Results from *Corbicula* Samples, 2002

Thomas R. Benzing and Marshall Bowles
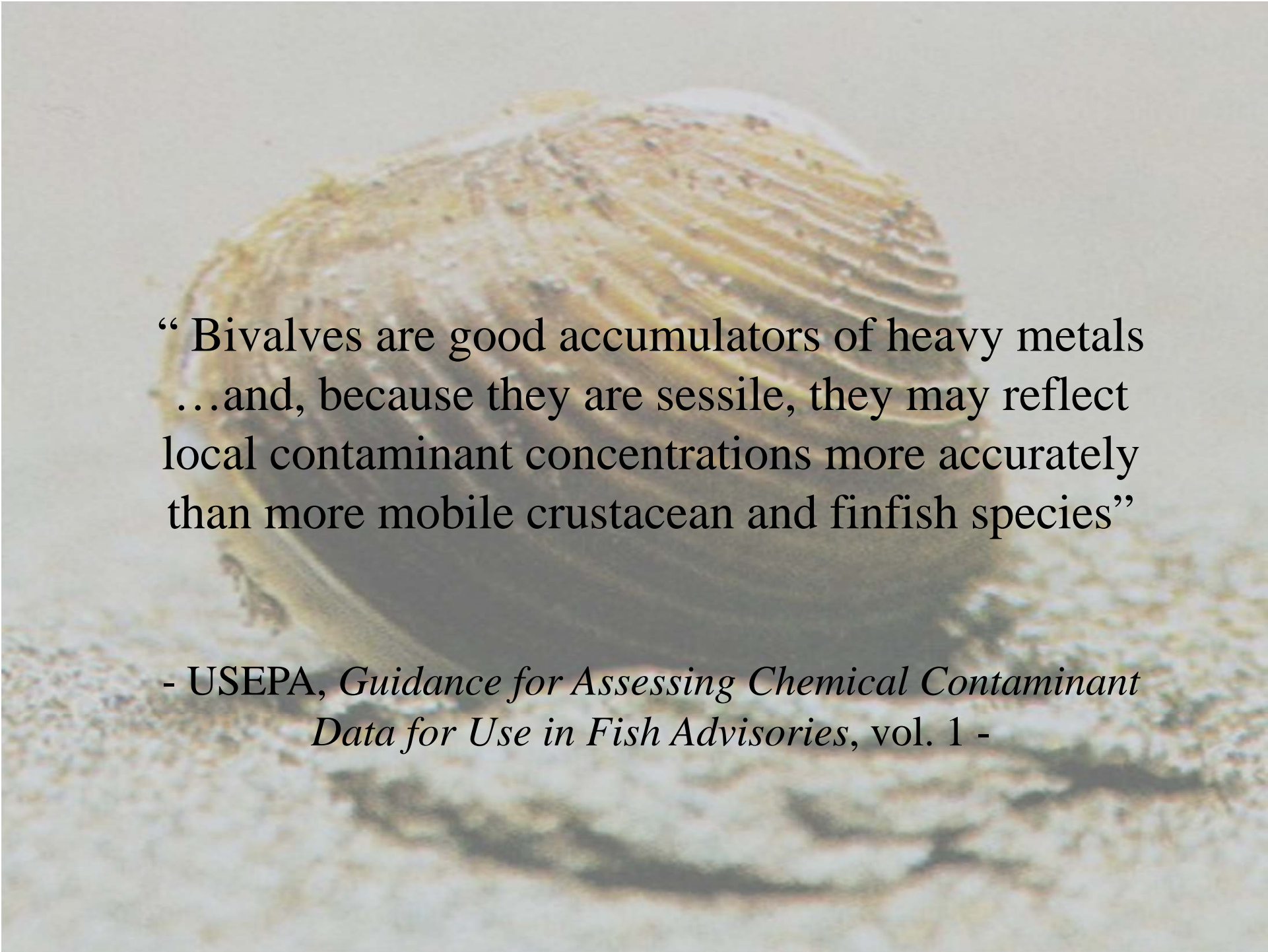
James Madison University

April 29, 2003

Ecology of *Corbicula fluminea*

- non-native freshwater clam

- first reported in Virginia in 1972

- average life span: 1-3 years

- abundant in South River

- filter rate: 8 – 800 mL per hour

- typical adult size: 0.2 – 0.5 grams

Asiatic clam, *C. fluminea*

" Bivalves are good accumulators of heavy metals …and, because they are sessile, they may reflect local contaminant concentrations more accurately than more mobile crustacean and finfish species"

- USEPA, *Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories*, vol. 1 -

Clam Sites

2 control sites:

