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Colby College Watershed Study: Togus Pond
(2004)

Senior Capstone in Environmental Science

2004

An Assessment of Water Quality

Colby College

Problems in Environmental Science course (Biology 493), Colby College

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An Assessment of Water Quality



Natalie Maida

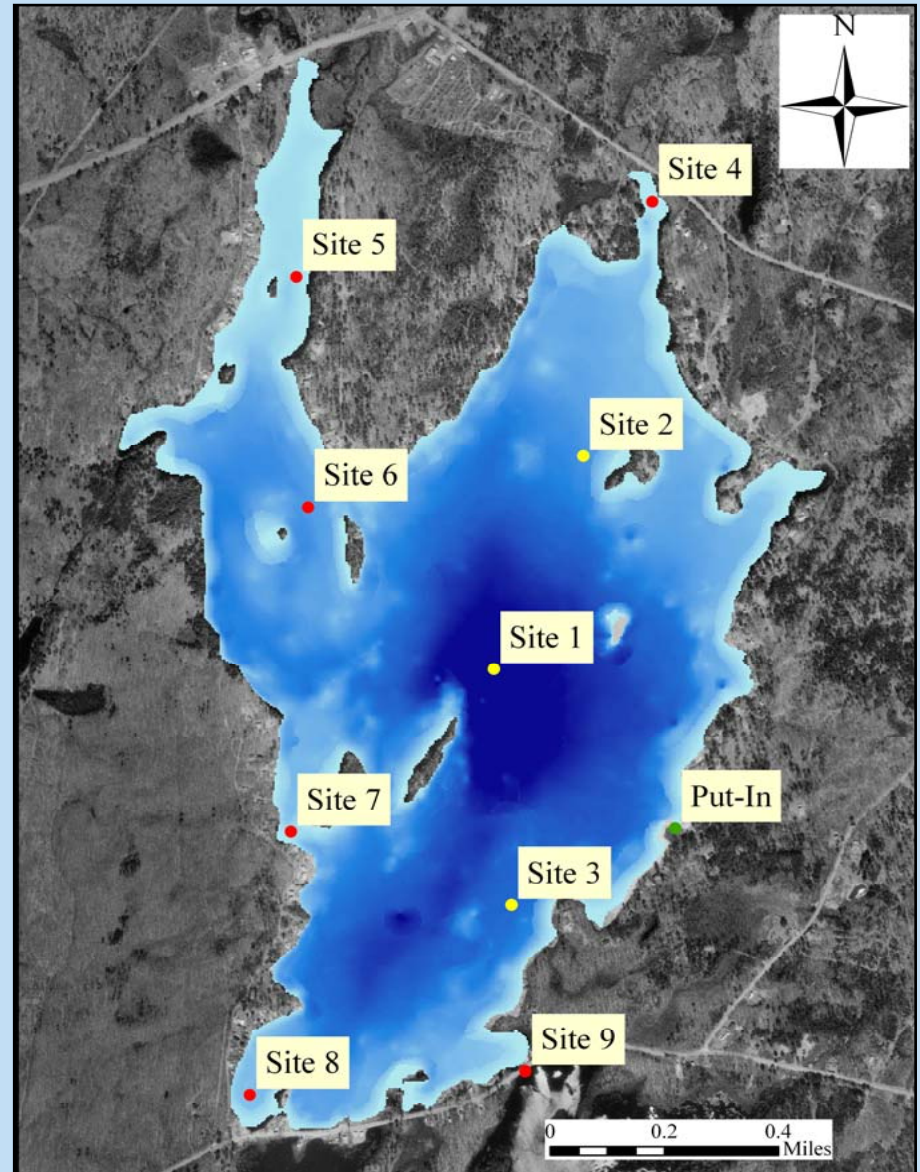
Water Analysis Overview

- Sample Site Locations
- Physical Measurements
- Chemical Tests
- Biological Tests



Sample Sites

- Characterization Sites:
1, 2, 3
- Spot Sites:
4, 5, 6, 7, 8, 9 (culvert)
- Tests performed through
the summer and early fall
- Analyses performed on
site, in the Colby
Environmental Analysis
Center, or by Northeast
Laboratory



