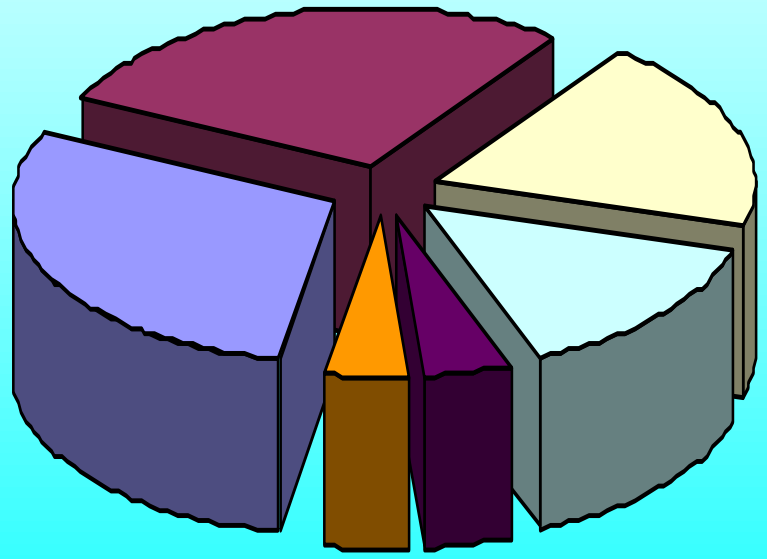
- Trichoptera Hydropsychidae 52%
- Emphemeroptera Heptageniidae 17.5%
- Trichoptera Polycentropodidae 5.5%
- Coleoptera Elmidae 5.5%
- Plecoptera Taeniopterydidae 4.7%

Hunts Bridge, Site B, 10/31/05

Benthic Macro-Inverebrates

Top Five Percent

FBI= 2.9
Excellent



- Trichoptera Hydropsychidae 29%
- Oligochaeta 28%
- Coleoptera Elmidae 20%
- Ephemeroptera Heptageniidae (mayflies) 15%
- Plecoptera Perlodidae 4%
- Trichoptera Brachycentridae 4%

EPT Richness Comparison 10/25/06

Cushman Road	#Families	Shady Pines	#Families
Ephemeroptera	4	Ephemeroptera	4
Plecoptera	4	Plecoptera	3
Trichoptera	5	Trichoptera	4
Totals	13	Totals	11

Summary

- **Overall, Abbott Run met the Class A Standards.**
- **Site A and Site B had about the same number of net-spinning caddisflies. This is a significant change for site B when compared to the 2006 data. This type of caddisfly can tolerate a higher level of organic pollution.**
- **Family Biotic Index (FBI) values increased at both sites. Site A went from excellent to very good water quality and Site B is still in the excellent range.**
- **For site B, the pH was higher which we believe had to do with pouring of basic concrete abutments for the Hunts Bridge throughout September.**

The End

By:

Mike Betts, Wilmer Bonilla, Malcolm Brennan, Lisa Criscione, Elise D'Adamo, Allison DelVecchio, John Farroba, Ashley Haselton, Stephanie Howard, Britney Holbert, Steven Kummer, Christen Linehan, Ana Makrinikolas, Greg McKim, Alex Micale, Crystal Nelson, Ryan Norton, Joy Pigeon**

****PowerPoint Coordinator**