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### Indian Head River Project

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# **INDIAN HEAD RIVER PROJECT**

**Whitman-Hanson Regional High  
School  
RiverNet Club  
2005**

# **RiverNet Club**

**We are a group of students interested in local rivers. Some of us have worked with RiverNet in Middle School with Ms. Kofton. We are continuing the research on the Indian Head River that the Hanson Middle School has done in the past.**

# **RiverNet Club**

## **Students**

**Steve, Jacob, Liam,  
Winnie, Eddie, Liz,  
Amanda, Alexandra,  
Tim**



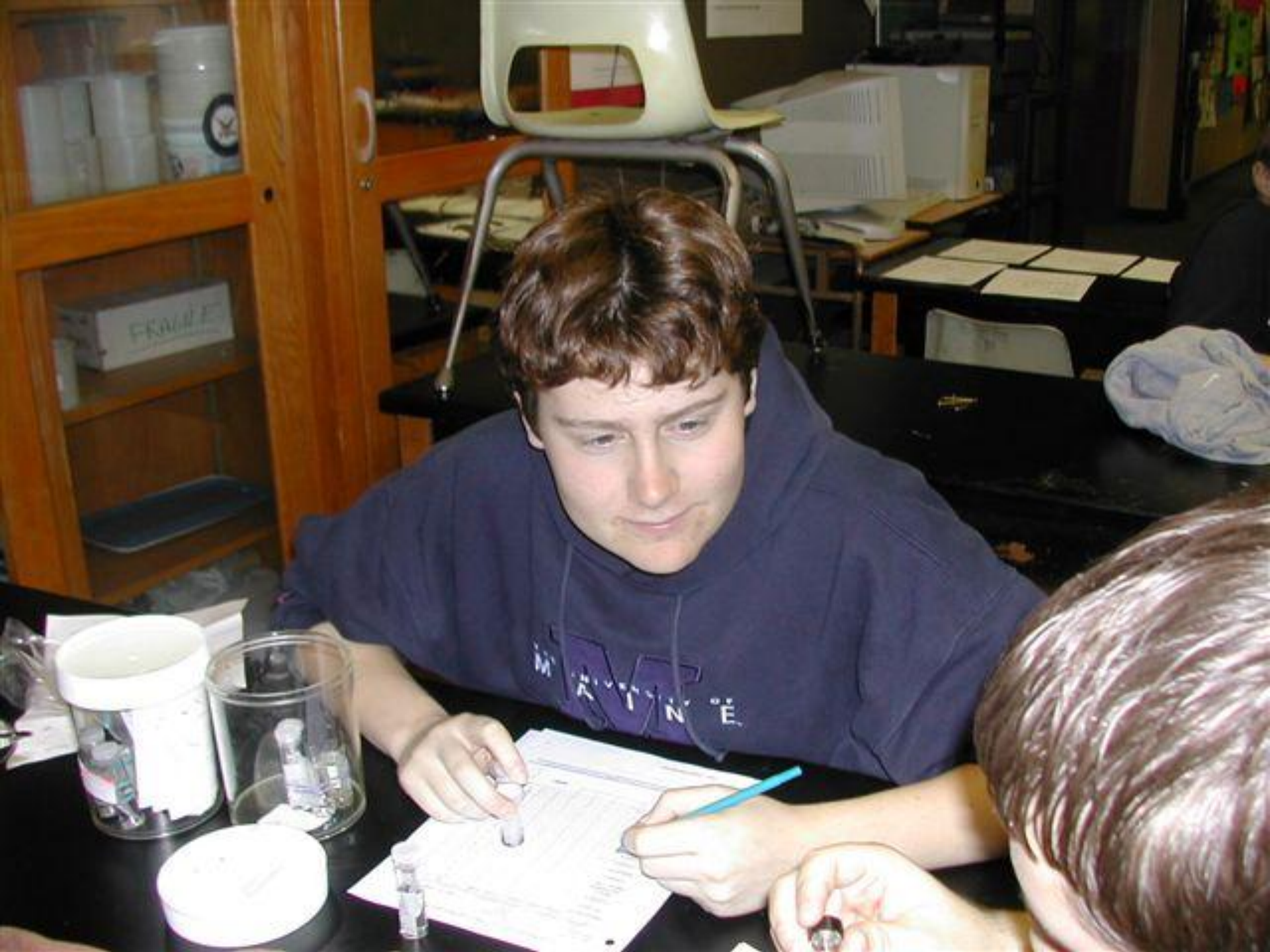




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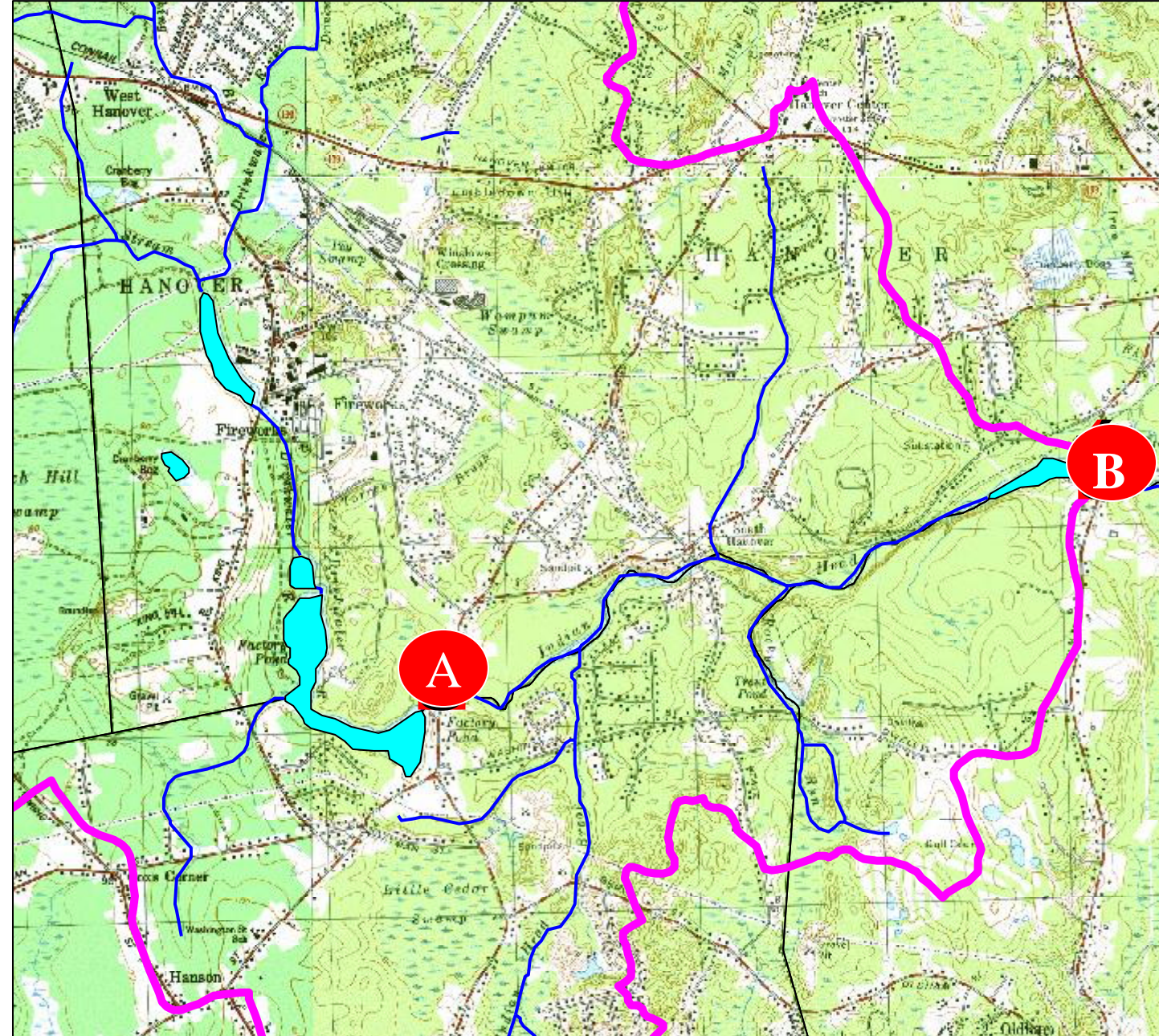


# Purpose

- To discover whether or not water quality has improved over the past four years.
- To compare two study sites along the river.

# Indian Head River RiverNet Program

## Study Sites



- Indian\_ws.shp
- Indian\_ponds.shp
- Indian\_streams.shp
- MA Towns

2000 0 2000 4000 Meters



# Indian Head River Site B





# Problem

- There have been high nitrate readings in the past

# Indian Head River Watershed Studies

-  Indian\_ws.shp
-  Indian\_ponds.shp
-  Indian\_streams.shp
-  Clip4.shp
-  Crop Land
-  Pasture
-  Forest
-  Non-Forested Wetland
-  Mining
-  Open Land
-  Participation Rec.
-  Spectator Rec.
-  Water-based Rec.
-  Multi-Fam. Res.
-  High Density Res.
-  Medium Dens. Res
-  Low Dens. Res
-  Salt Water Wetland
-  Commercial
-  Industrial
-  Urban Open
-  Transportation
-  Waste Disposal
-  Water
-  Woody Perennial
-  MA Towns

