

April 12, 2010

Joyce Laudise
65 Lenape Lane
Berkely Heights, NJ 07972

RE: Twin and Walker Creek Watershed Monitoring Program
2005 Water Quality Monitoring Final Report
FXB File No. PA1551-04-001

Dear Ms. Laudise,

The purpose of this letter is to report results from the 2005 Twin and Walker Creek Watershed Monitoring Program. The primary purpose of the monitoring program is to characterize trophic state within Big Twin Lake, Little Twin Lake, and Walker Lake based on measurements of secchi depth, total phosphorus, and chlorophyll *a*. The monitoring program consisted of measuring total phosphorus, chlorophyll *a*, and secchi depth from the photic zone of Big Twin Lake, Little Twin Lake, and Walker Lake on four occasions during the 2005 growing season. Results from all four of those sampling events are presented in this letter.

Results

Table 1 presents raw and averaged data for the study period. Surface water total phosphorus concentration was highest in Walker Lake ($0.069 \text{ mg/l} \pm 0.094$) and lowest in Little Twin Lake ($0.008 \text{ mg/l} \pm 0.005$). Chlorophyll *a* concentration was lowest in Little Twin Lake ($4.075 \text{ mg/l} \pm 0.568$), followed by Big Twin Lake ($6.675 \text{ mg/l} \pm 2.032$), and Walker Lake ($12.375 \text{ mg/l} \pm 12.605$). Transparency as measured by Secchi Depth was highest for Little Twin Lake ($4.00 \text{ m} \pm 1.35$), while Secchi Depth values were somewhat lower for Walker Lake ($3.78 \text{ m} \pm 2.16$) and Big Twin ($3.00 \text{ m} \pm 0.00$).

Average values for secchi depth, total phosphorus, and chlorophyll *a* were used to compute trophic state indices following Carlson, 1977. Figures 1, 2, and 3 compare trophic state indices for 2005 with those calculated for previous years. In 2005, results from pheophytin *a* and chlorophyll *a* analyses for Walker Lake were particularly high in June. These results may be questionable and may skew the chlorophyll *a* trophic state value for Walker Lake. The total phosphorus results were lower for Little Twin Lake than in previous years and this has resulted in a noticeable reduction in the trophic state level based on phosphorus for Little Twin Lake as shown in Figure 1.

Based on the four years of available data, it appears that the trophic states of the three lakes is stable and are not degrading. This trend is also present when viewing the long-term secchi disc trophic state indices. It is important to note, however that analysis was performed on a small dataset and that more monitoring is required to determine the presence/absence of long term water quality trends.

Table 1. 2005 Twin and Walker Creek Watershed Monitoring Program Lake Monitoring Results

<i>Waterbody Name</i>	<i>Sample No.</i>	<i>Month Collected</i>	<i>Total Phosphorus (mg/l)</i>	<i>Chlorophyll a (mg/l)</i>	<i>Secchi Depth (m)</i>
Big Twin Lake	1	6/25/2005	0.032	5.00	3.00
	2	7/24/2005	0.032	6.40	3.00
	3	8/28/2005	0.010	5.70	3.00
	4	9/24/2005	0.021	9.60	3.00
Average			0.024	6.675	3.00
Standard deviation			0.011	2.032	0.00
Little Twin Lake	1	6/25/2005	0.011	4.00	3.50
	2	7/24/2005	0.011	4.50	3.50
	3	8/28/2005	0.001*	4.50	3.00
	4	9/24/2005	0.010	3.30	6.00
Average			0.008	4.075	4.00
Standard deviation			0.005	0.568	1.35
Walker Lake	1	6/25/2005	0.025	31.00**	3.00
	2	7/24/2005	0.025	3.40	2.50
	3	8/28/2005	0.210	6.40	2.60
	4	9/24/2005	0.015	8.70	7.00
Average			0.069	12.375	3.78
Standard deviation			0.094	12.605	2.16
*Value is non-detect reported at the detection limit **Value is questionable					

Figure 1. Comparison of Phosphorus-Based Trophic State Index 2002-2005 for Big Twin Lake, Little Twin Lake, and Walker Lake