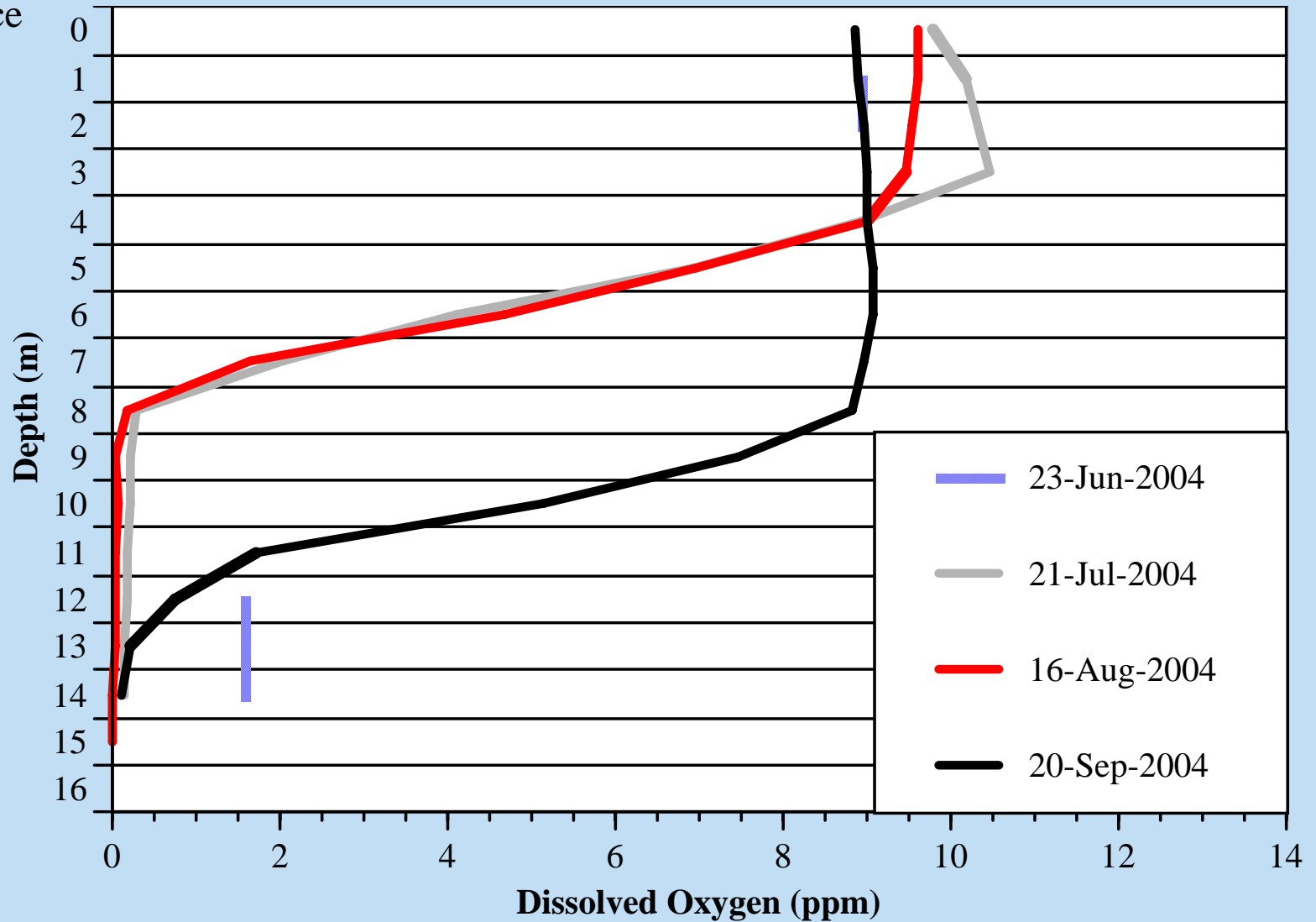
Physical Tests

- Dissolved Oxygen
- Temperature
- Transparency
- Turbidity
- Color
- Conductivity