CS01, Ridgeview Park
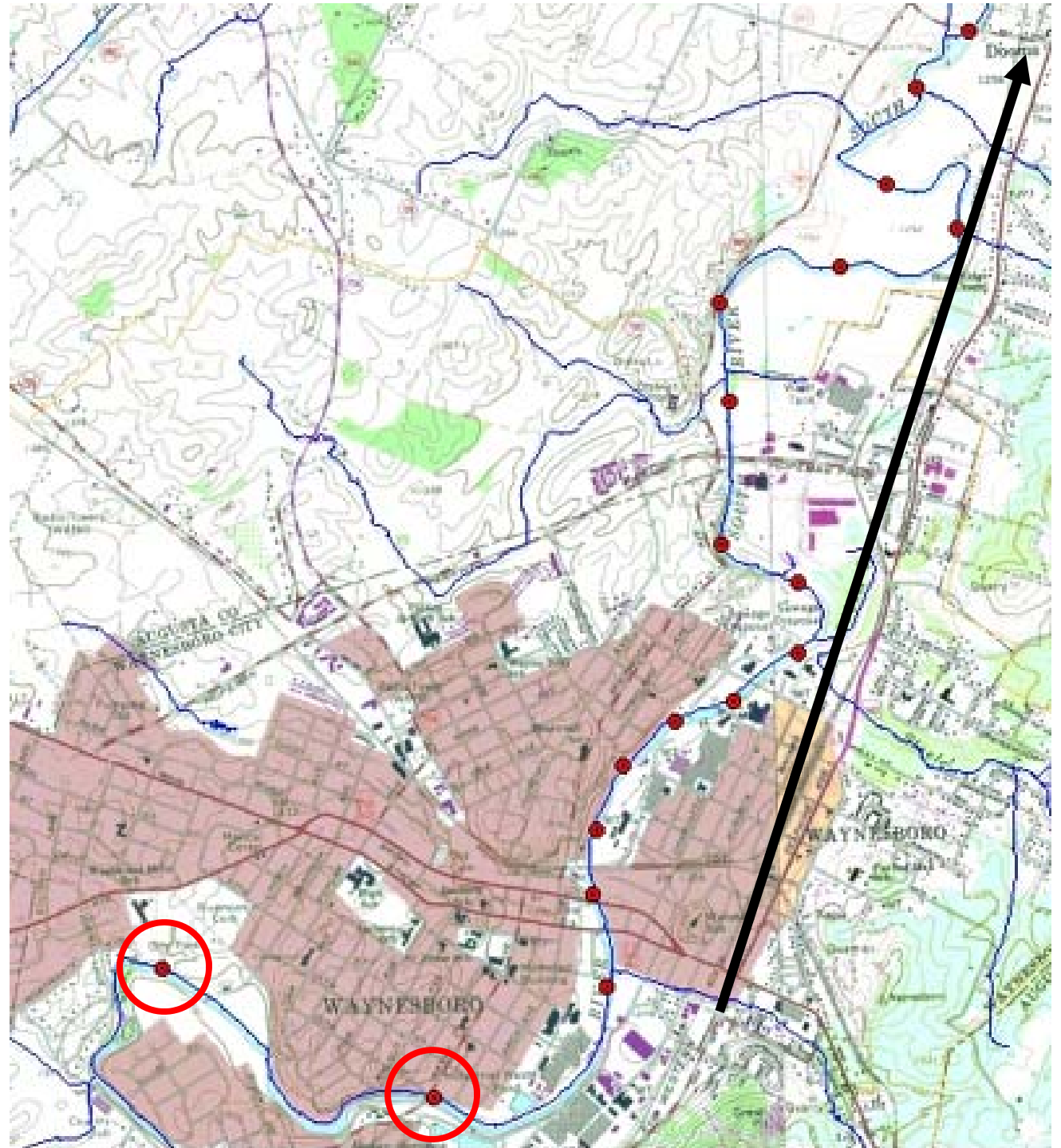
CS02, Wayne Avenue

16 test sites:

CS03 to CS18
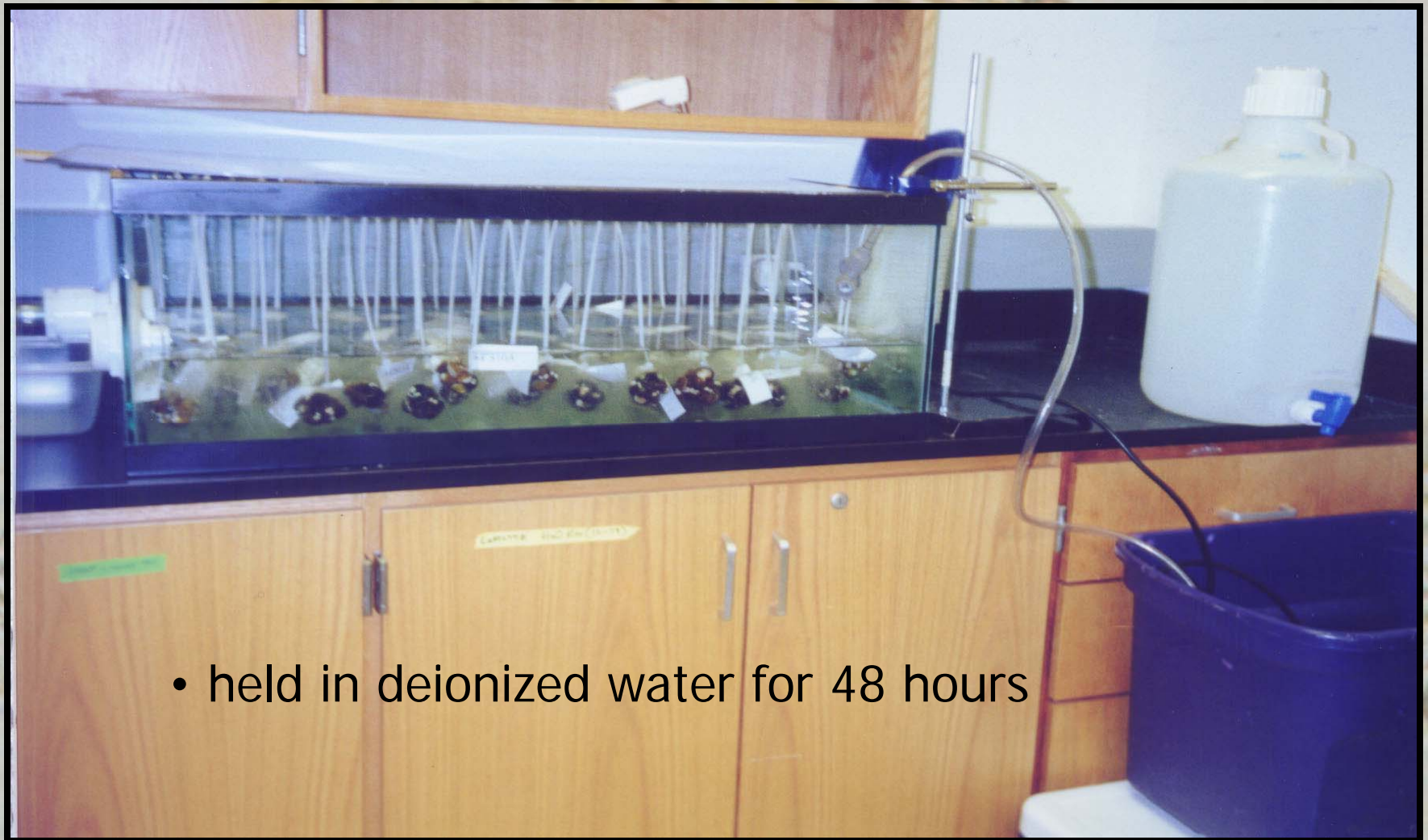
A = river left

B = river middle

C = river right

Clam Collection Day: November 9, 2002
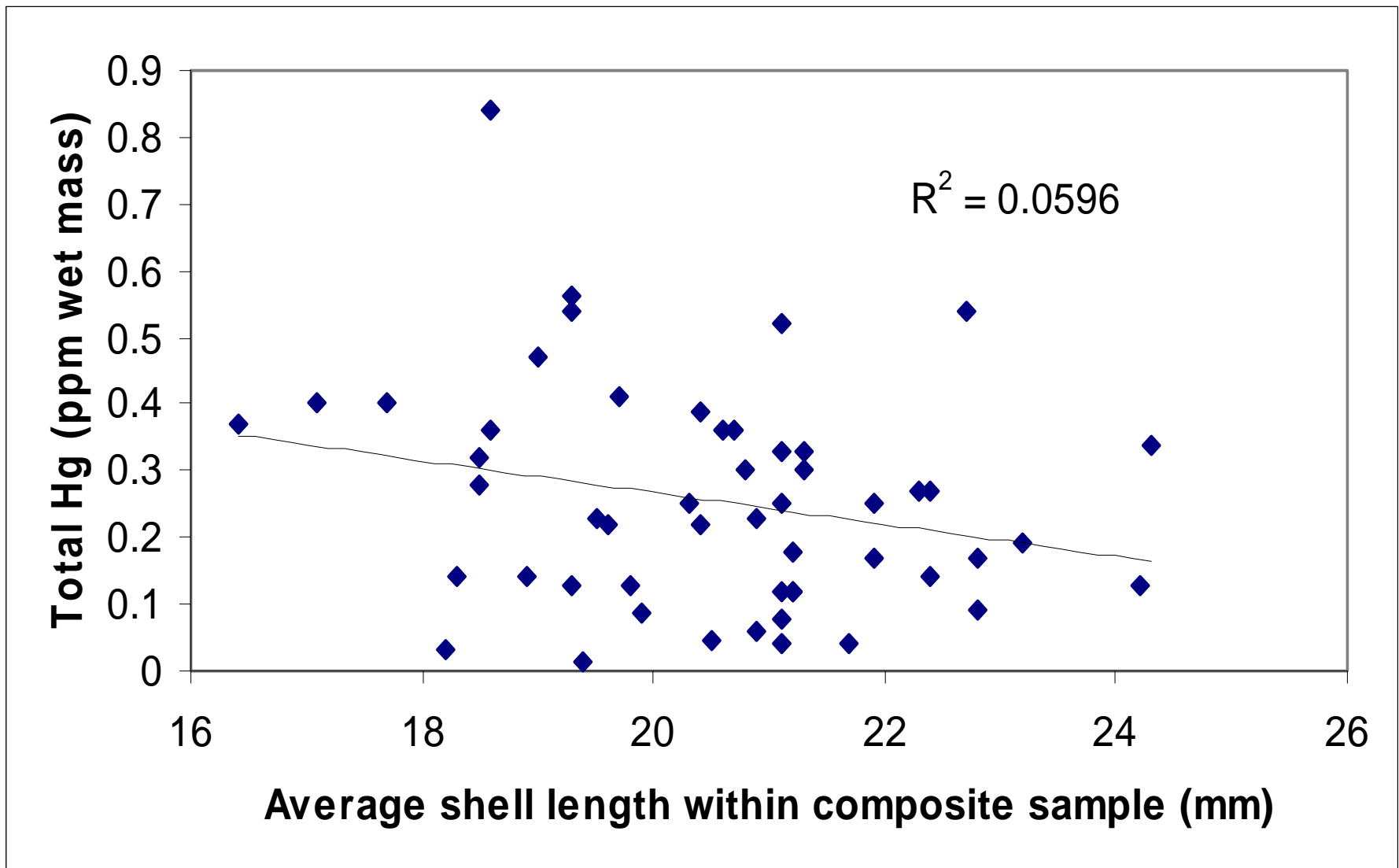
Purging the Clams