Land Use

2000 0 2000 4000 Meters

2 October 2004

# **Land Use**

**Forest 60.9 %**

**Agriculture 0.5%**

**Residential 28.8%**

**Commercial/Industrial  
2.4%**

**Wetlands 1.6 %**

**Other 5.5%**



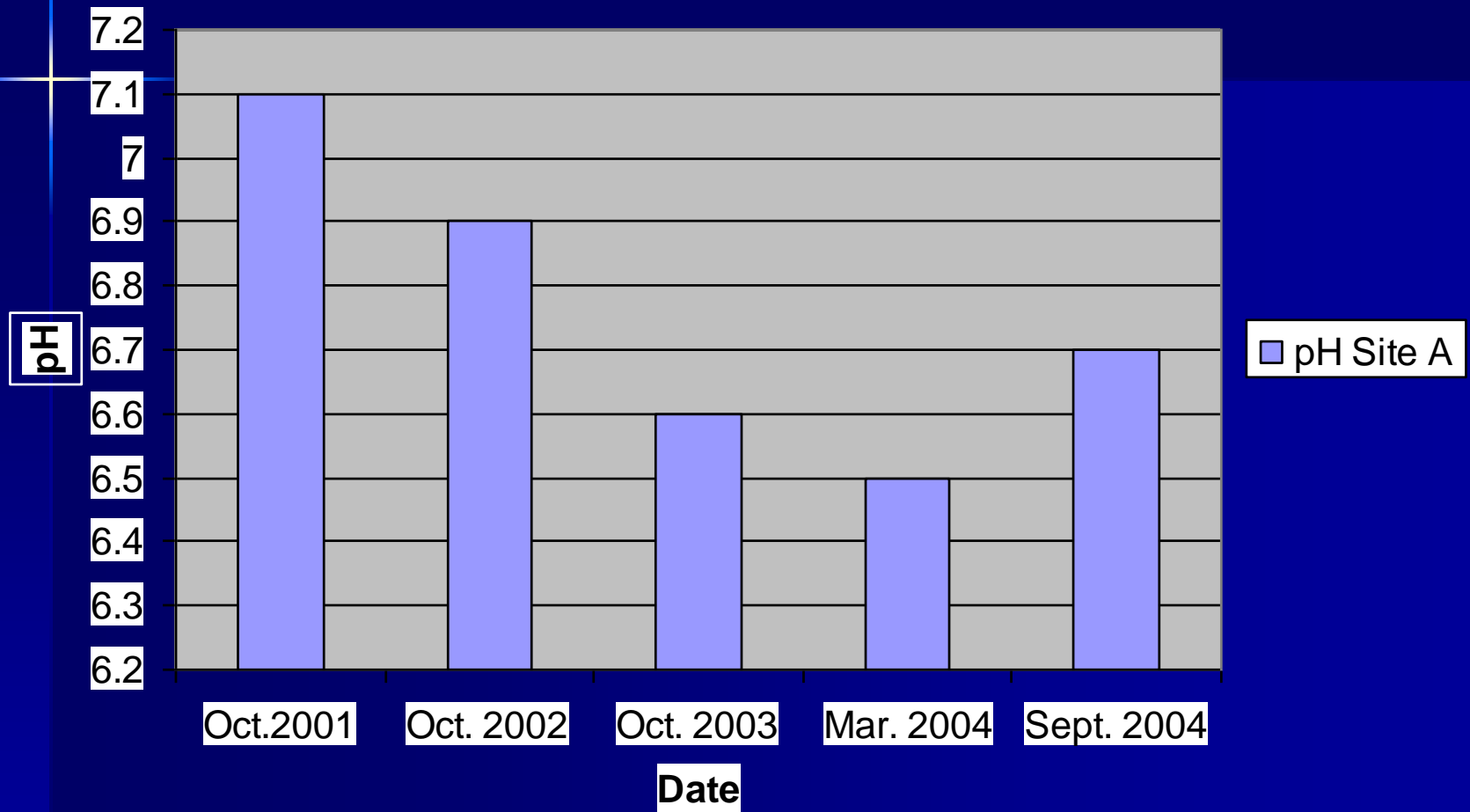
# **Watershed**

**Watershed Area –  
29 square miles.**

**There are 40 stream  
miles in the watershed  
and 159 road miles.**

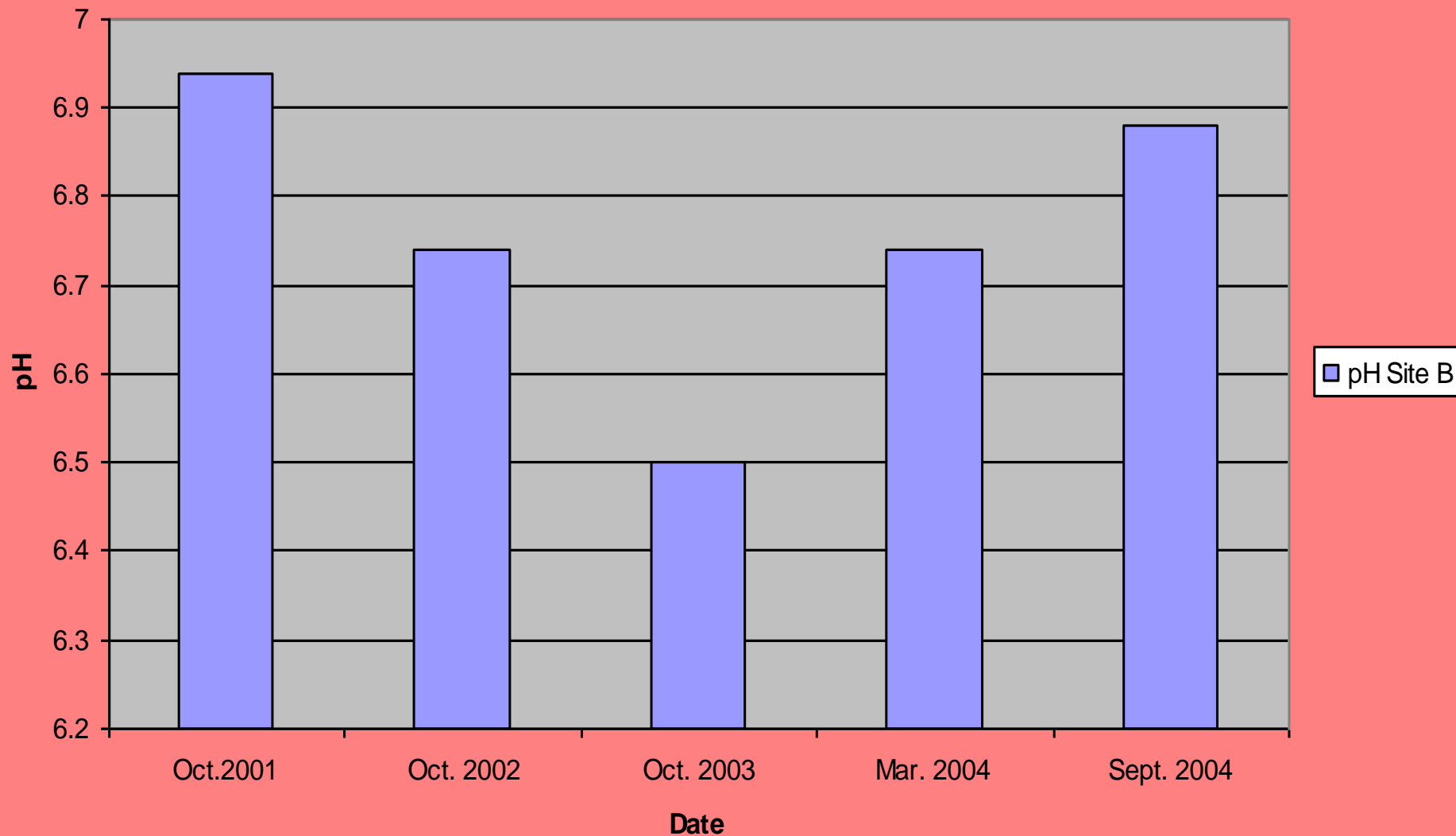
**10 % imperviousness**

# Indian Head River pH Readings Site A Winter Street



# Indian Head River pH Readings

## Site B Curtis Crossing





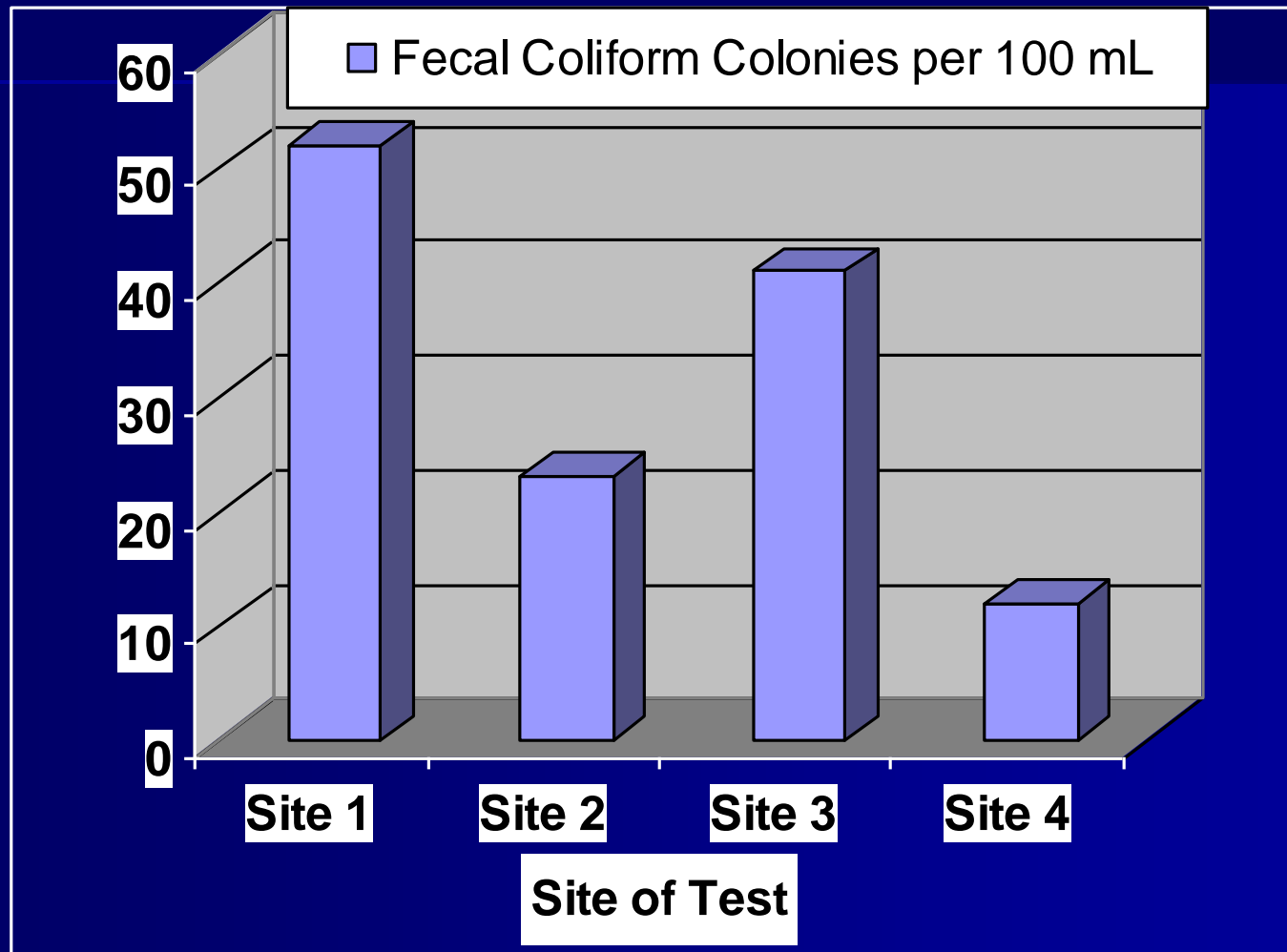
# Indian Head River RiverNet Program

## Fecal Coliform Test Sites

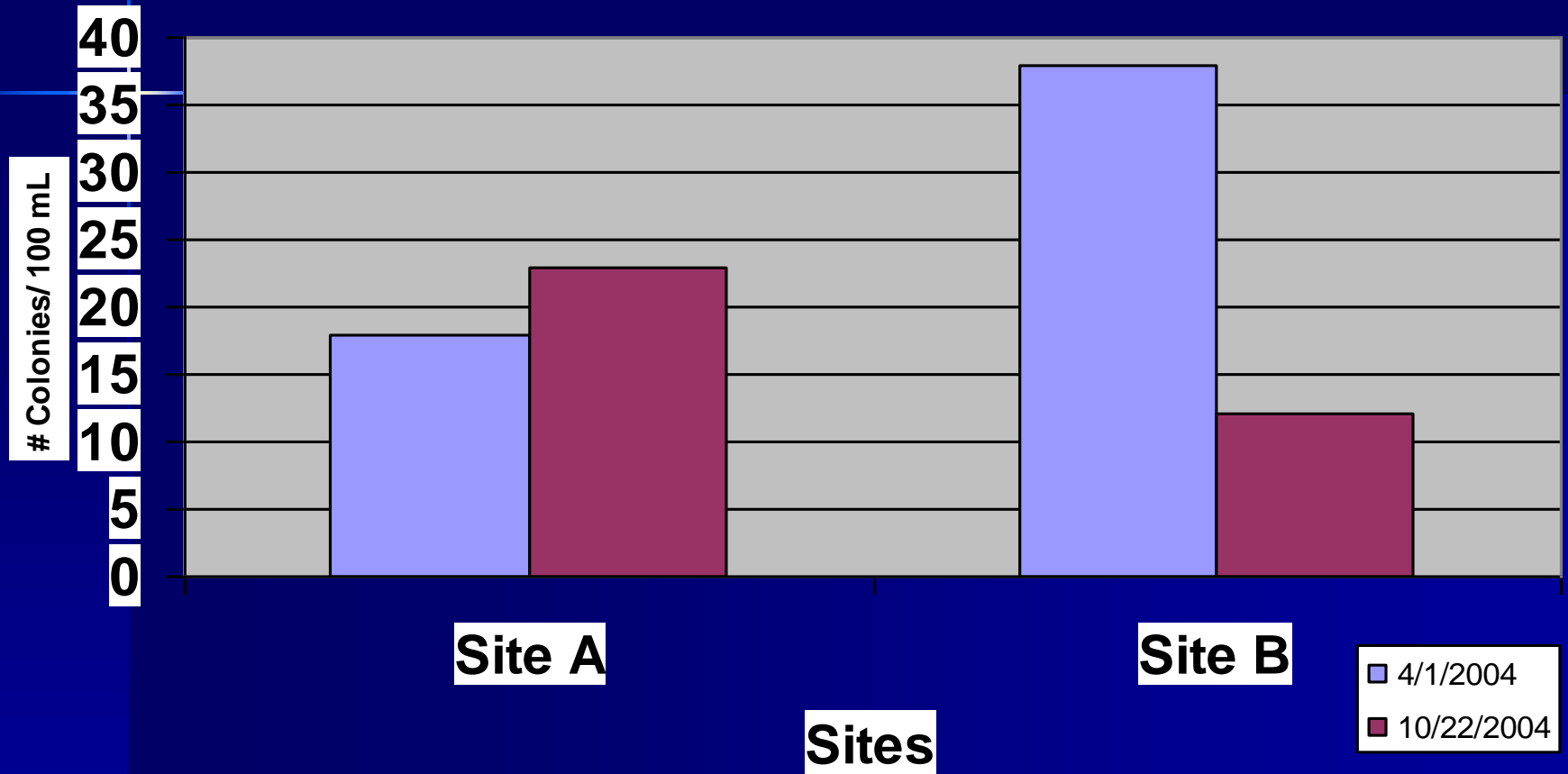
- Indian\_ws.shp
- Indian\_ponds.shp
- Indian\_streams.shp
- MA Towns