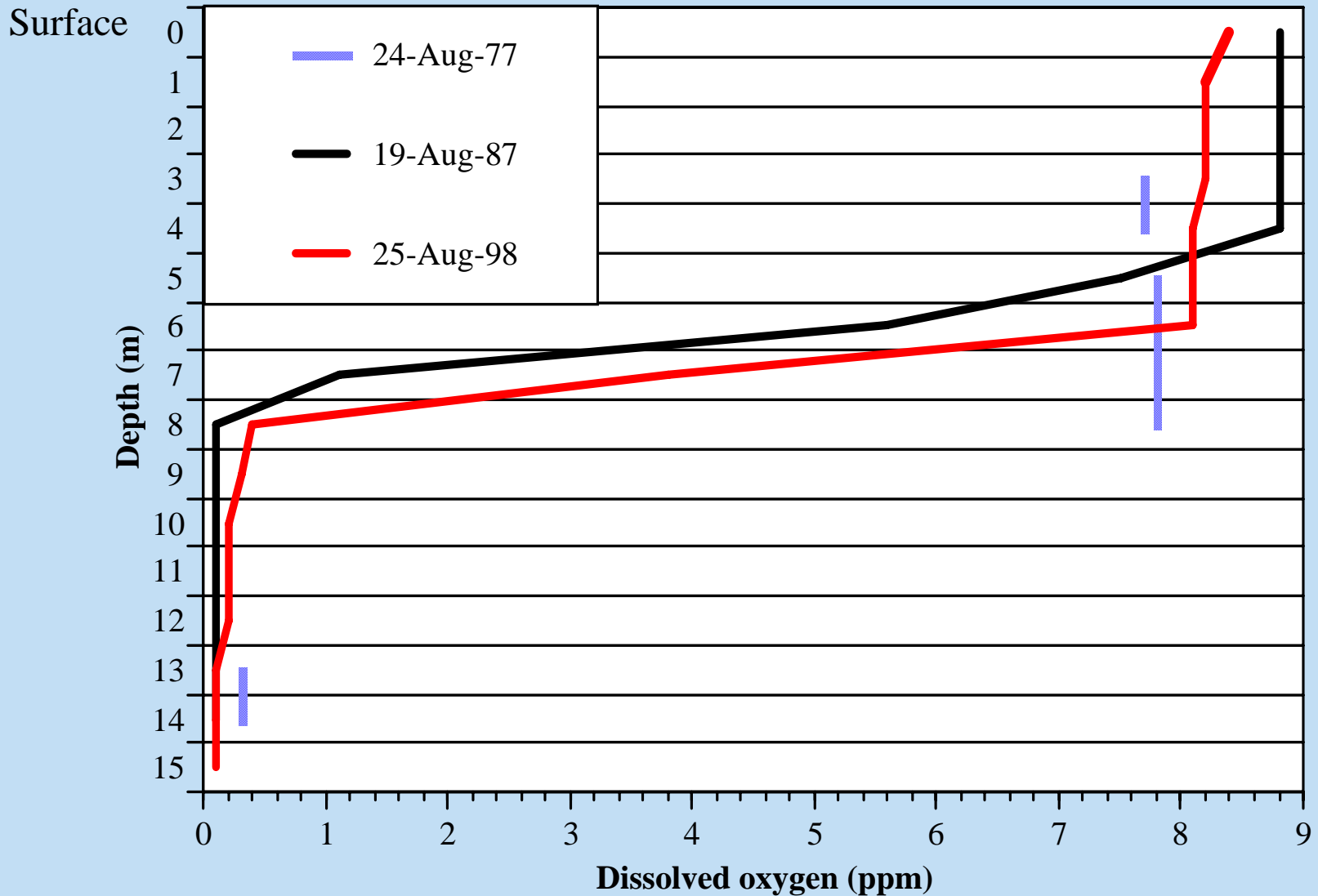


Dissolved Oxygen

Surface

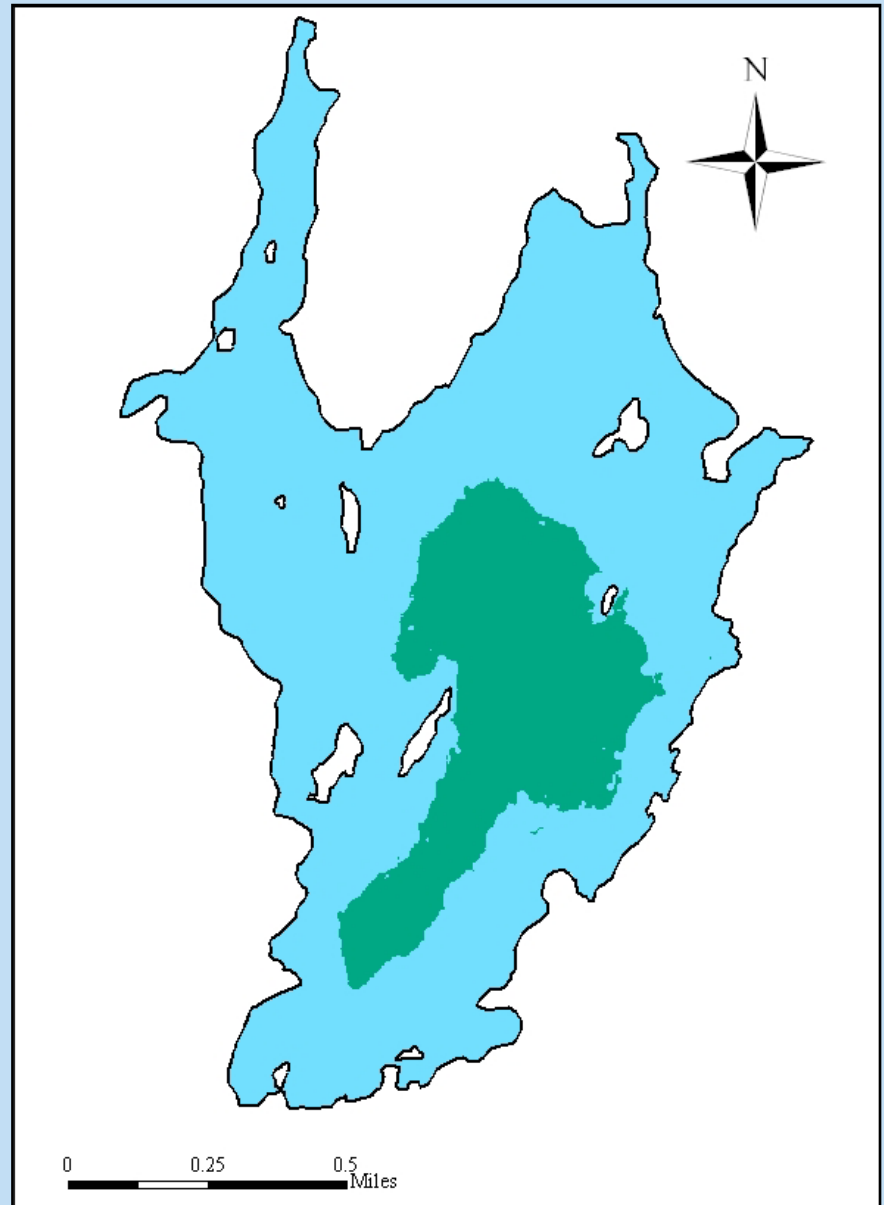
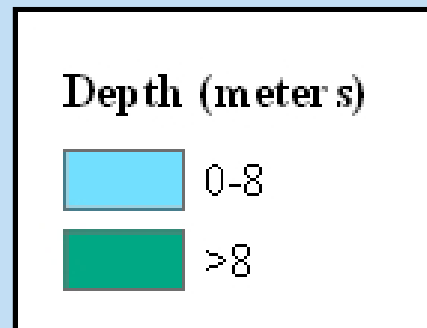