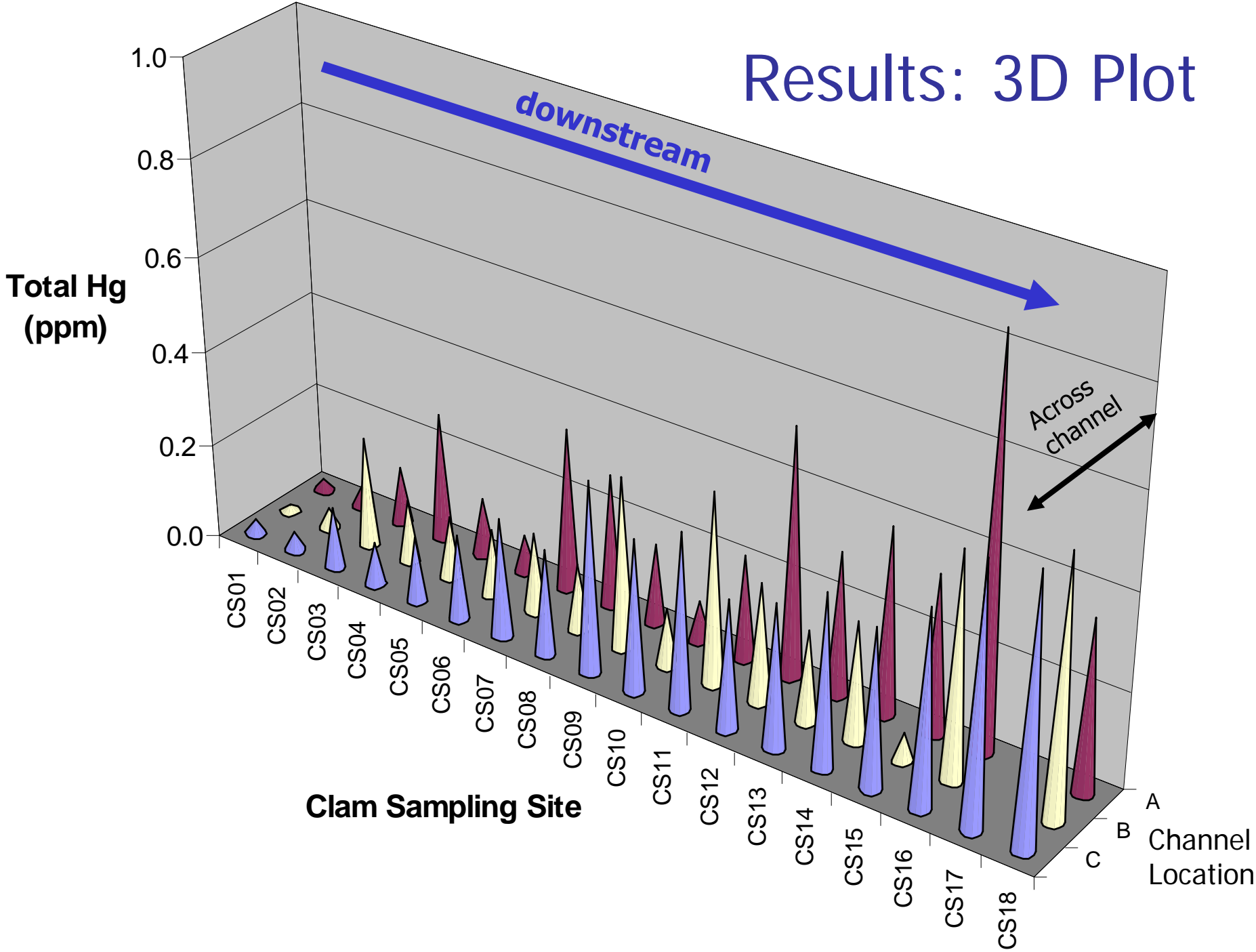- held in deionized water for 48 hours

Shucking the Clams

Does Age of the Clams Affect Hg Content?

$R^2 = 0.0596$

Total Hg (ppm wet mass)

Average shell length within composite sample (mm)

Results: 3D Plot

downstream

Total Hg (ppm)

Across channel

Clam Sampling Site

CS01 CS02 CS03 CS04 CS05 CS06 CS07 CS08 CS09 CS10 CS11 CS12 CS13 CS14 CS15 CS16 CS17 CS18

A
B
C

Channel Location

Do control and non-control sites differ?

Mercury Concentration (ppm) By Control/Non-Control Site

P-Value = 0.0004

Control/Non-Control Site
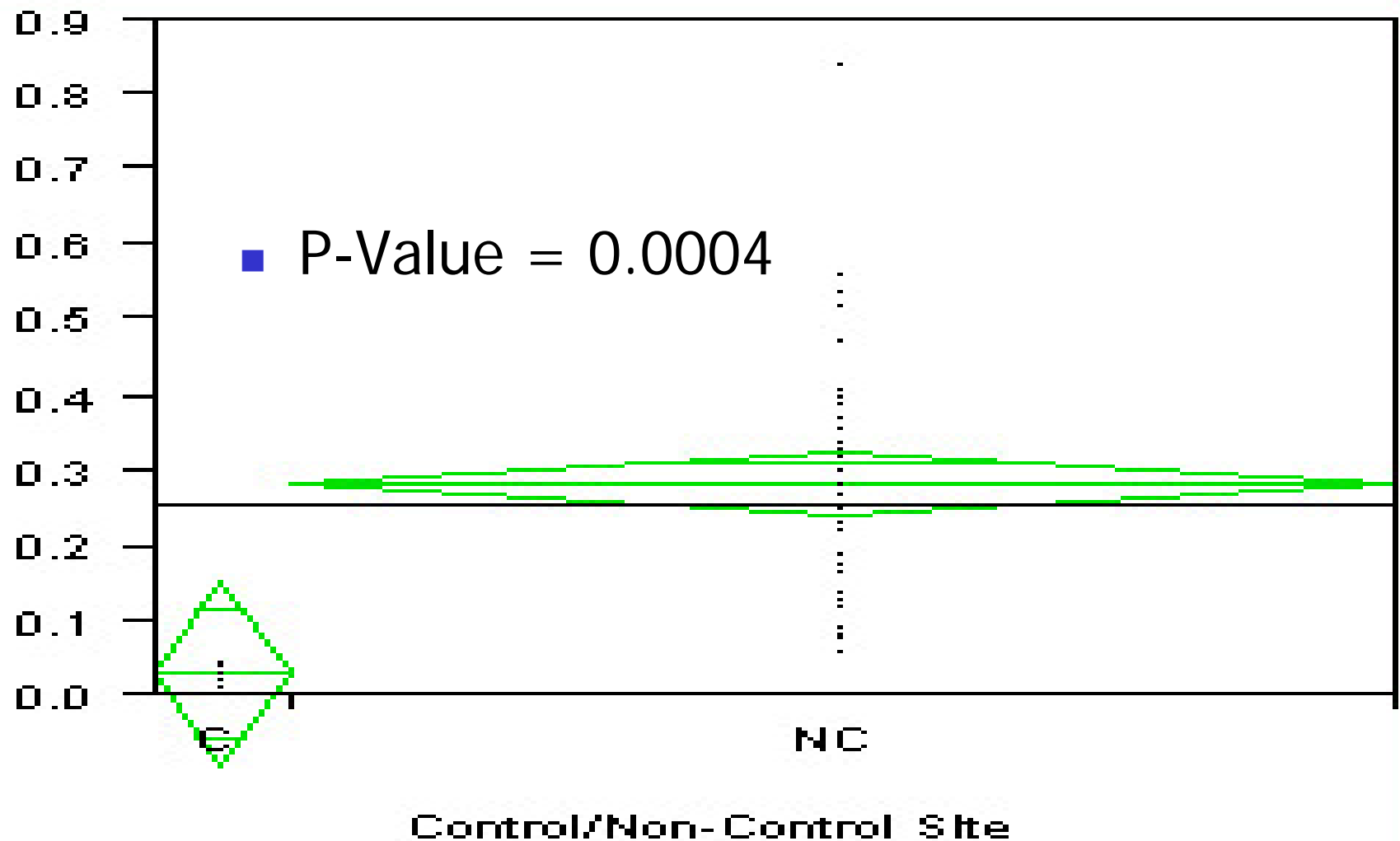
Are there differences across the channel?