2000 0 2000 4000 Meters

## Fecal Coliform Comparison 10/22/04

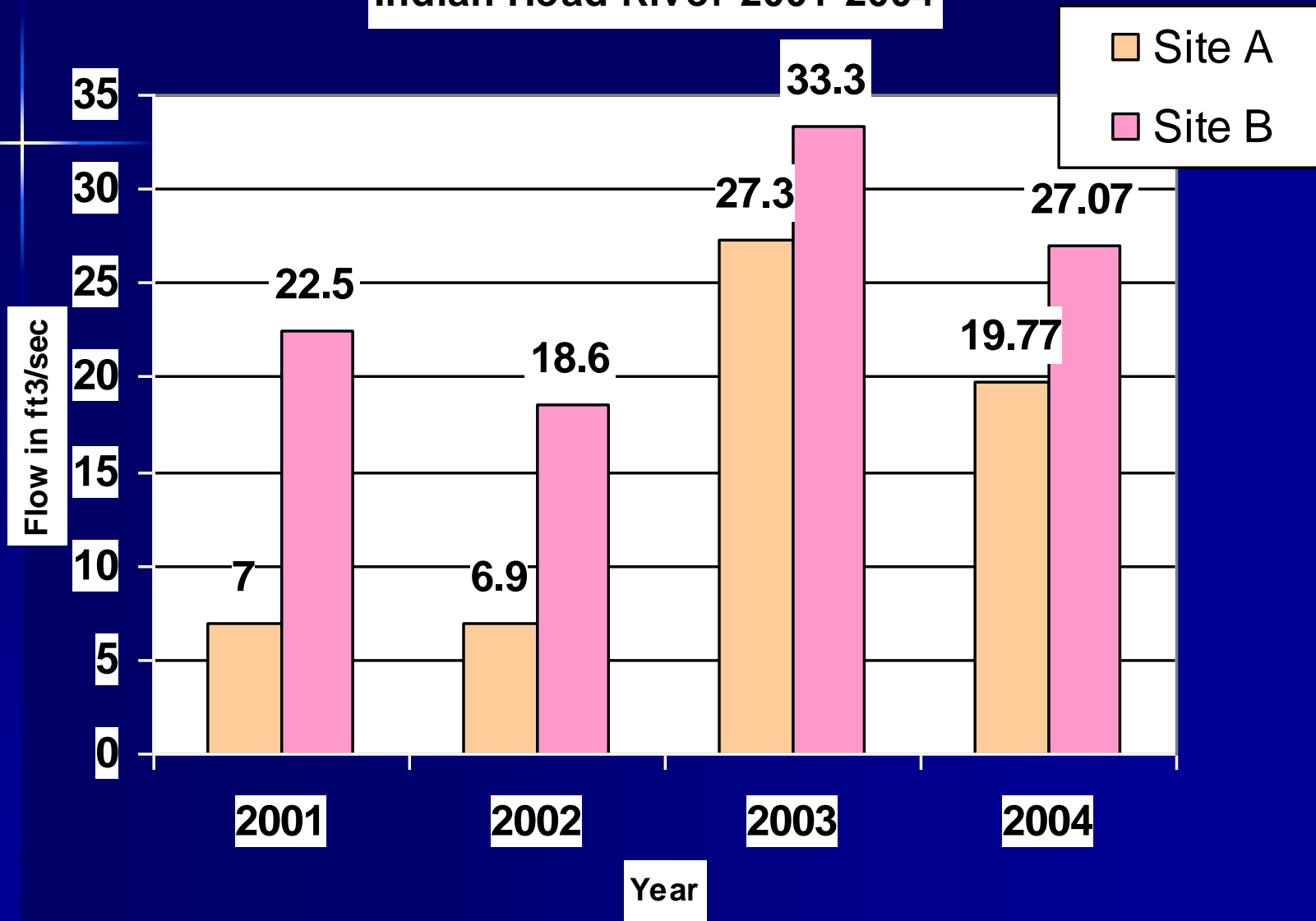


**Fecal Coliform Comparison Between Sites A and B  
in the Indian Head River  
April 1 and October 22, 2004**



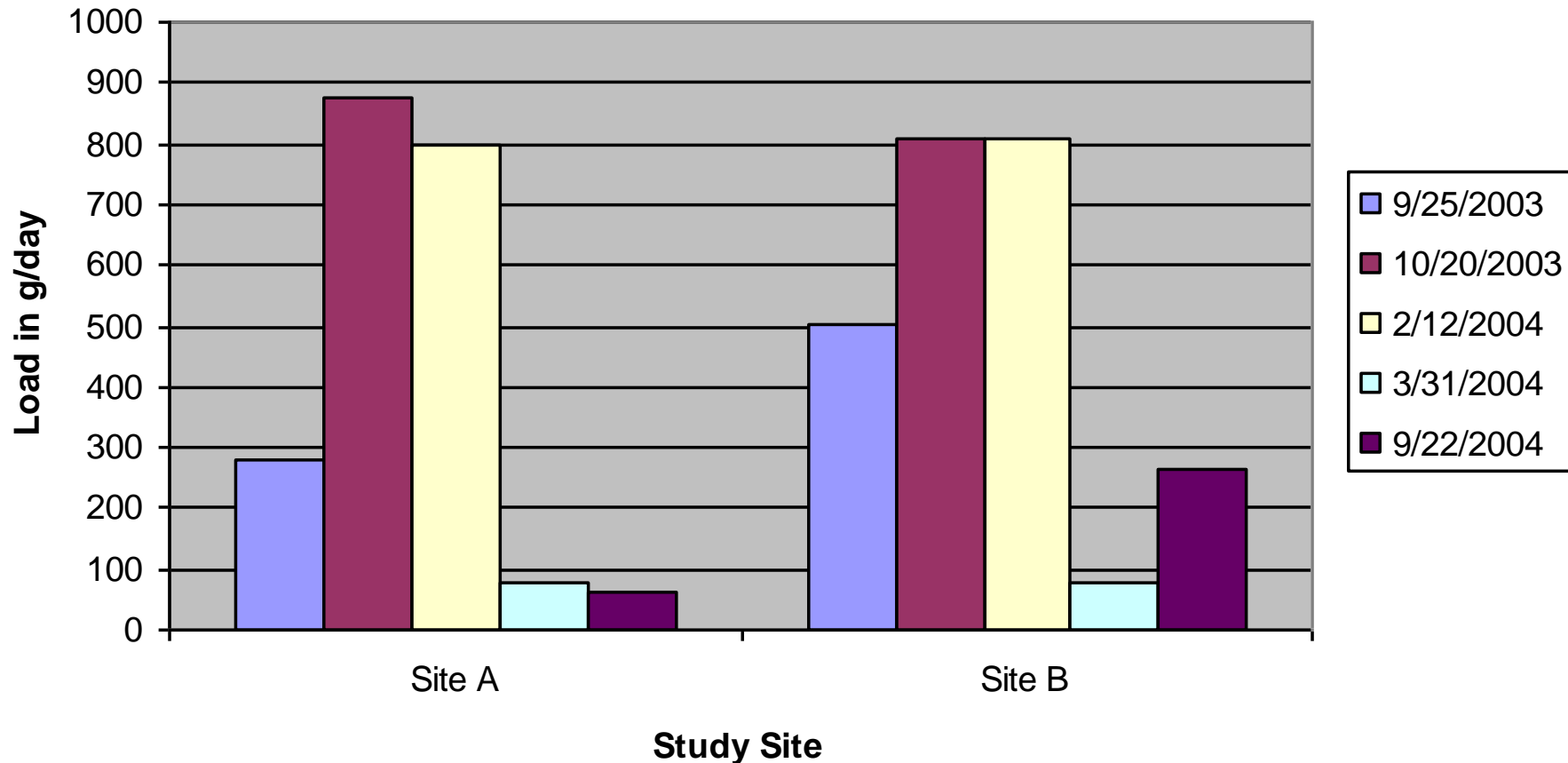
**Note: At Site B there was not a plate count  
with 20-60 colonies per 100 mL in Oct.2004.**