Historical DO



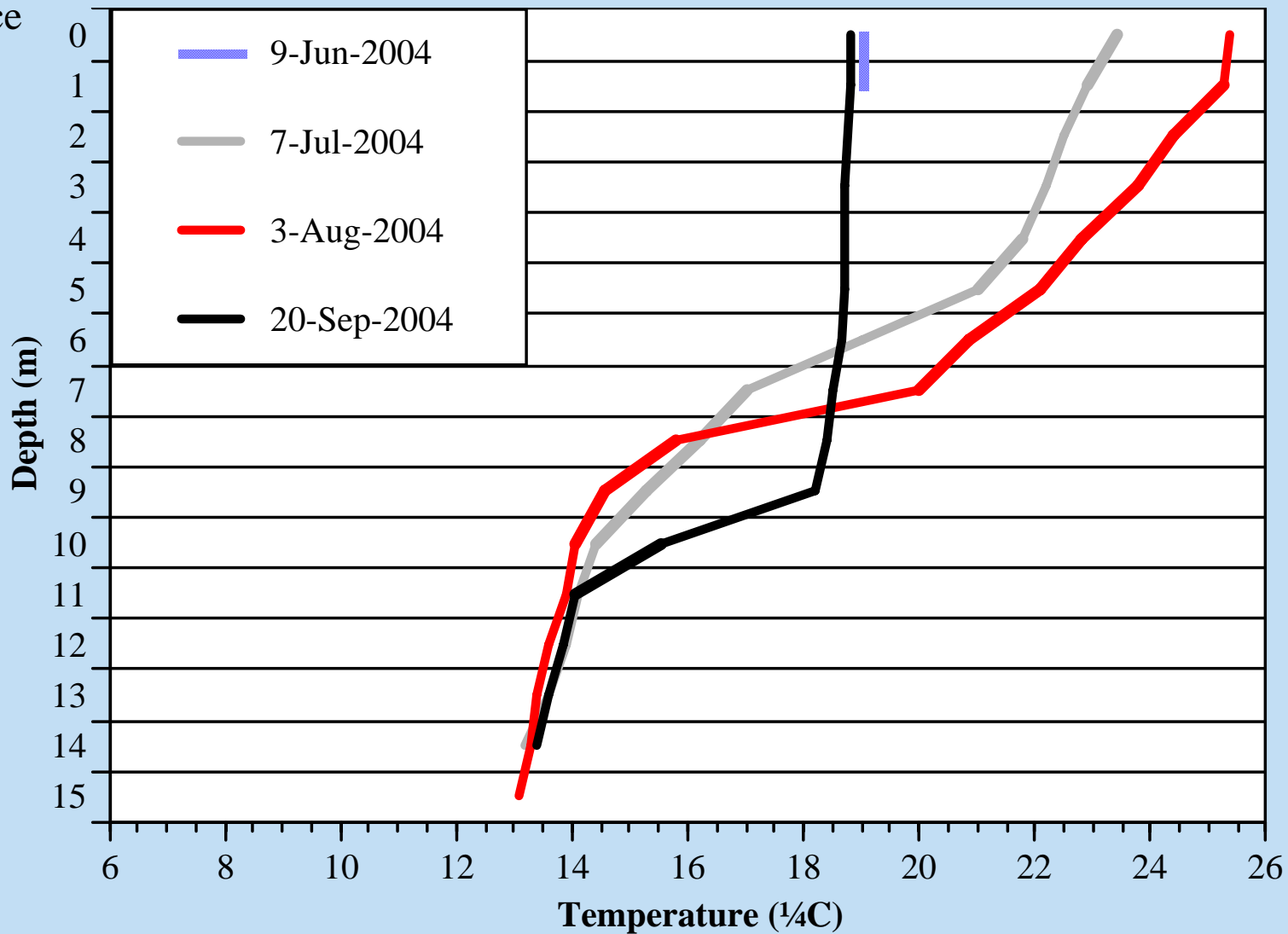
Anoxic Volume of the Lake

- Togus Pond lake water is anoxic below 8 m.
- 12% of the lake volume is anoxic

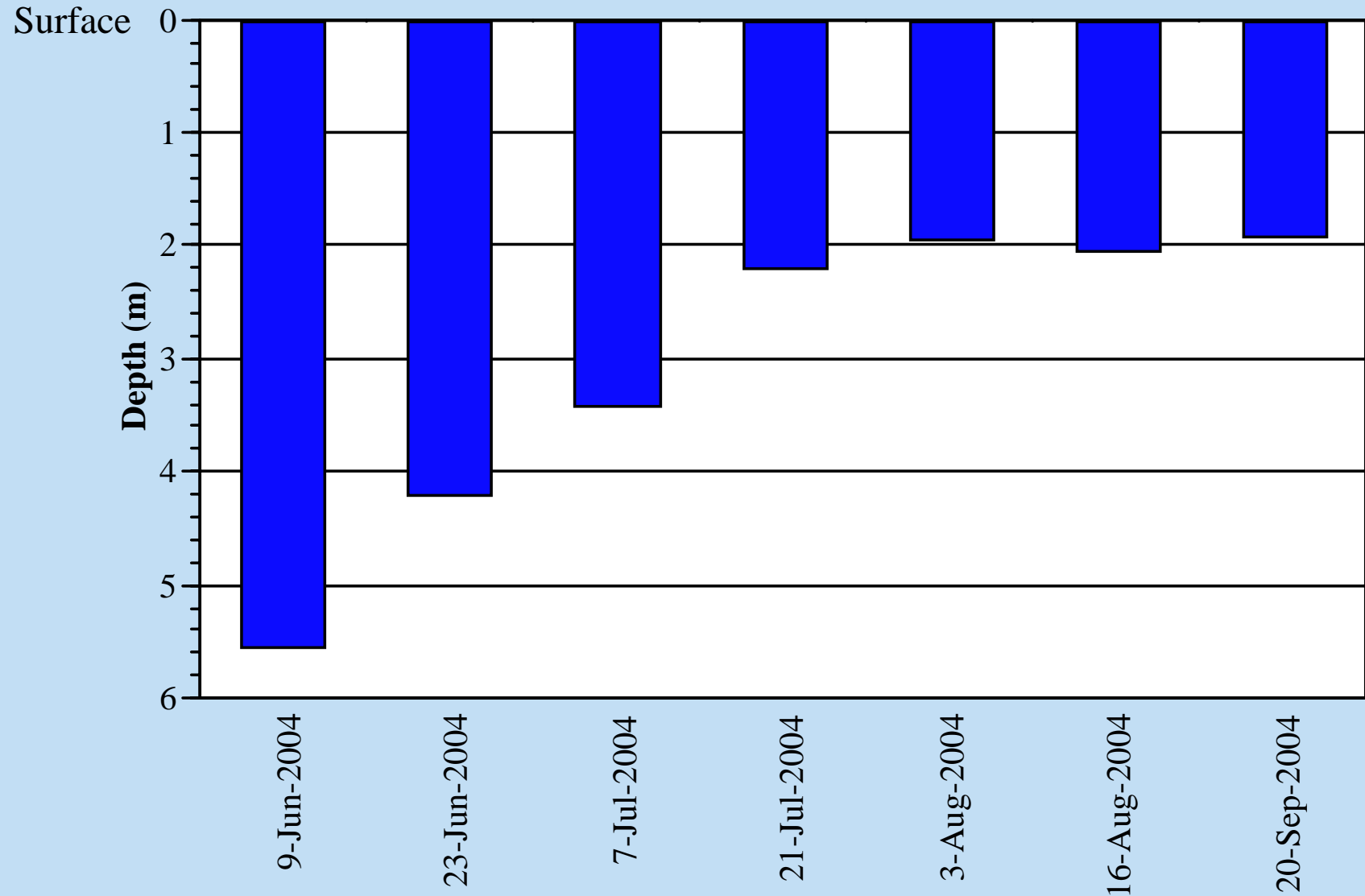


Temperature

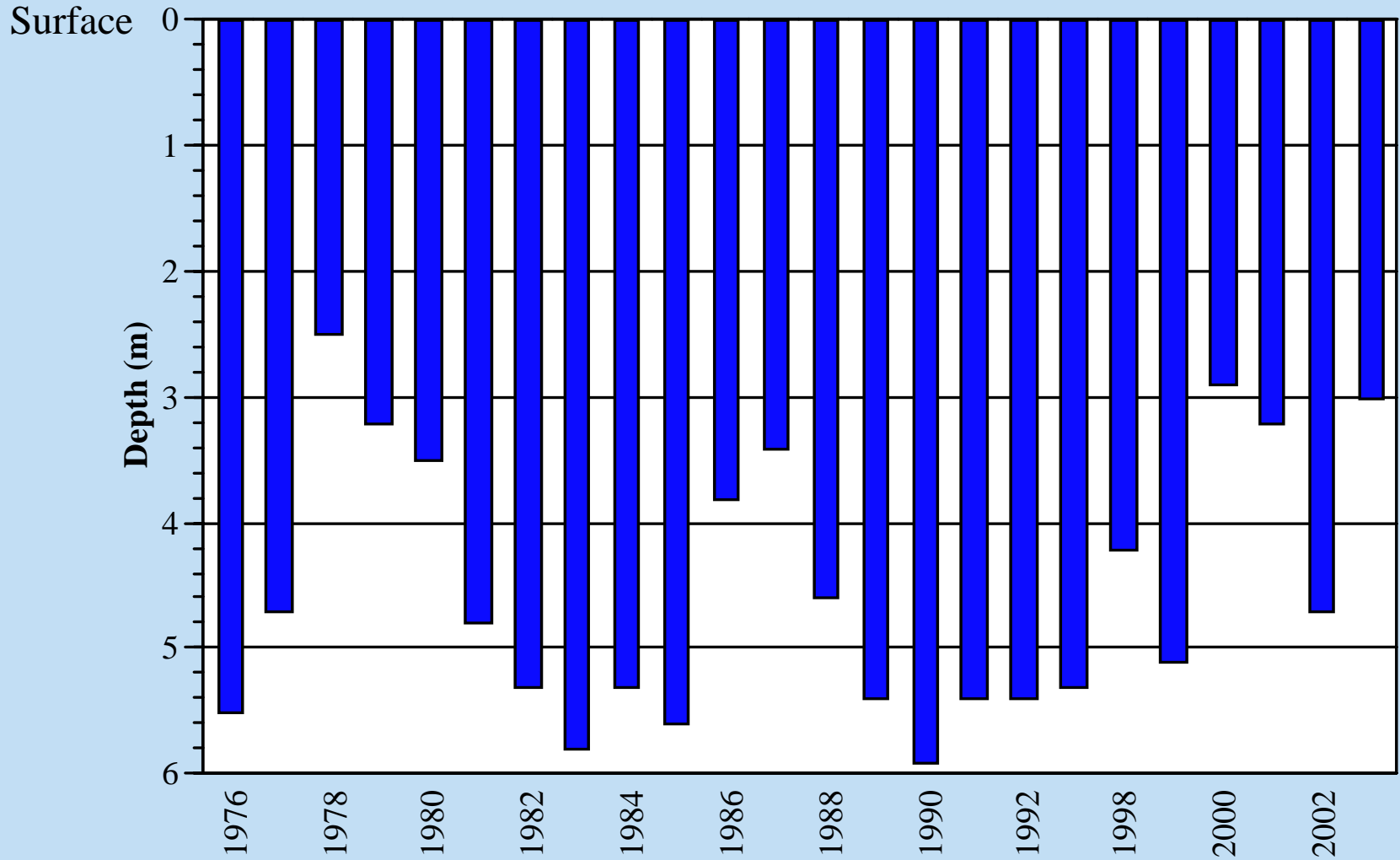
Surface



Transparency



Historical Transparency



Other Physical Tests

- **Turbidity-**
mean 4 NTU
- **Color-** mean
45 SPU
- **Conductivity-**
mean 58
 $\mu\text{mhos/cm}$



A Comparison of Physical Parameters in Togus Pond and lakes in the area near Togus Pond