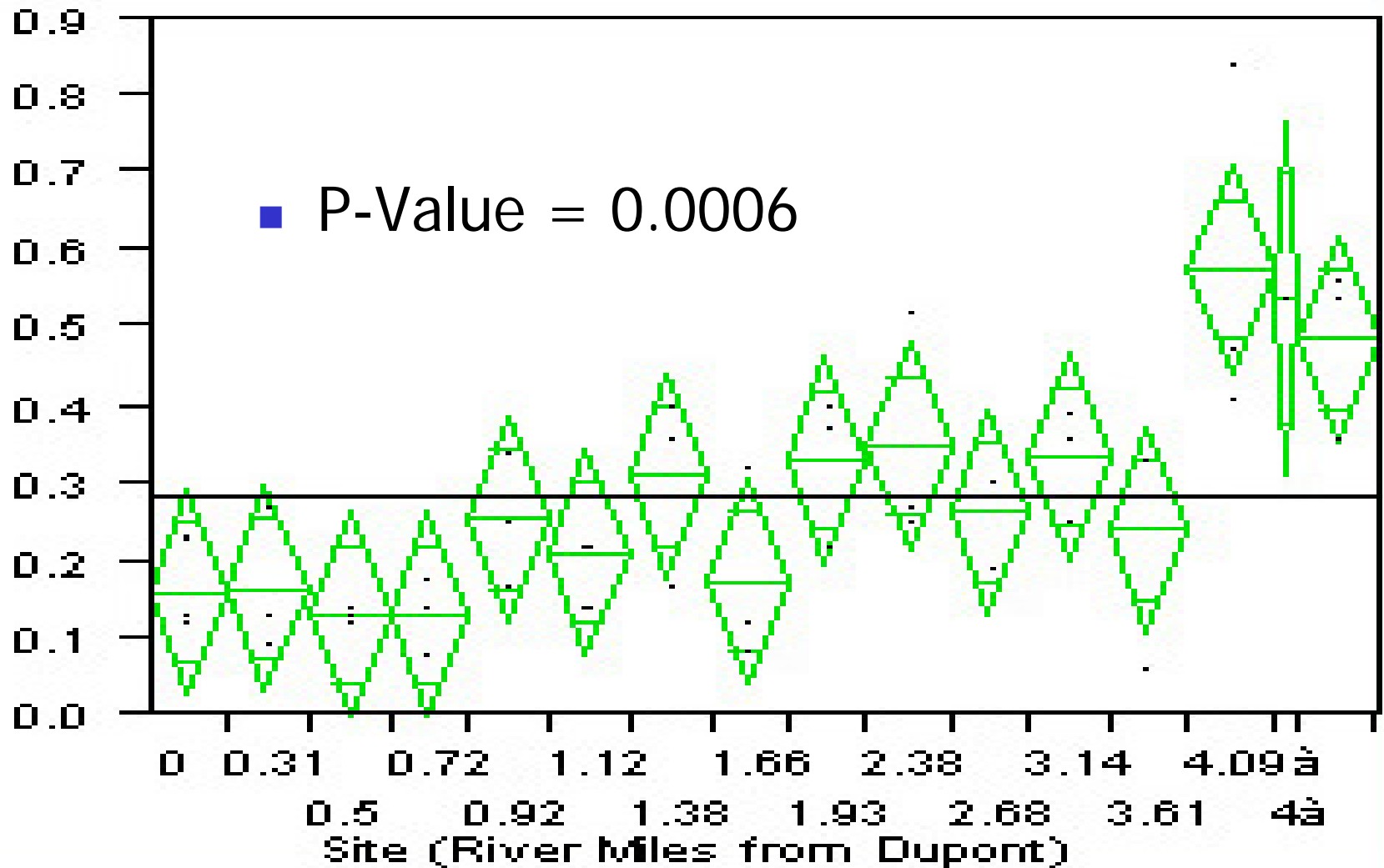**Total Hg Concentation (ppm) By Location**