# Changes in Total Discharge Indian Head River 2001-2004



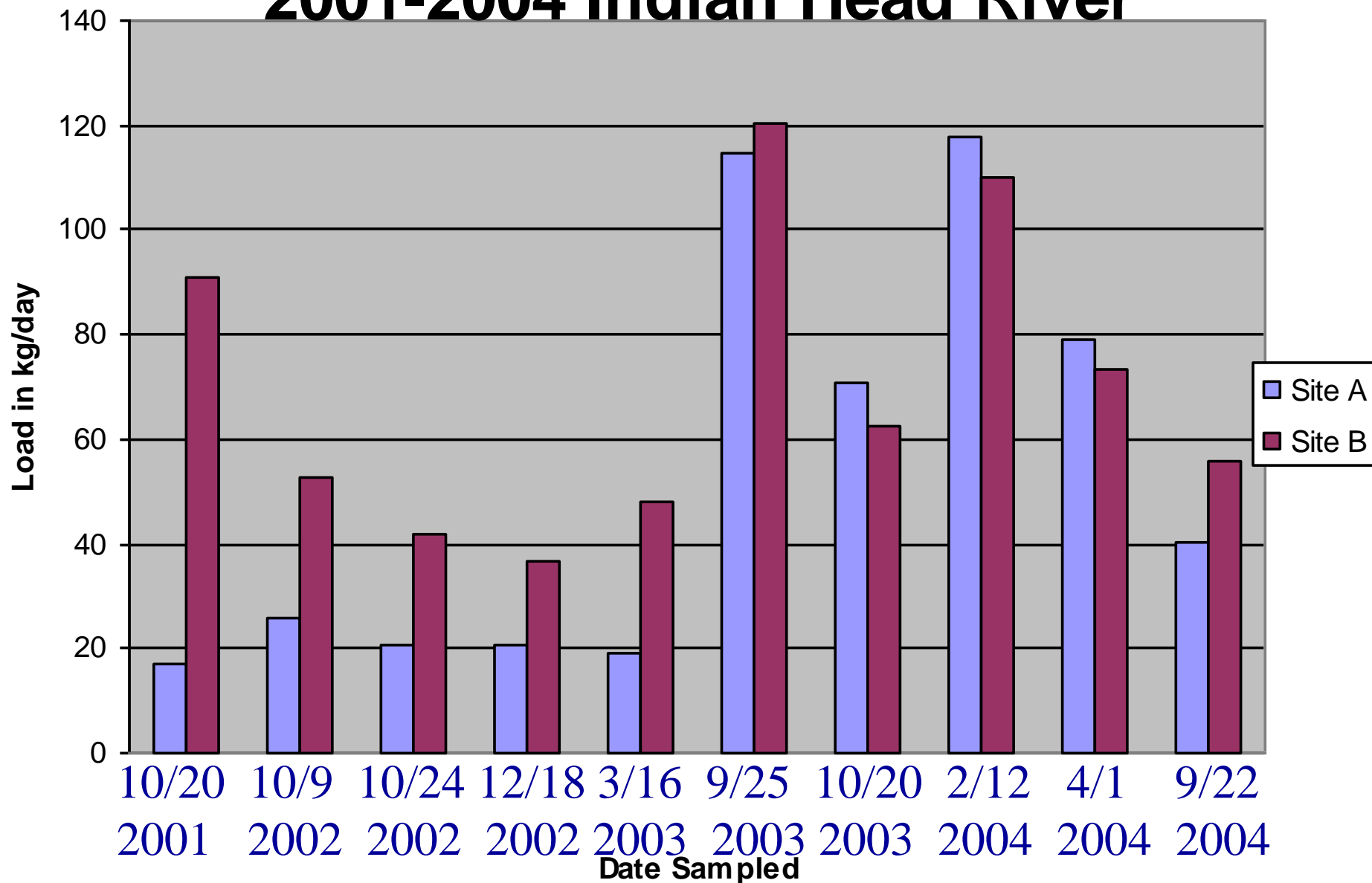


# Comparison of Phosphorus Load For Two Study Sites Indian Head River 2003-2004



# Nitrogen Load Sites A & B

## 2001-2004 Indian Head River



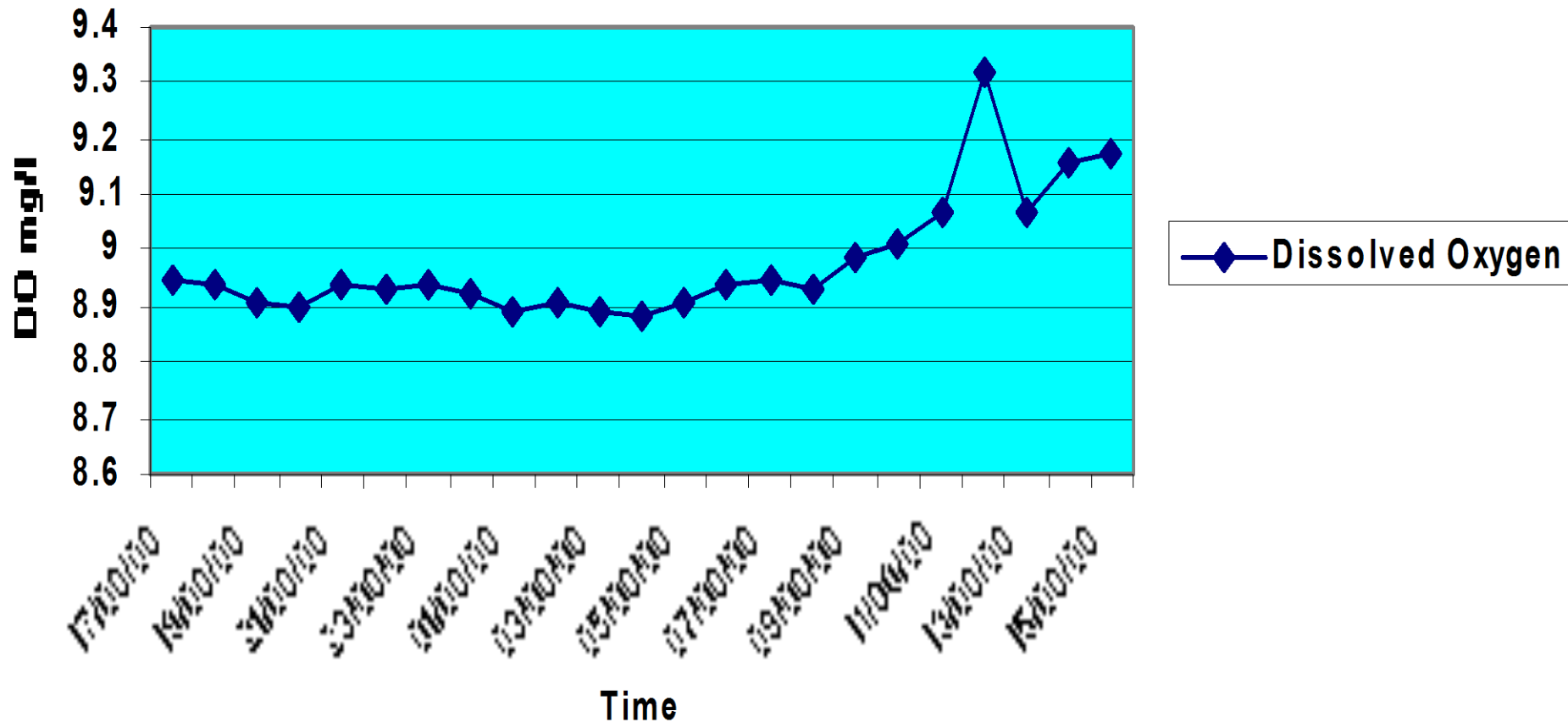
# N:P Ratios

■ Site A                      638:1

■ Site B                      210:1

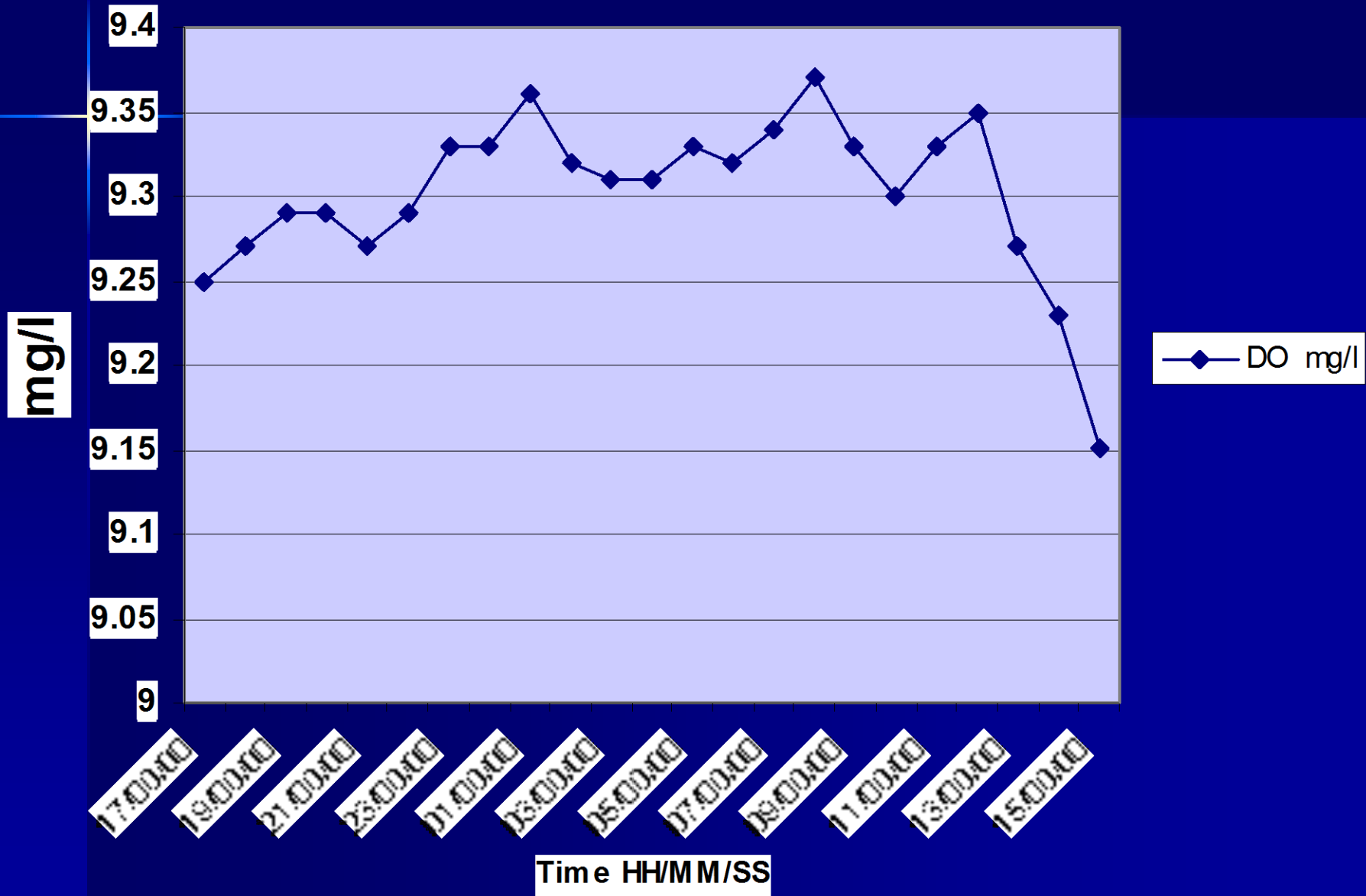
# Dissolved Oxygen Indian Head River

## Site A 9/22-9/23, 2004

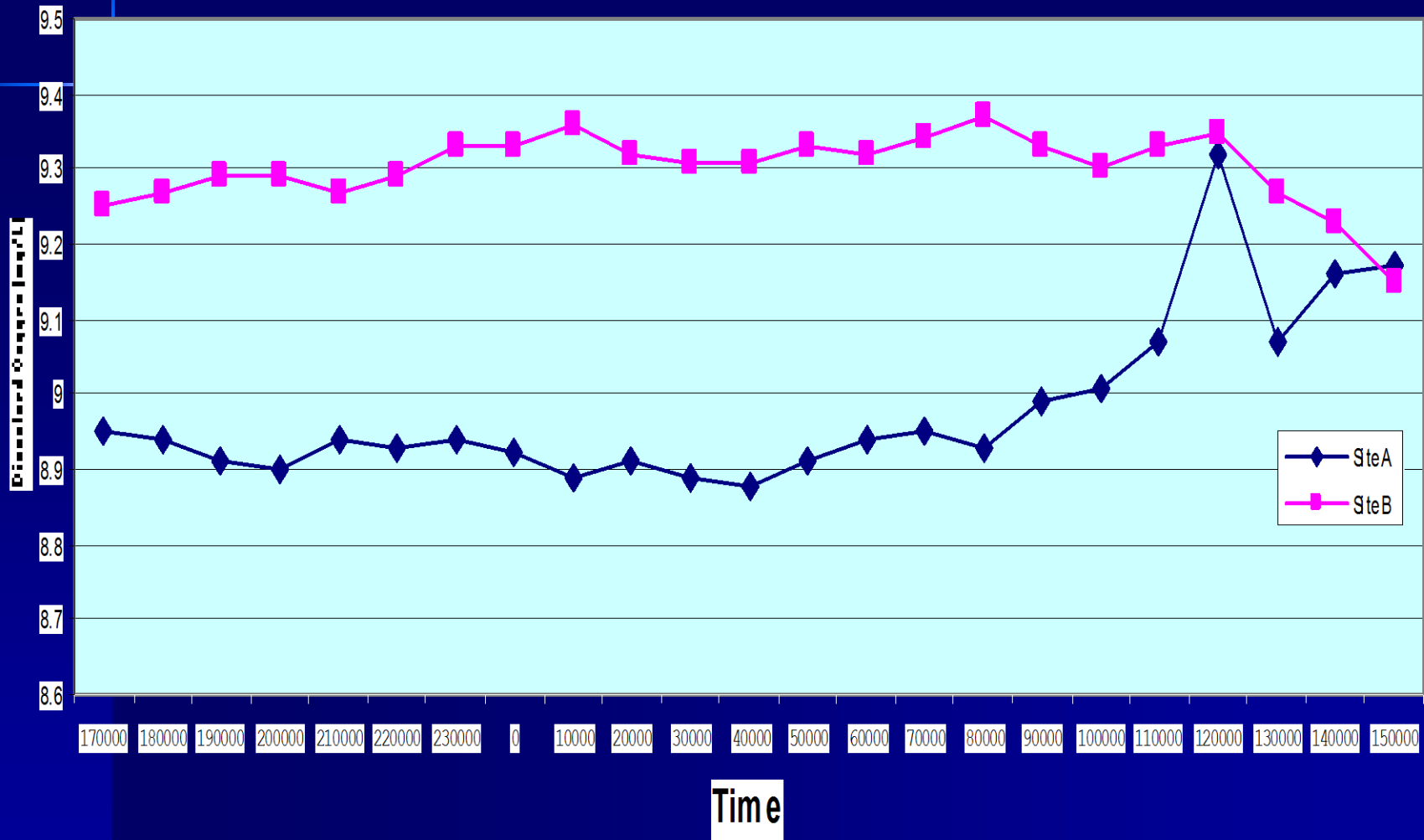




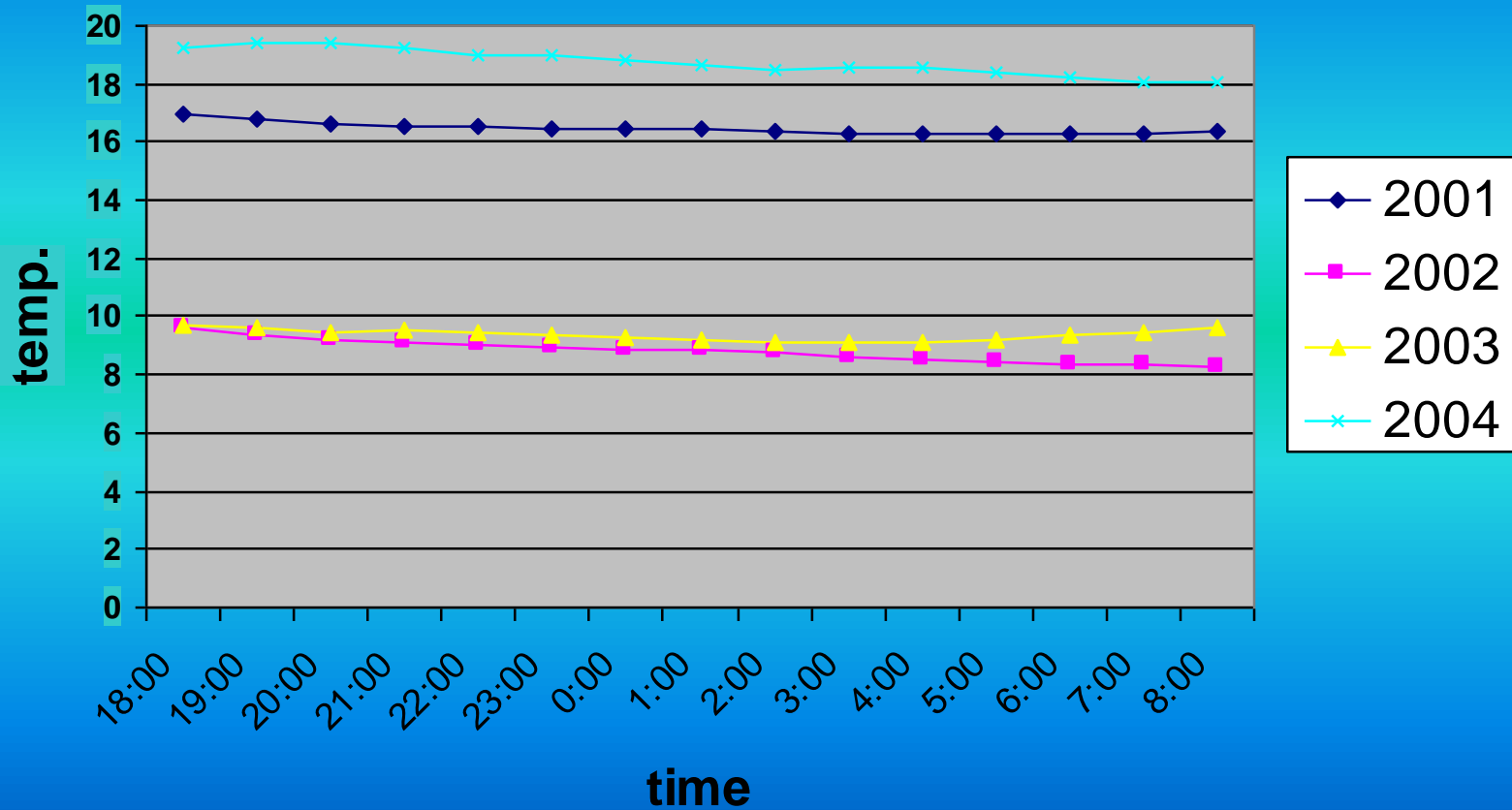
Dissolved Oxygen Indian Head River  
Site B 9/22/04