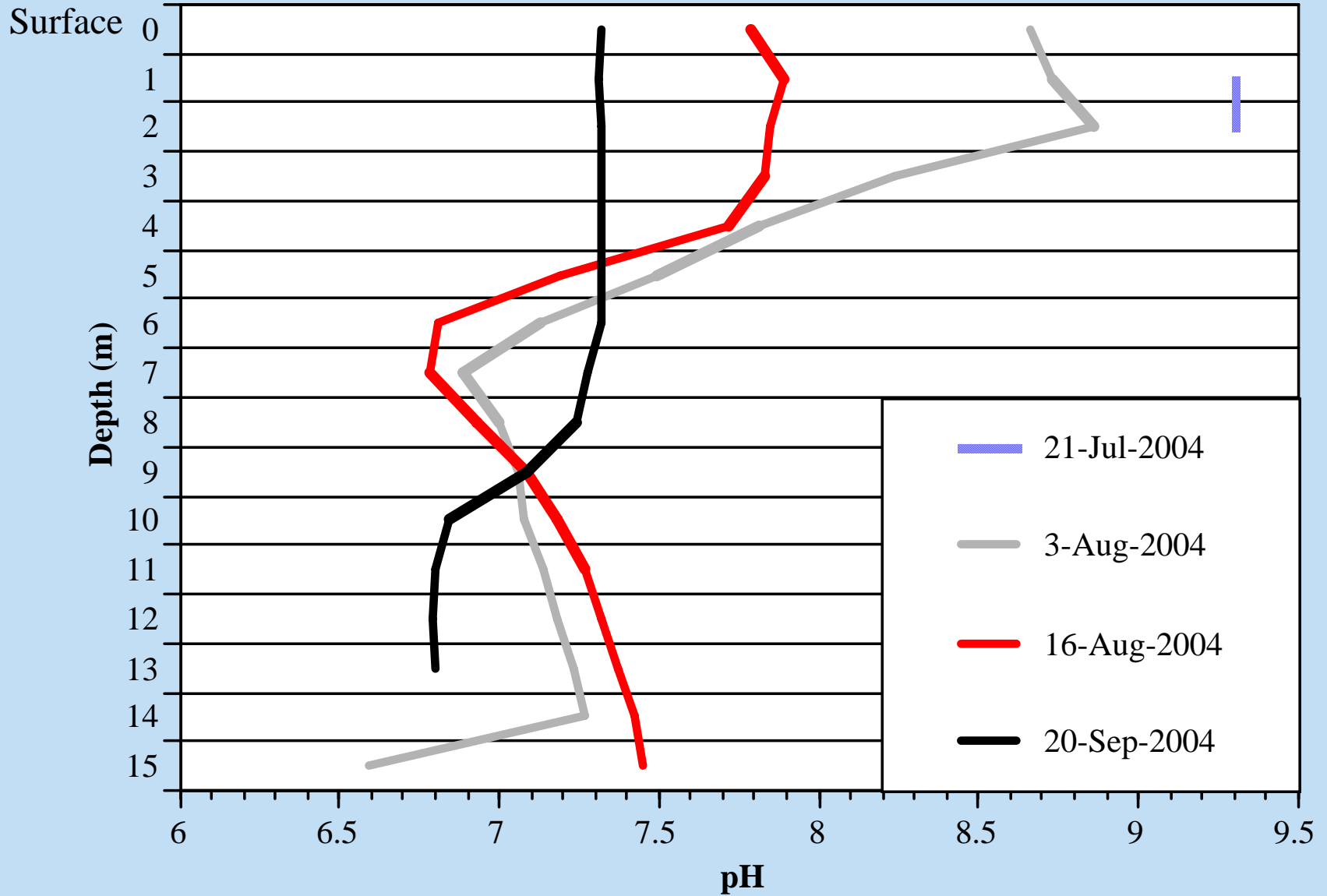
	Togus Pond 2004	Threemile Pond 2004	Webber Pond 2003	East Pond 1999
Dissolved Oxygen	0-9	0.2-9.5	0.05-7.4	2-11
Color (SPU)	44 ± 16.1	14 ± 8.5	19 ± 3.6	17
Conductivity (µmhos/cm)	58 ± 2.0	48 ± 5.8	39 ± 1.0	28
Turbidity (NTU)	7.2 ± 1.3	1.6 ± 0.8	5.9 ± 2.7	8.0
Transparency (m)	3.0 ± 0.5	2.9 ± 0.04	1.3 ± 0.1	3.3