P-Value = 0.4772
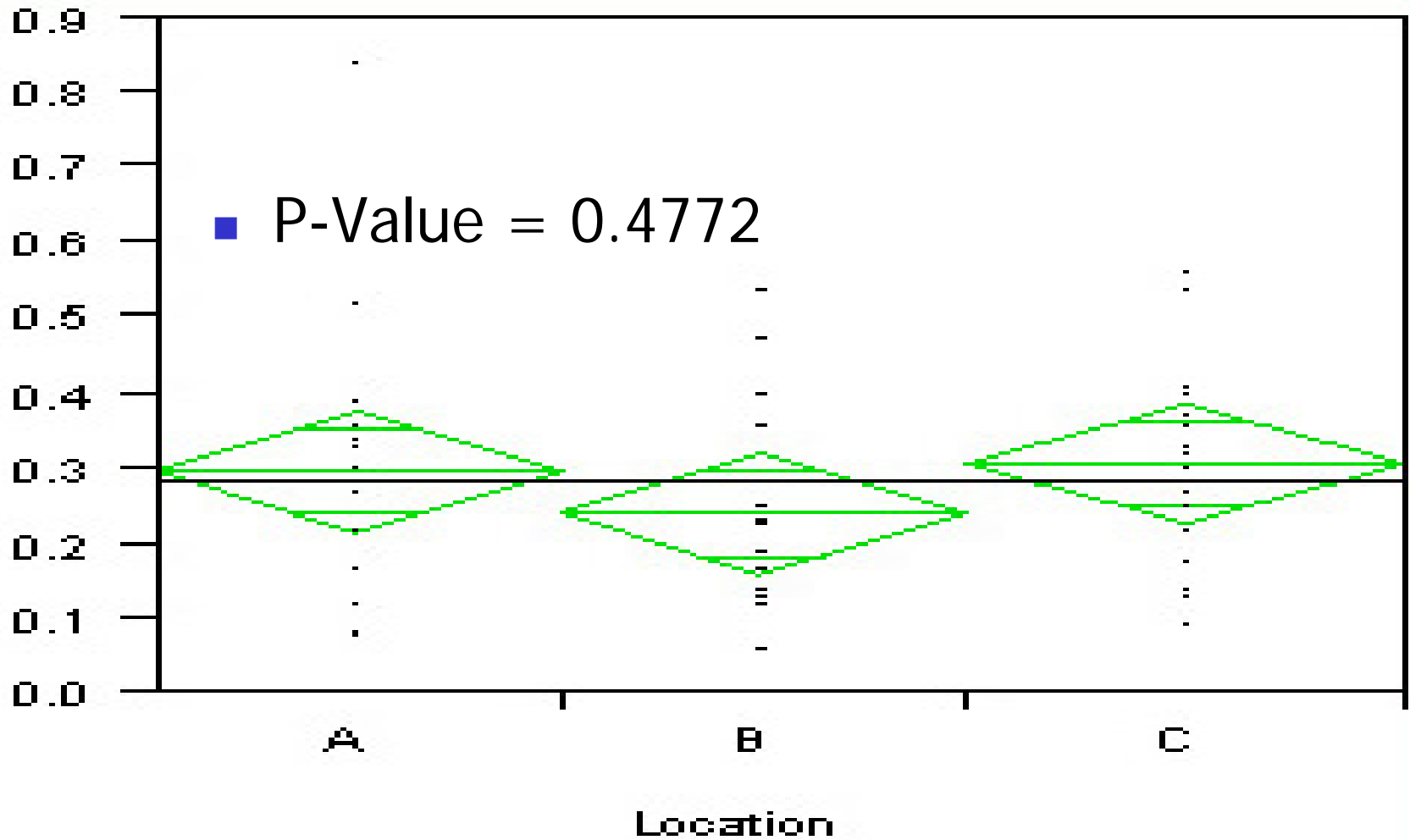
Results: Average Tissue Concentration
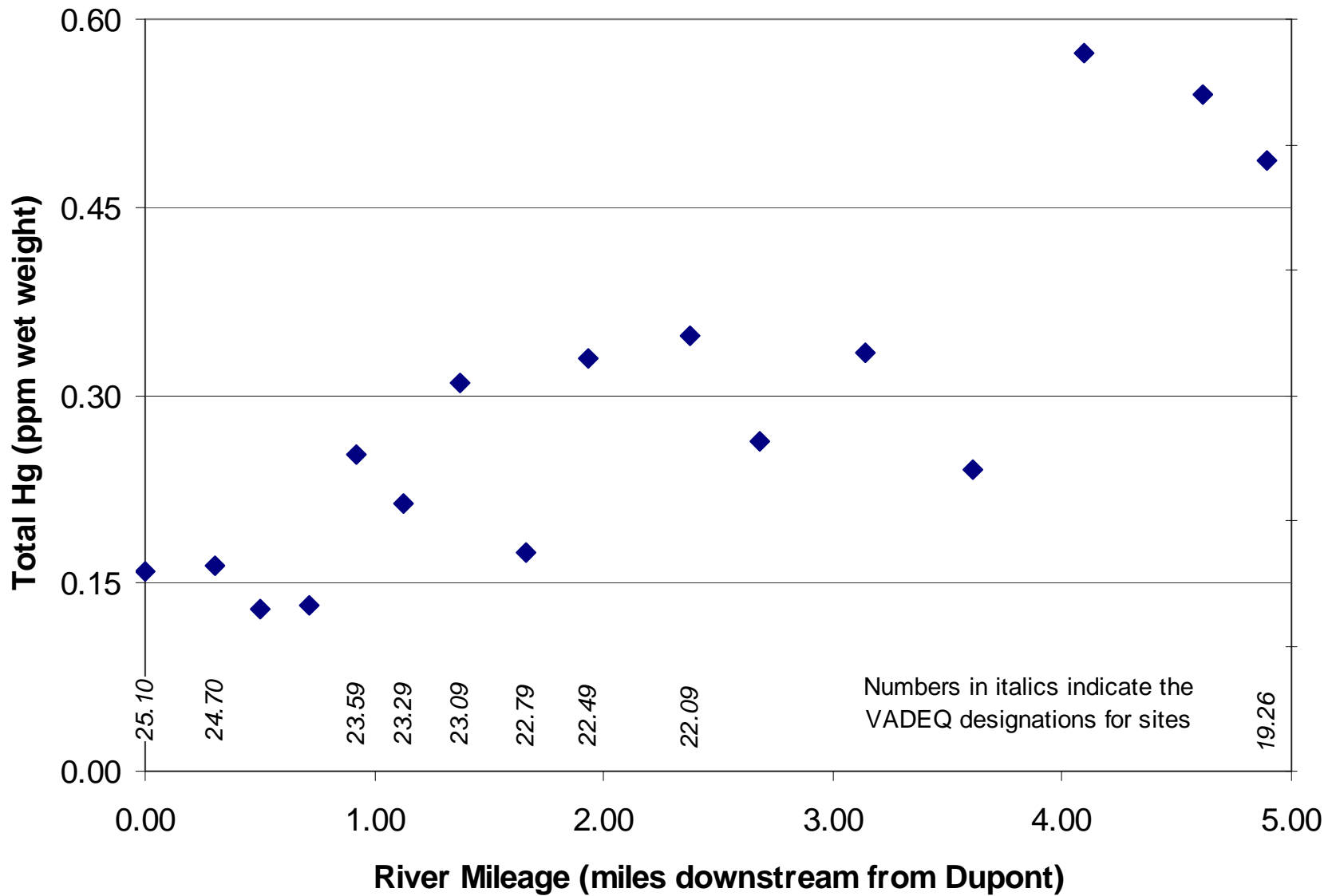
Is there a significant difference in the means of the non-control sites?