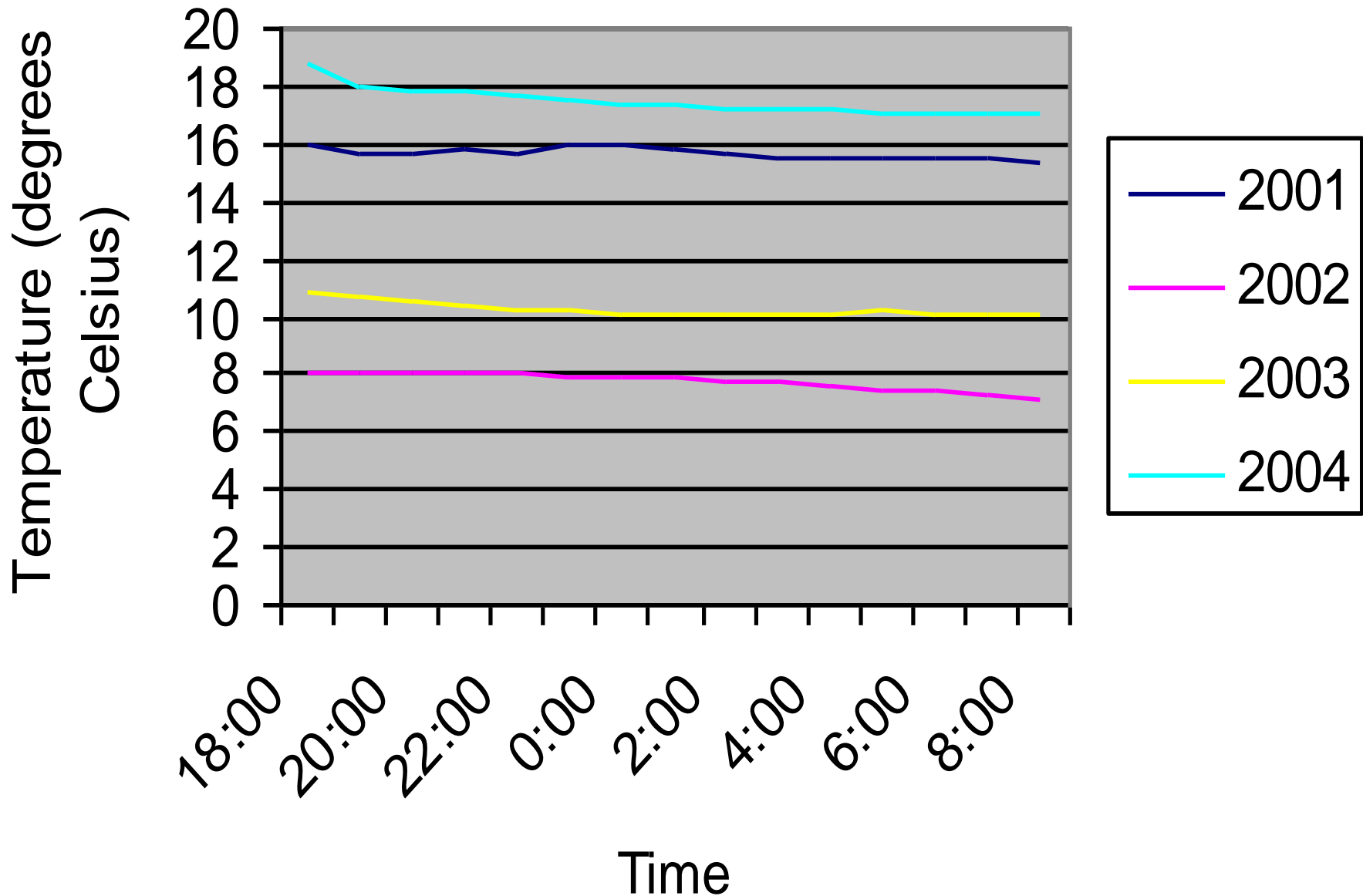
Comparison of Dissolved Oxygen from 5 PM September 22 to 3 PM September 23, 2004