Chemical Tests

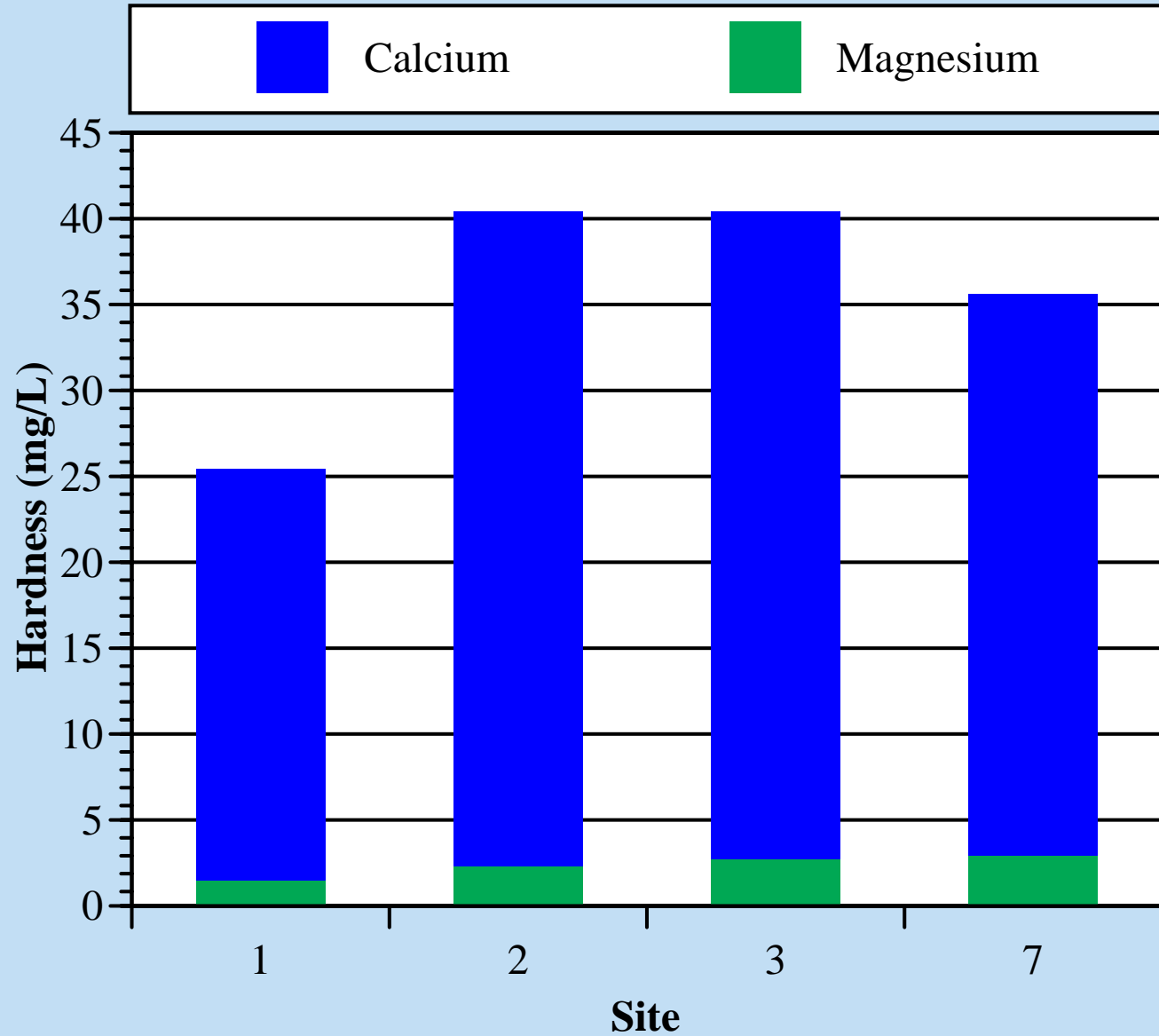
- pH
- Hardness
- Nitrates
- Alkalinity
- Ammonium
- Phosphorus



pH



Hardness



Other Chemical Tests

- Nitrates- mean 0.9 ppm
- Alkalinity- mean 18 ppm
- Ammonium- mean 0.08 ppm
- Phosphorus- mean 28 ppb



Milton Roy Thermospectronic Aquamate Spectrophotometer used to test phosphorus samples

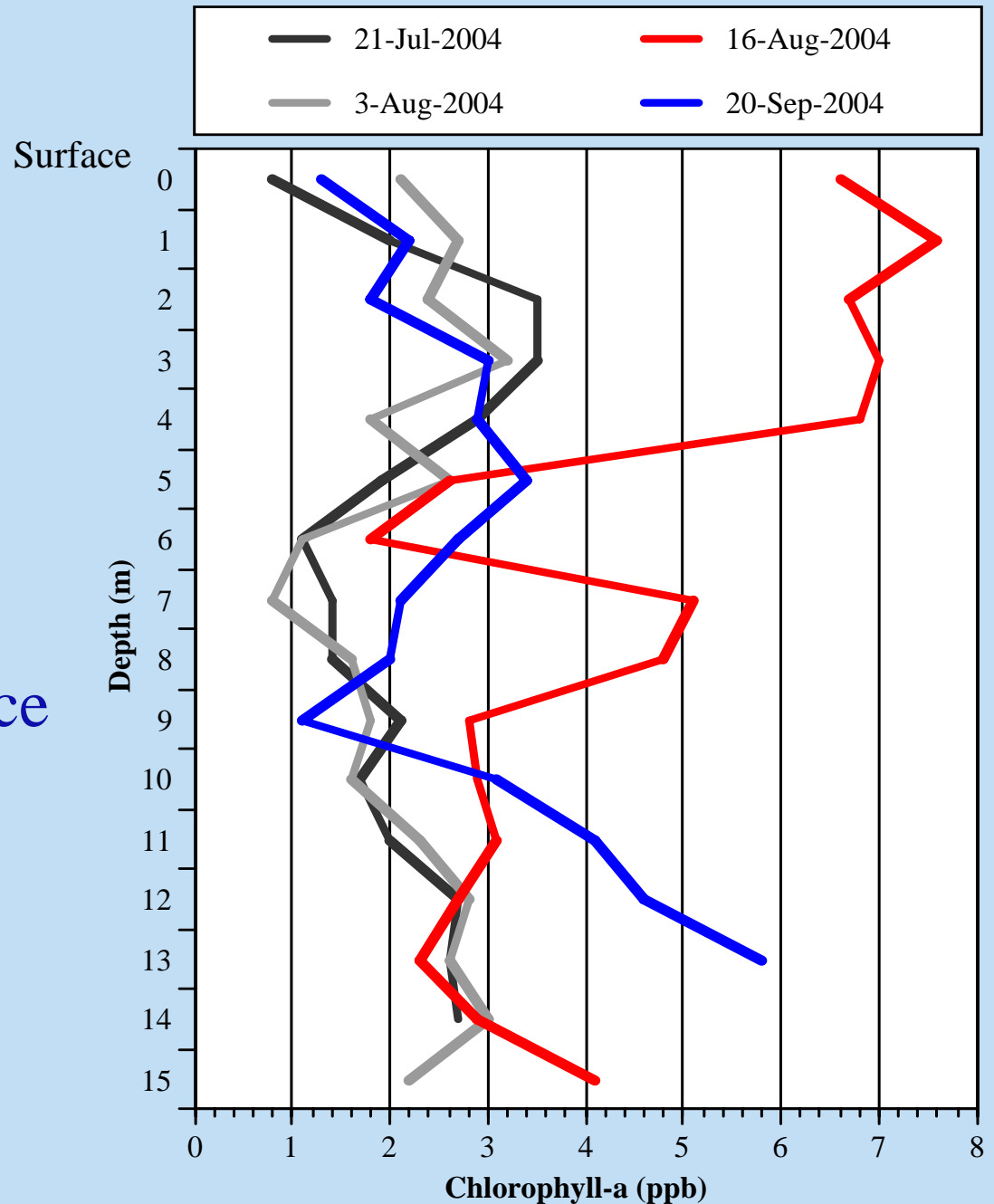
A Comparison of Chemical Parameters in Togus Pond and lakes in the area near Togus Pond