Total Hg Concentation (ppm) By Site (River Miles from Dupont)

P-Value = 0.0006

Are CS16 – CS18 significantly higher?

Yes, since p-value < 0.0001

Numbers in italics indicate the VADEQ designations for sites

Total Hg (ppm wet weight)

25.10 *24.70* *23.59* *23.29* *23.09* *22.79* *22.49* *22.09* *19.26*

River Mileage (miles downstream from Dupont)
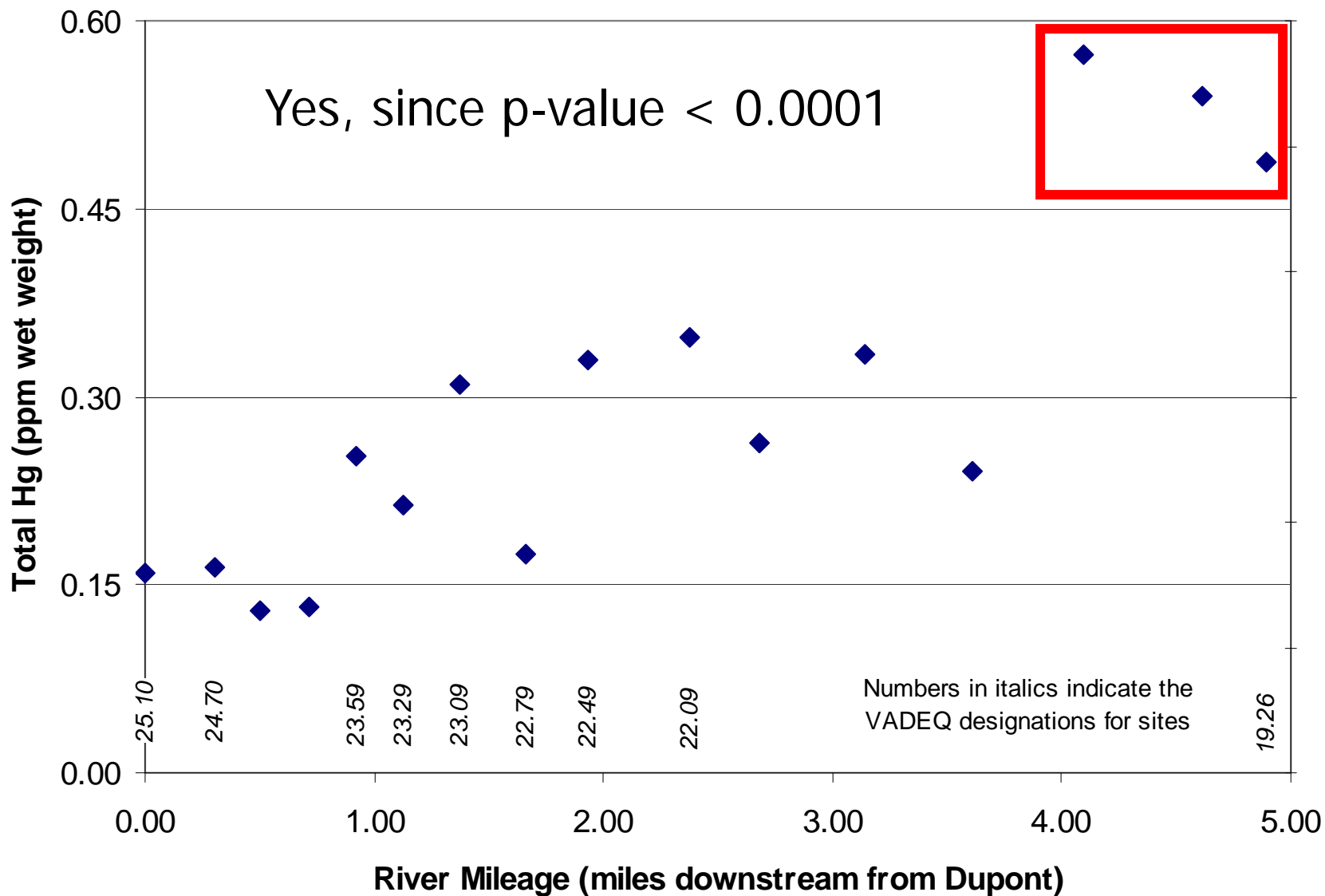
Differences between CS03 and CS15?