# Temperature Comparison Indian Head River Site A 2001-2004

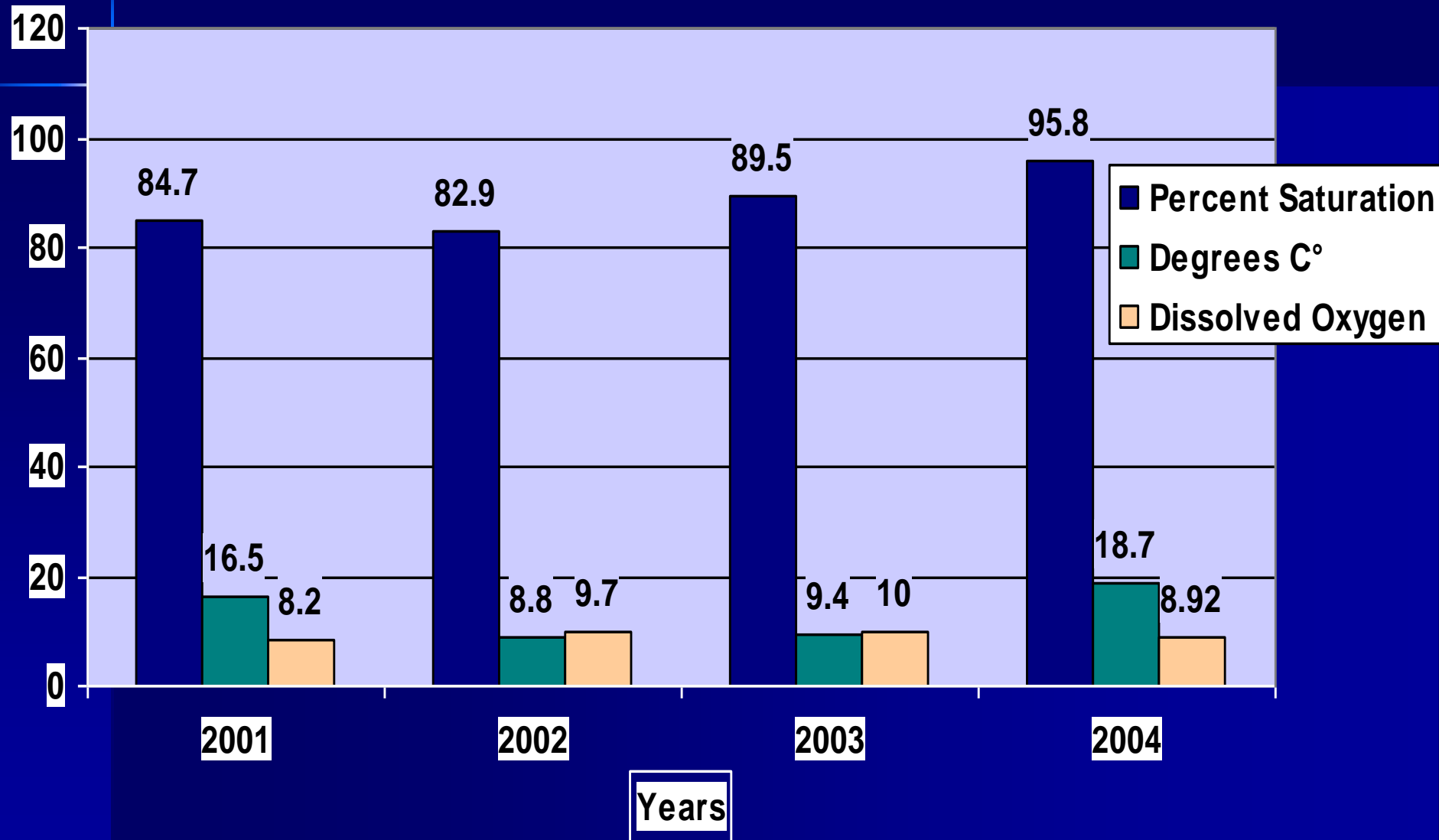


# Temperature Comparison Indian Head River Site B 2001-2004

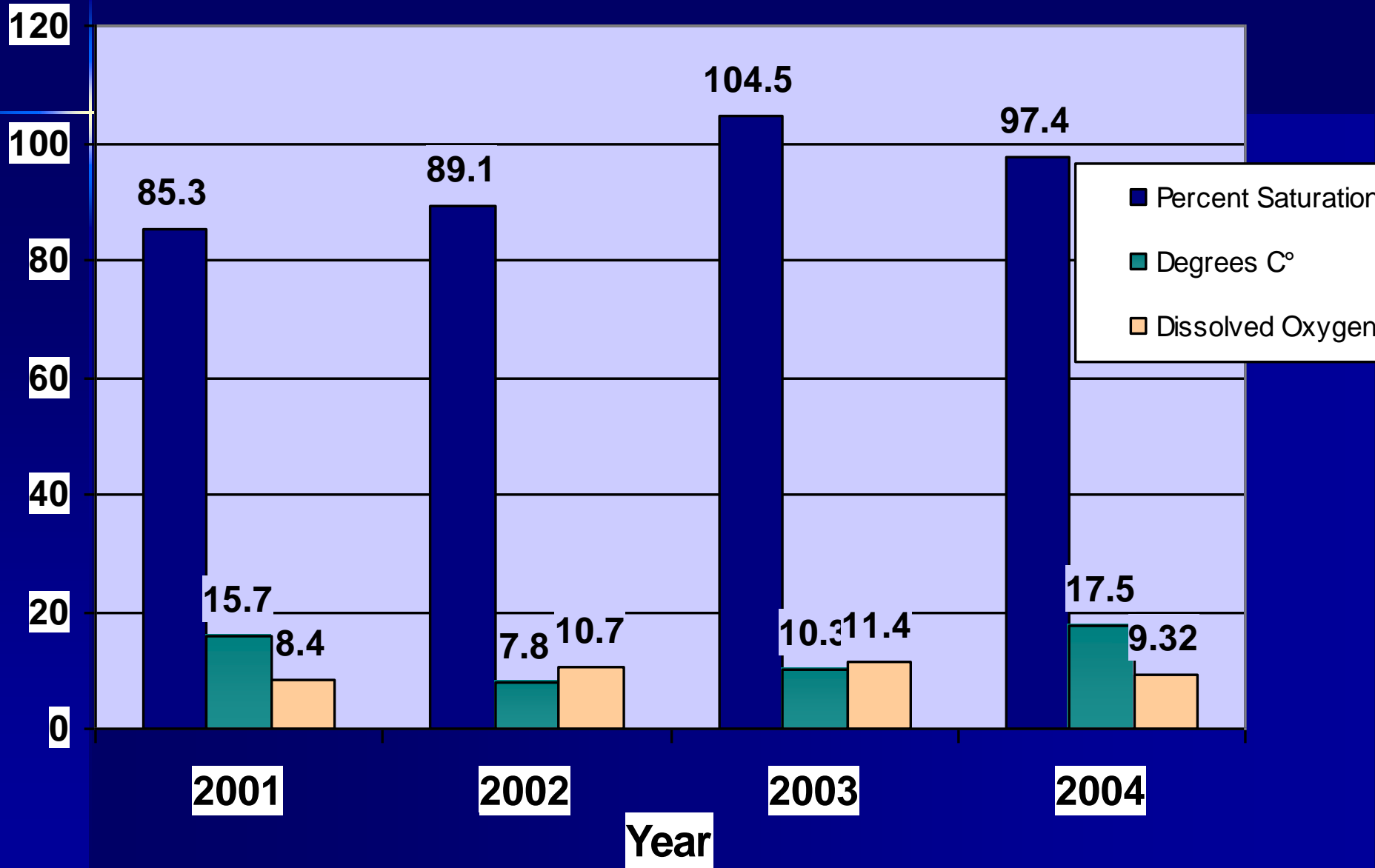




# Comparison of Dissolved Oxygen and Temperature Indian Head River Site A 2001-2004 6PM- 8AM



# Comparison of Dissolved Oxygen and Temperature Indian Head River Site B 2001-2004 6pm-8am



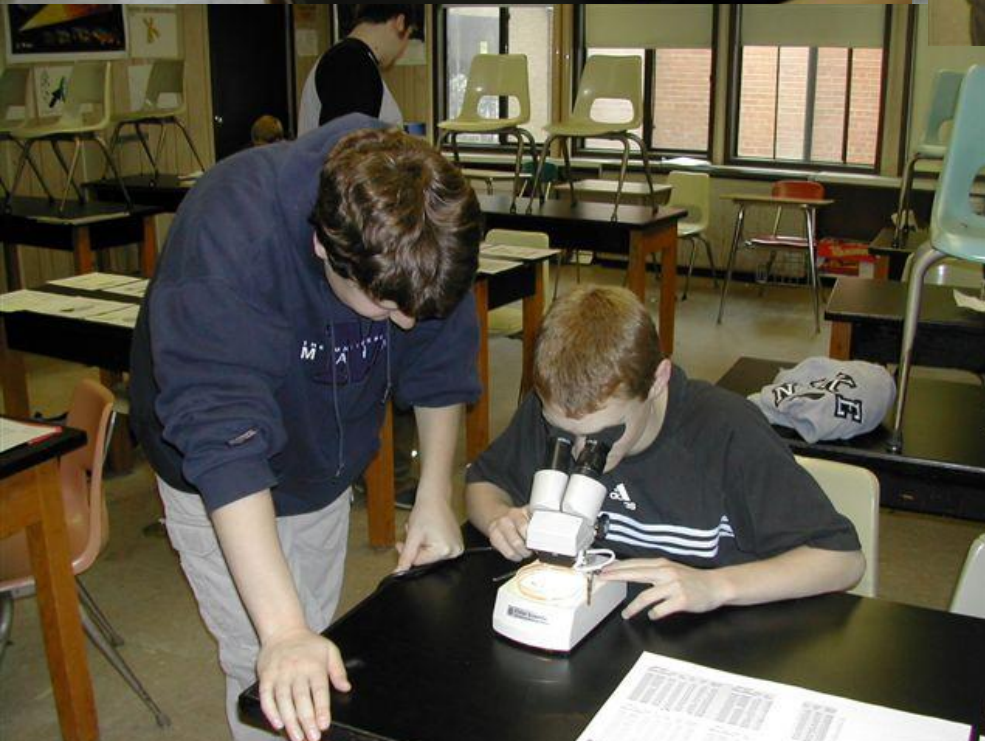
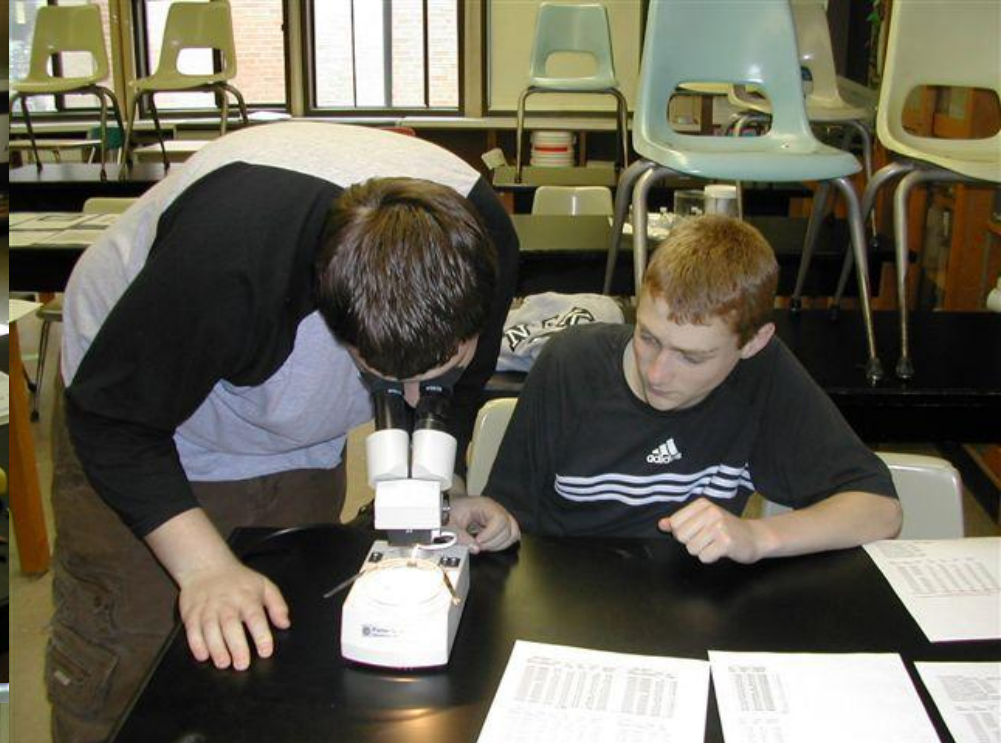
# Macroinvertebrates Site A



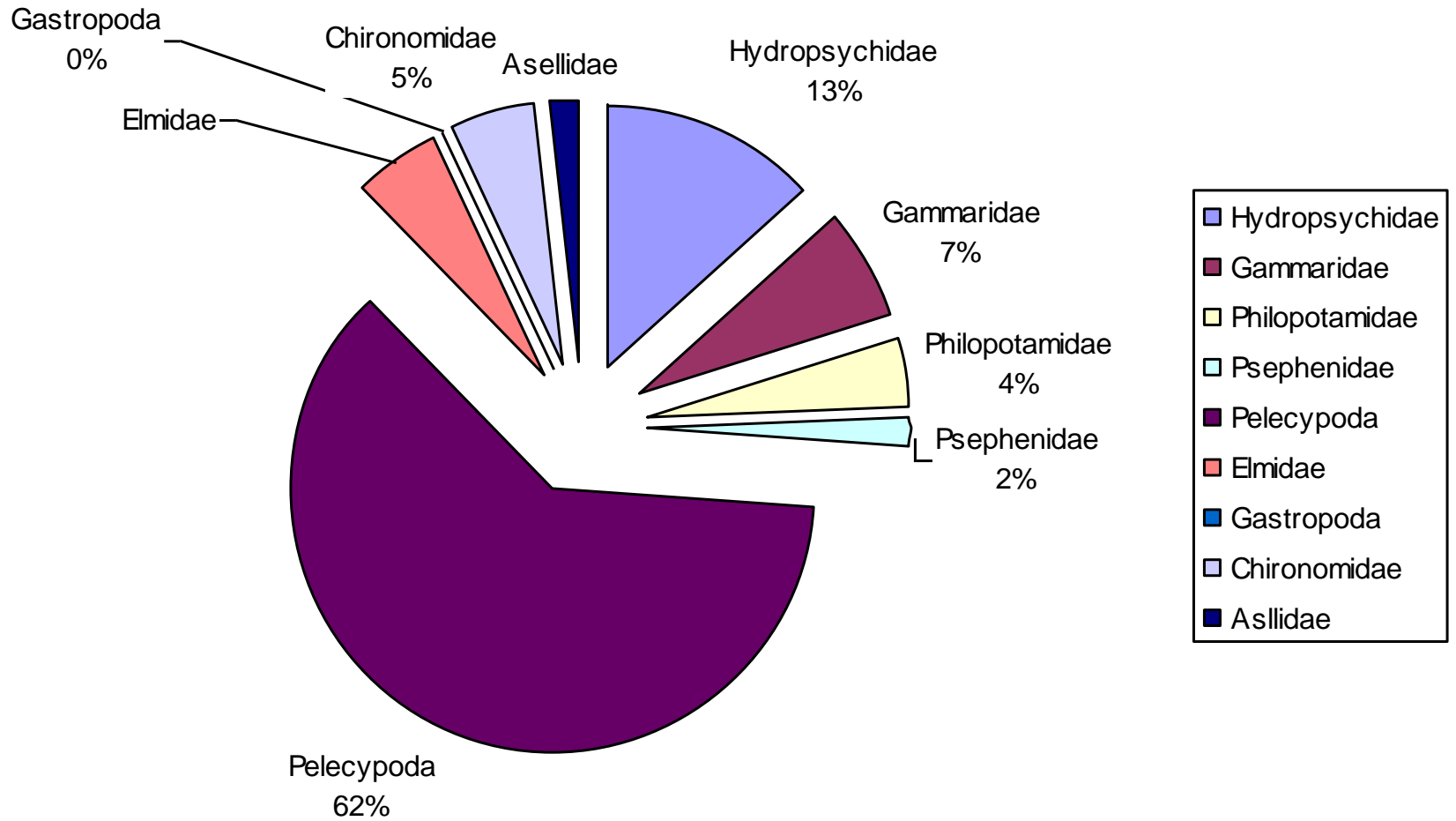
# Macroinvertebrate collection Site B 10/7/04