	Togus Pond 2004	Threemile Pond 2004	Webber Pond 2003	East Pond 1999
pH	7.6 ± 0.3	7.1 ± 0.3	7.1 ± 0.3	7.4 ± 0.2
Nitrates (ppm)	0.95 ± 0.16	0.06 ± 0.02	0.07 ± 0.02	0.04
Alkalinity (mg/L)	18.3 ± 1.4	42.3 ± 4.8	37.0 ± 22.4	11.2 ± 0.7
Hardness (mg/L)	22.2 ± 4.5	4.04 ± 1.0	2.9 ± 0.1	3.9

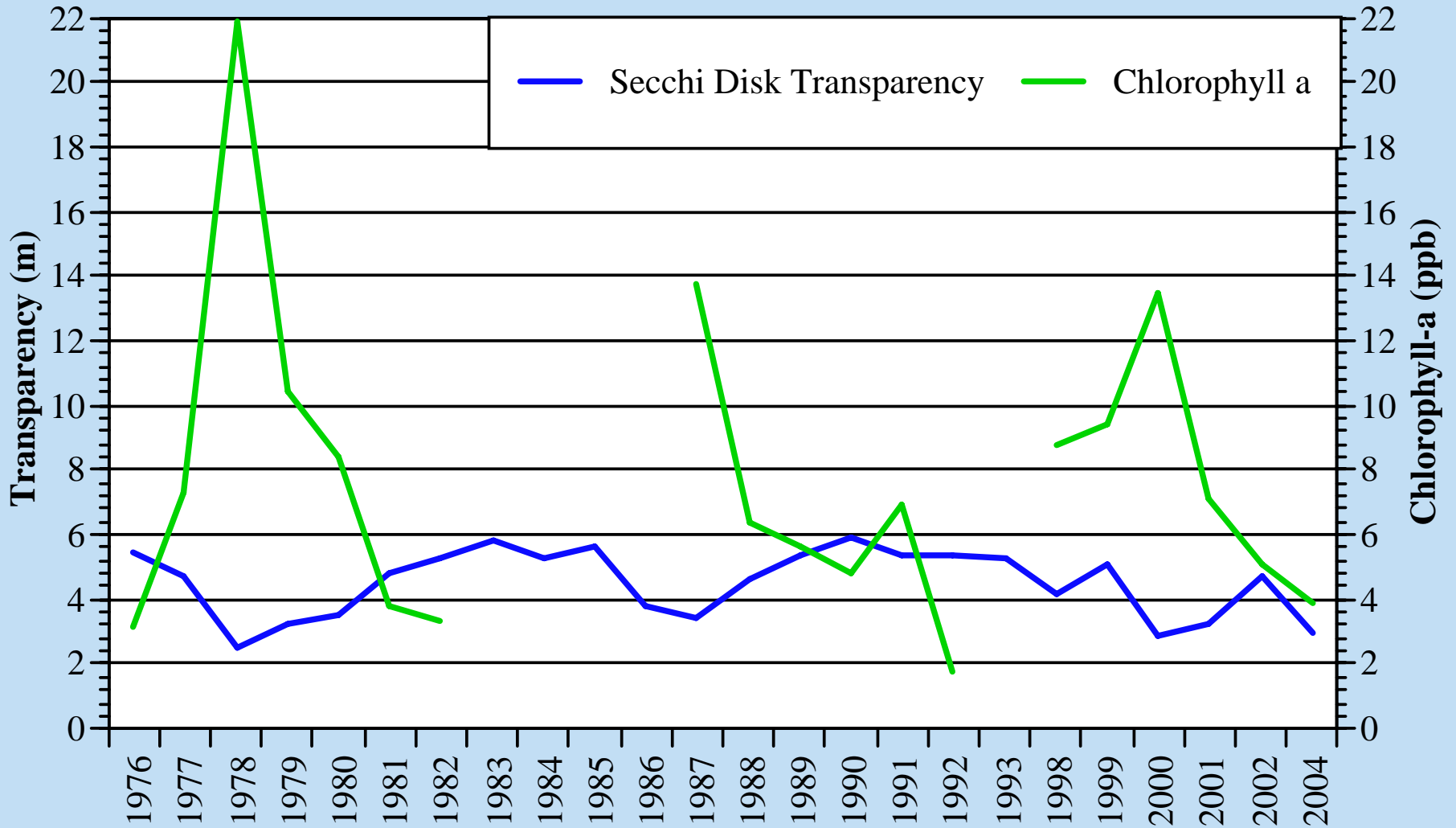
Biological Tests

Chlorophyll-*a*

- High values in August at the surface
- High values in September at depth



Chlorophyll-*a*



Fecal Coliform

- Fecal coliform was tested at 3 sites across the lake and all results measured 0 CFU/100mL



Water Analysis Conclusions

High Values Found

- Color: Mean 44 SPU
- Conductivity: Mean 58 $\mu\text{mhos/cm}$
- Nitrates: 0.95 ppm
- Hardness: 22mg/L