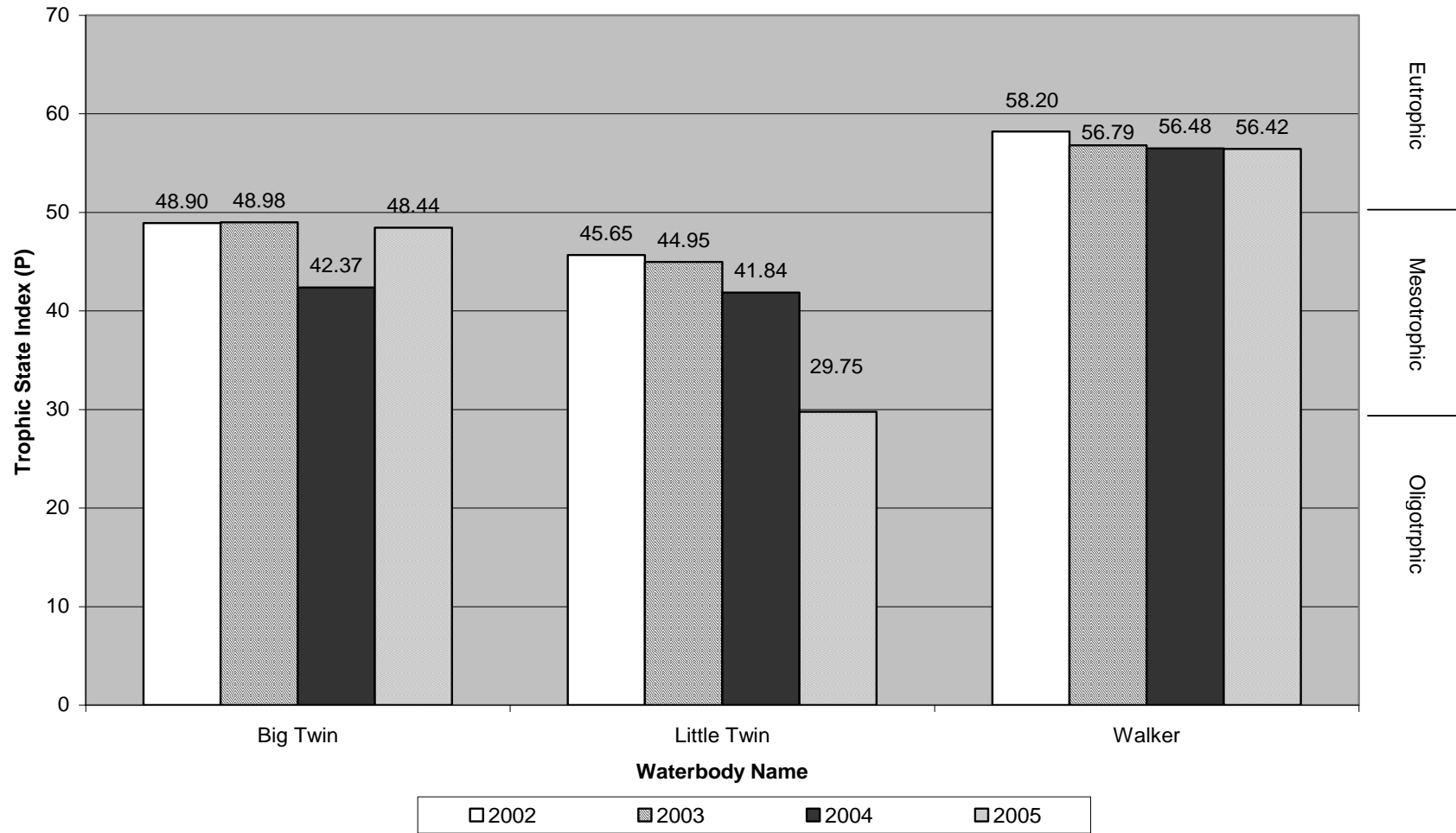


Figure 2. Comparison of Chlorophyll *a* - Based Trophic State Index 2002-2005 for Big Twin Lake, Little Twin Lake and Walker Lake