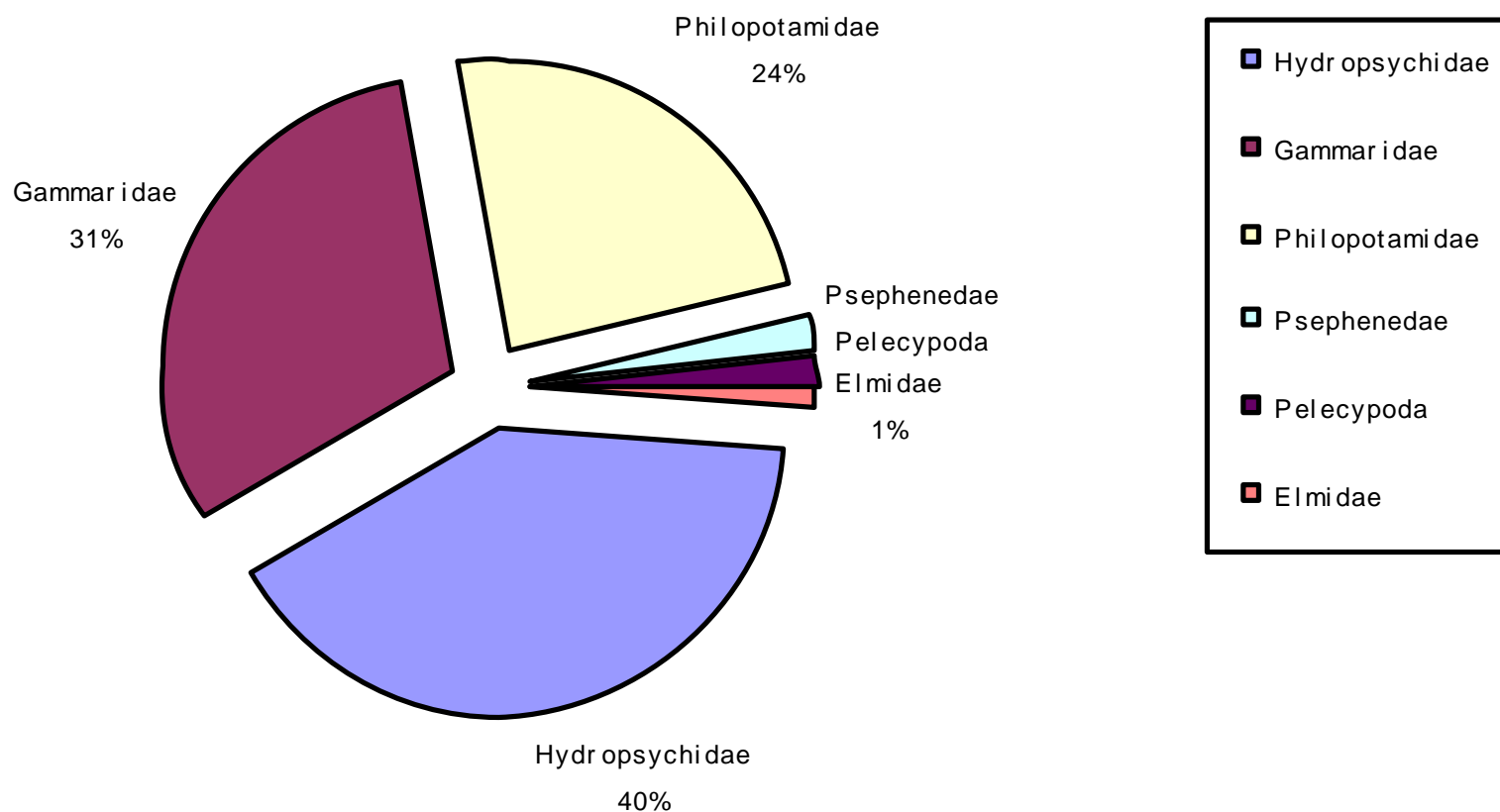




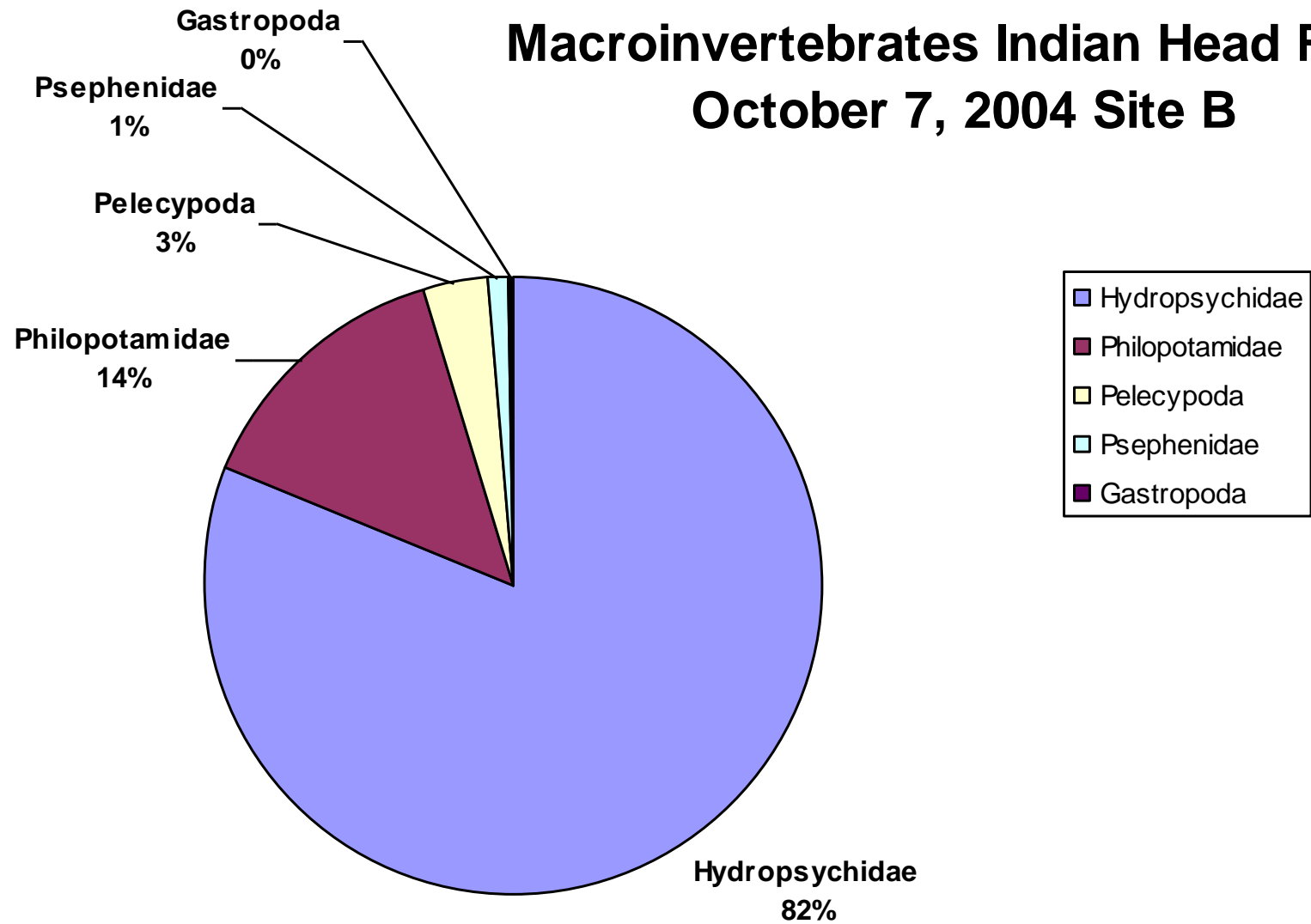
**Macroinvertebrates**  
**Indian Head River October 7, 2004**  
**Site A**



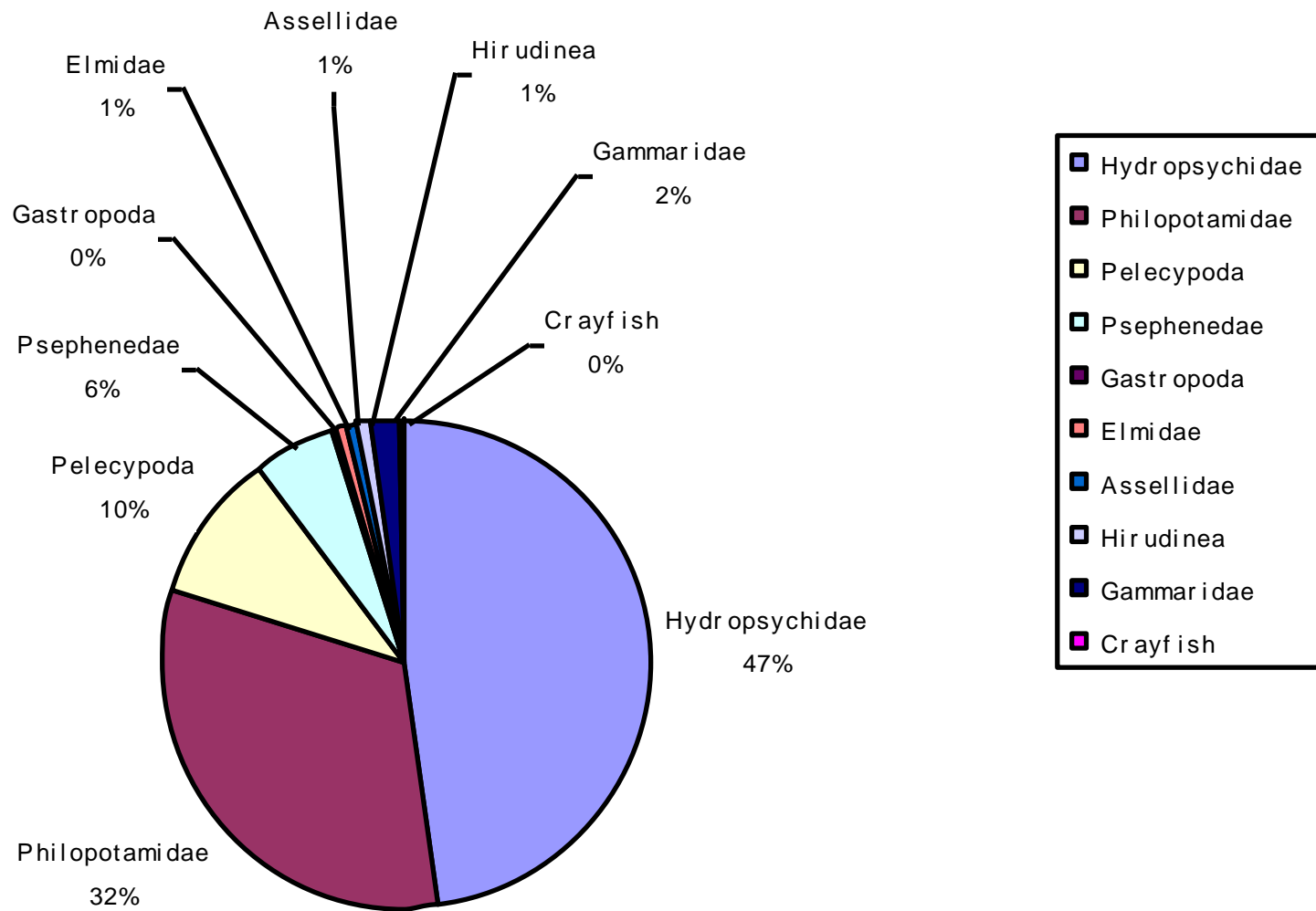
# Percent Composition of Macroinvertebrates Indian Head River Site A 2003