Total Hg (ppm wet weight) vs. River Mileage (miles downstream from Dupont). Numbers in italics indicate the VADEQ designations for sites: 25.10, 24.70, 23.59, 23.29, 23.09, 22.79, 22.49, 22.09, 19.26.
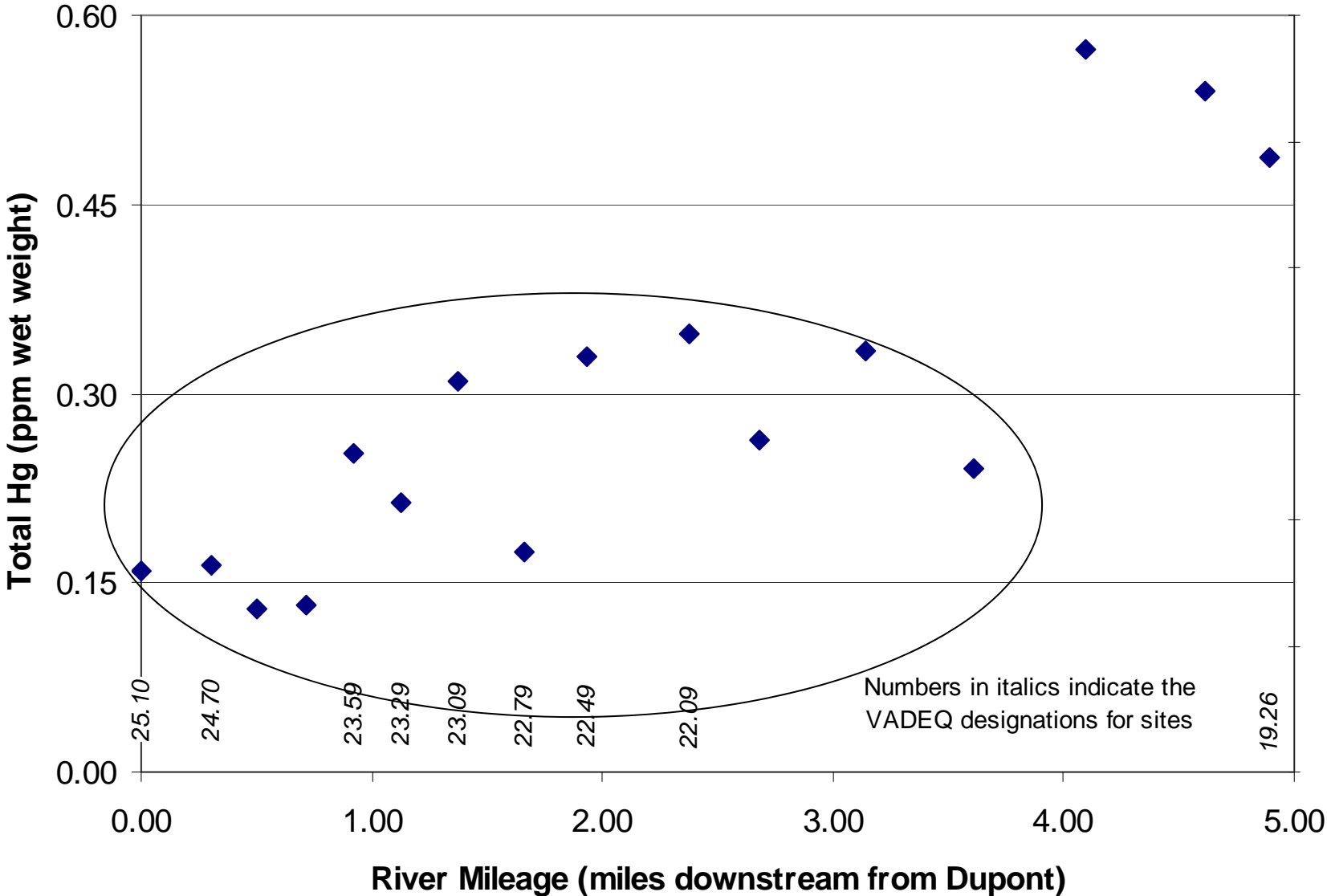
Are there significant changes between CS03 and CS15?

Subpopulation	SP1	SP2	P-Value
Range	CS03-05	CS06-15	0.0084
	CS03-06	CS07-15	0.0005
	CS03-07	CS08-15	0.0020
	CS03-08	CS09-15	0.0012
	CS03-09	CS10-15	0.0133
	CS03-10	CS11-15	0.0016
	CS03-11	CS12-15	0.0202
	CS03-12	CS13-15	0.1783

Conclusions

- The Asiatic Clam is abundant and easily collected in the South River

- Mercury concentrations in the Asiatic Clam range from 0.014 ppm to 0.84 ppm

- Mercury content was independent of shell length (within 15 – 30 mm size range)

- A significant change in total Hg in clam tissue was found between sites CS15 and CS16

Acknowledgements

Clam Collection Volunteers
Shucking Volunteers
South River Science Team
DuPont

Comparison to Fish Tissue Data