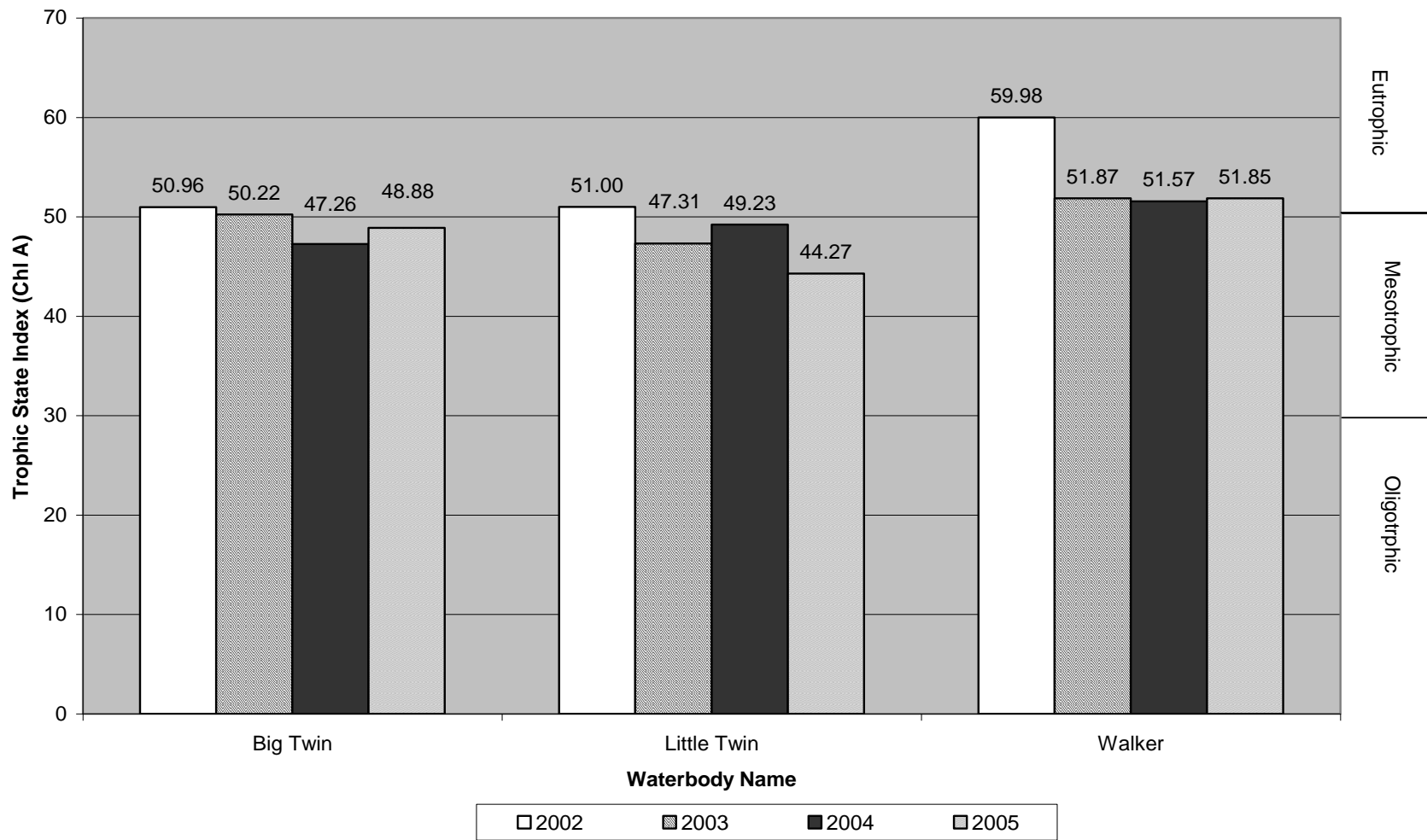
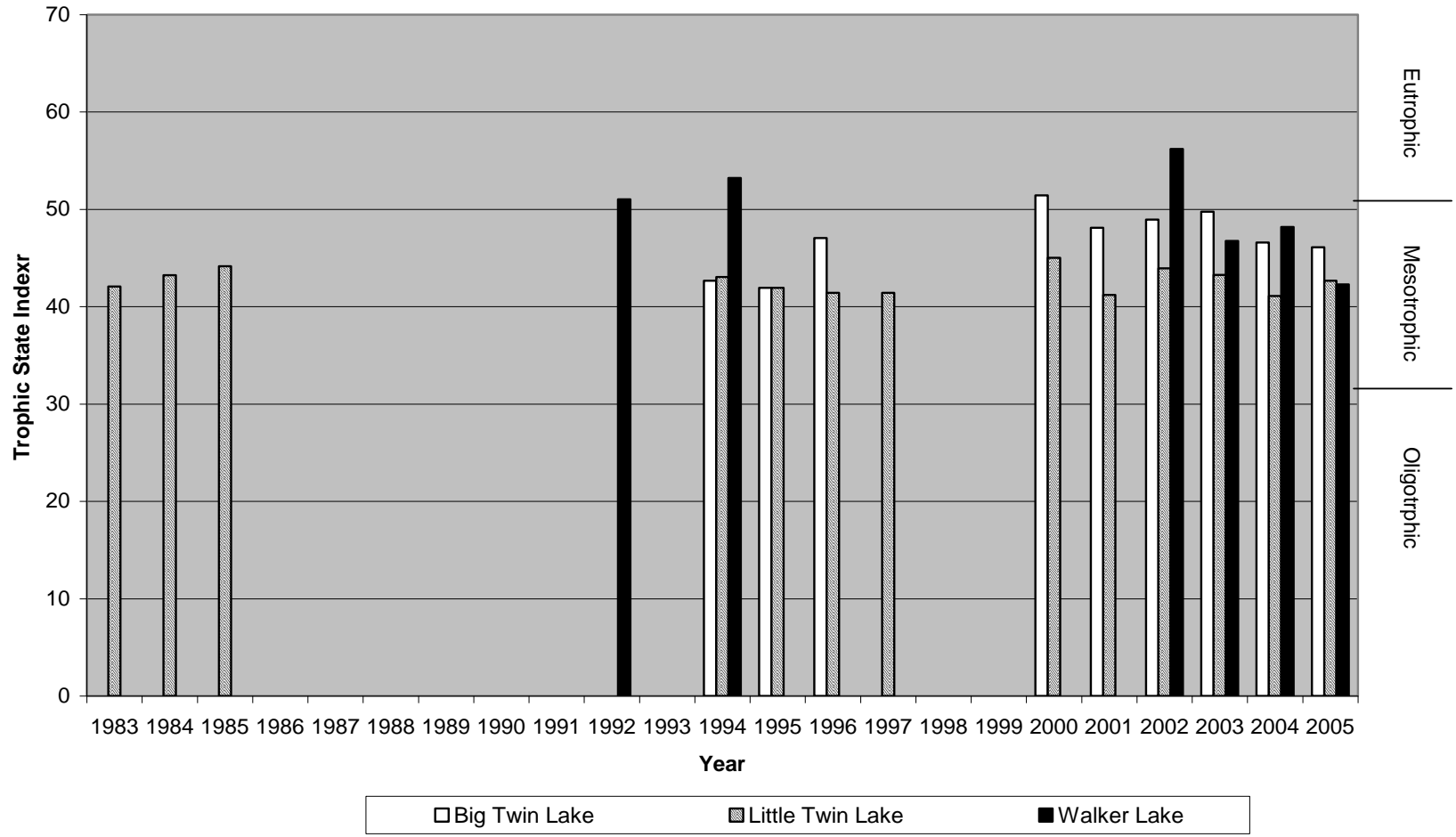


Figure 3. Comparison of Secchi Depth-Based Trophic State Index for Big Twin Lake, Little Twin Lake, and Walker Lake 1983-2005



References

Carlson, R.E. 1977. A trophic state index for lakes. *Limnology and Oceanography*. 22:361-369.

Thanks again for choosing F. X. Browne, Inc. for your lake consulting needs. We look forward to continuing our work together in the future. If you should have any questions concerning the 2005 report or would like to discuss any aspect of the data, please contact me at (215) 362-3878 at anytime.

Sincerely,

F. X. Browne, Inc.

Shandor J. Szalay
Senior Project Scientist

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