# Macroinvertebrates Indian Head River October 7, 2004 Site B



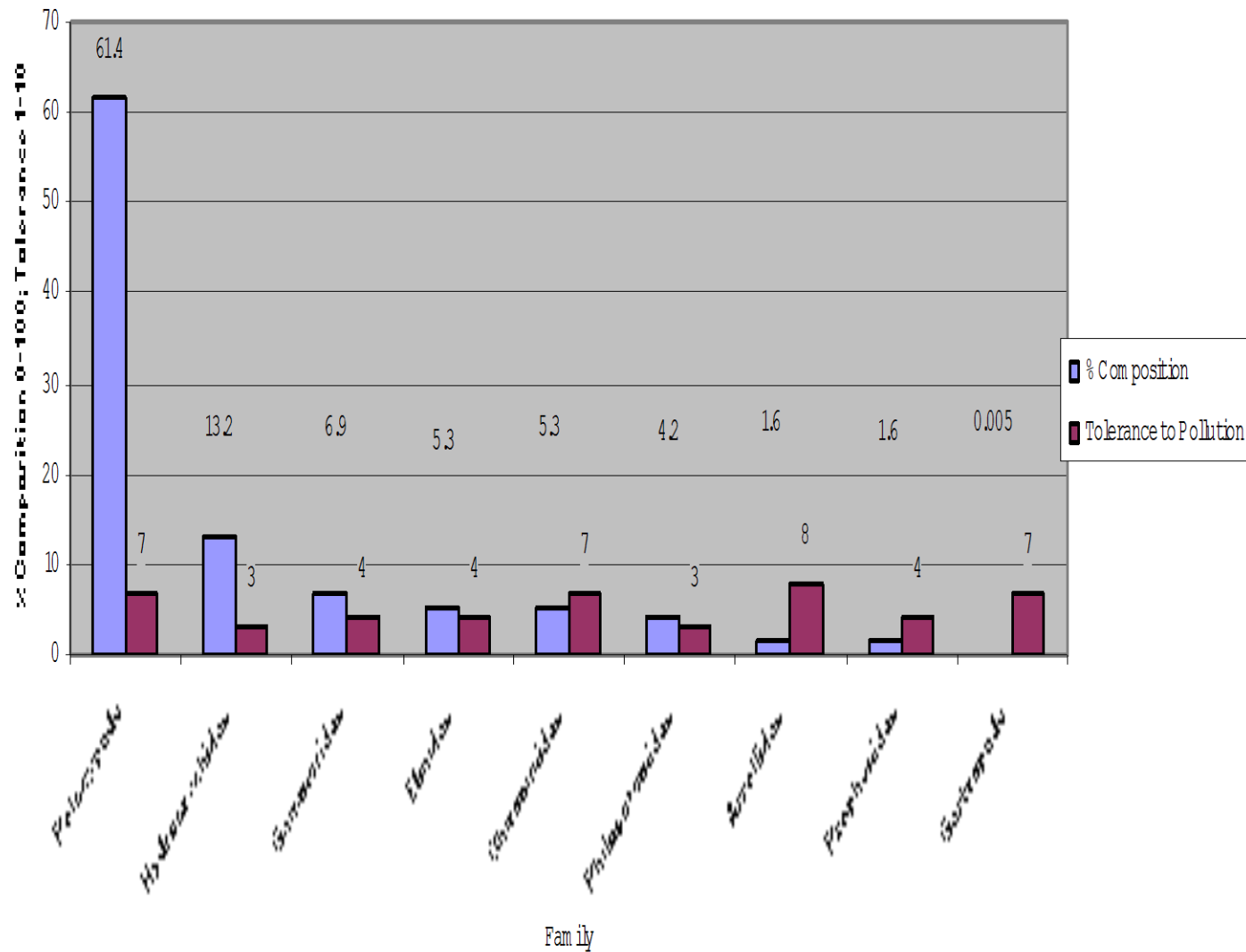
**Percent Composition**



Percent Composition Macroinvertebrates Indian Head  
River Site B 2003

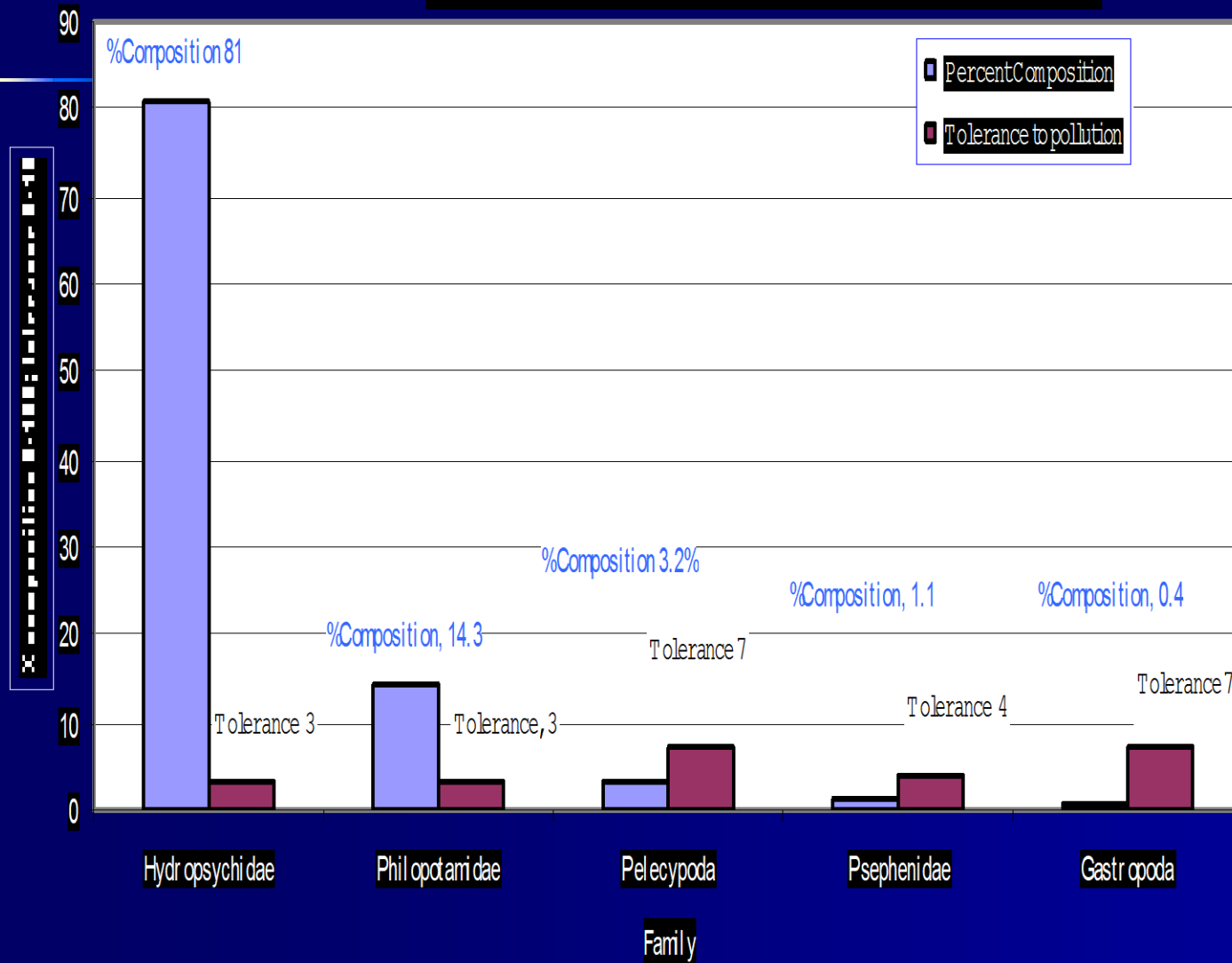


# Macroinvertebrates and Tolerance Indian Head River 10/7/04



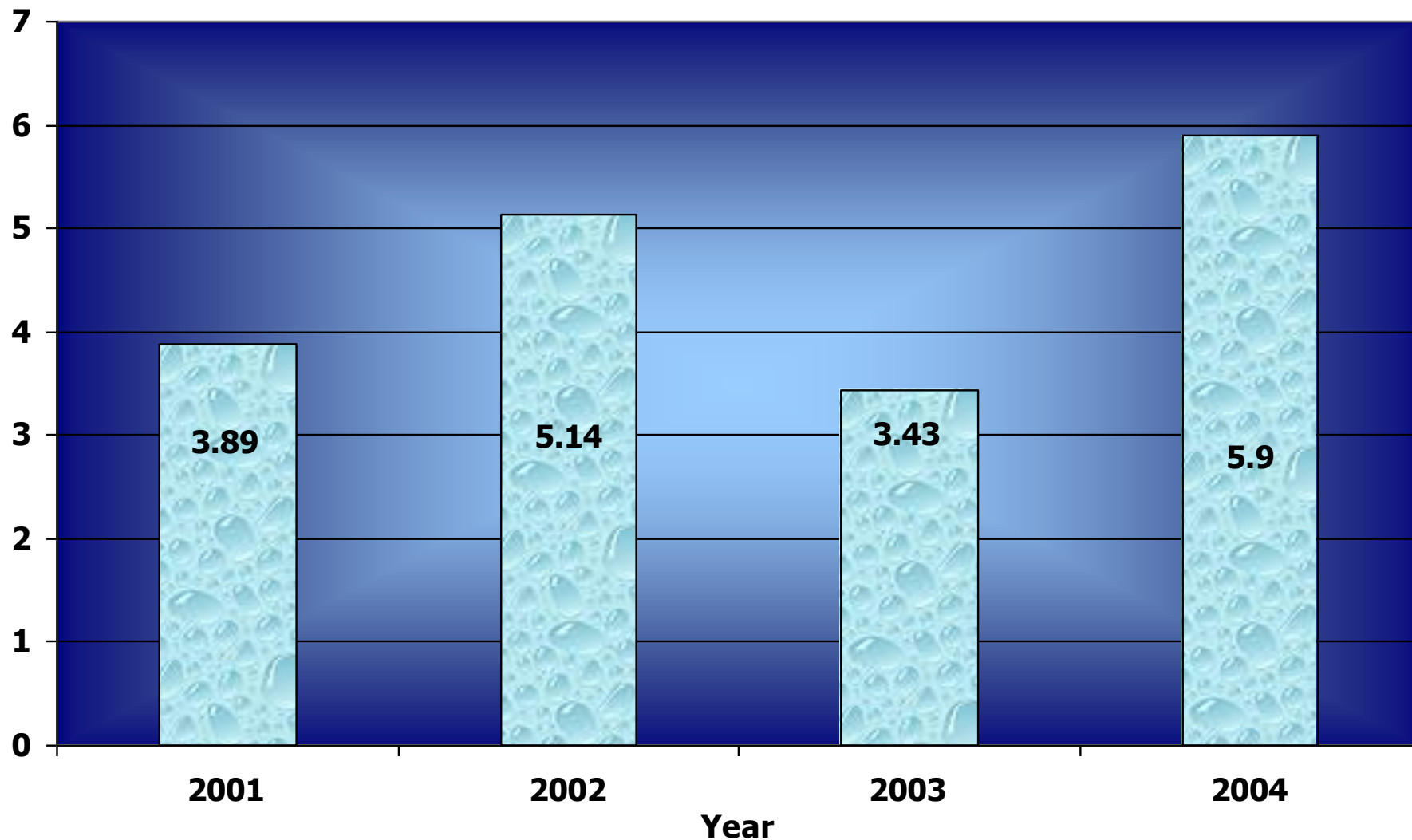
# Macroinvertebrates and Tolerance

## Indian Head River Site B 10/7/04



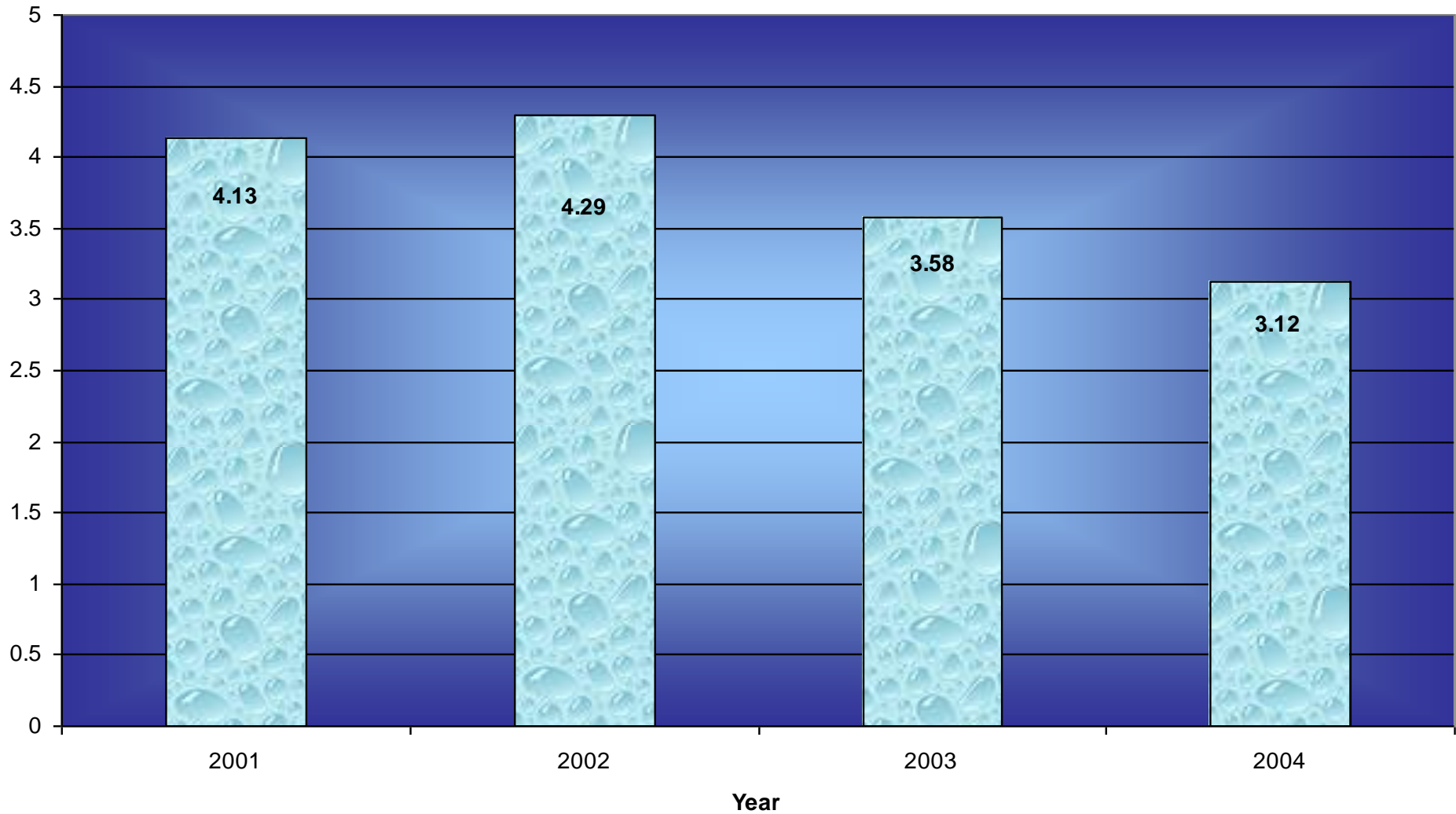
# Family Biotic Indices-Indian Head River

## Site A: 2001-2004



# Family Biotic Indices-Indian Head River

## Site B: 2001-2004



# **Hilsenhoff Biotic Index**

**0.0-3.75**

**Excellent**

**3.76-4.25**

**Very Good**

**4.26-5.00**

**Good**

**5.01-5.75**

**Fair**

**5.76-6.50**

**Fairly Poor**

**6.51-7.25**

**Poor**

**7.26-10.00**

**Very Poor**

**(Culp and Halliwell 1999)**



# **Conclusions**

**The Indian Head  
River meets all  
criteria for Class B  
warm water fisheries  
according to the  
parameters tested.**

# **Conclusions**

**Water quality  
appears better  
at Site B than  
Site A.**

# Conclusions

**The macroinvertebrate analysis at Site A rated fairly poor which indicated a deterioration in substrate conditions from 2003.**

# Conclusions

**The water chemistry results at Site A, however, are acceptable. The problem appears to be in the sediment.**

# Conclusions

**Greater flow and discharge may be an important variable in the dissolved oxygen and macroinvertebrate data.**



# Conclusions

**Nitrate readings  
were in the  
acceptable range in  
October 2004.**

# **Recommendations**

**To further determine the sources of nitrates in the system, water samples should be collected at more locations and at different times of the year.**

# **Recommendations**

**Monitoring should continue for macroinvertebrates, flow, discharge, and water chemistry to observe variations over time.**

# **Recommendations**

**Weather data  
should be noted  
for the week  
before data is  
collected.**

# Thanks

**We wish to express our sincere gratitude to Dr. Curry and Kim McCoy for all their work and support.**

**Thanks to Ms. Kofton for all the data from years past and information about the river.**



# **Thanks**

**Thanks also to  
sponsors of the  
RiverNet Program  
and Watershed  
Access Lab.**

# Executive Summary

[Click here to access the summary.](#)

**The End**