CASE STUDIES APPLYING EMPIRICAL APPROACHES

William T. Hall

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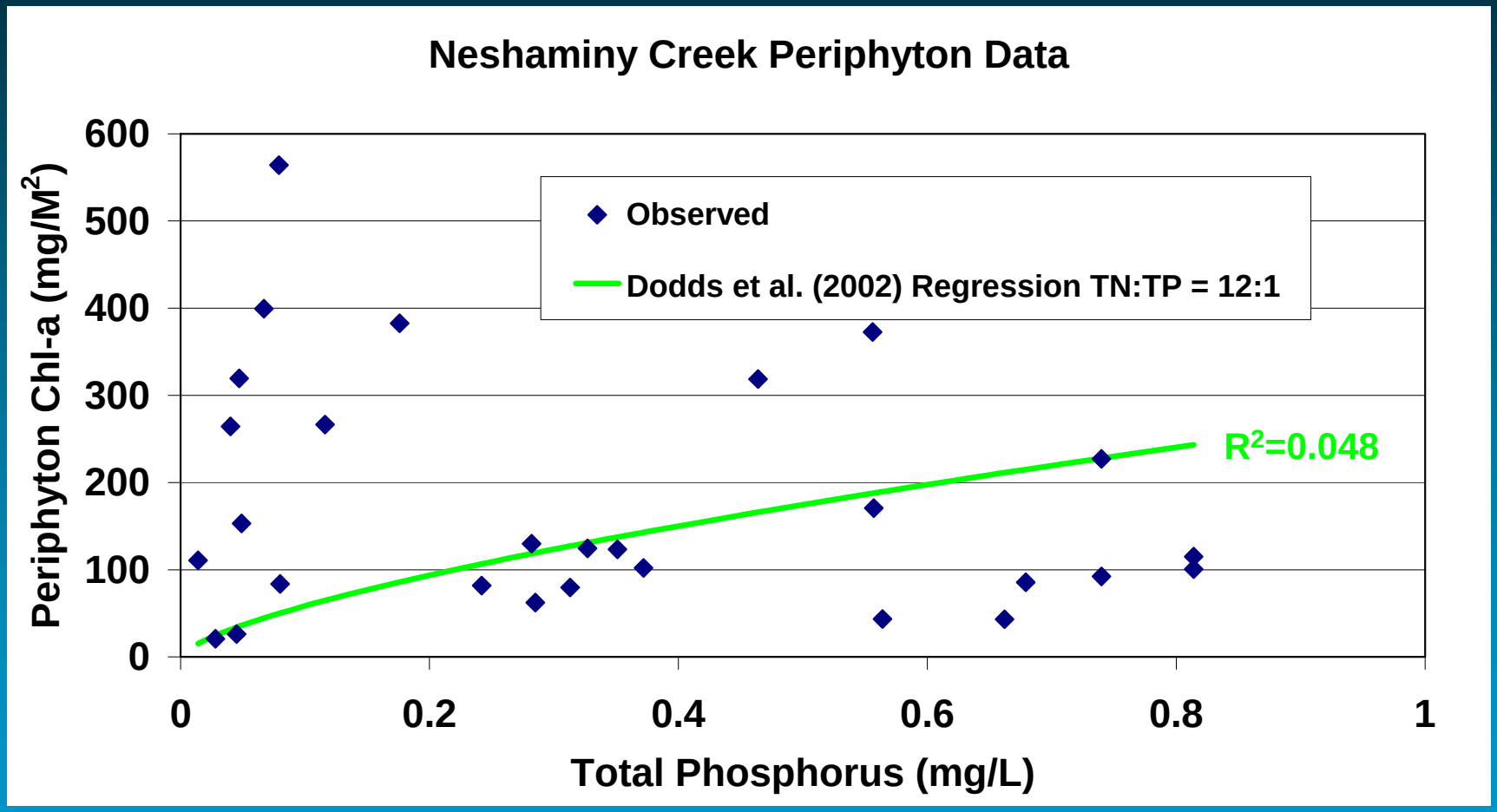
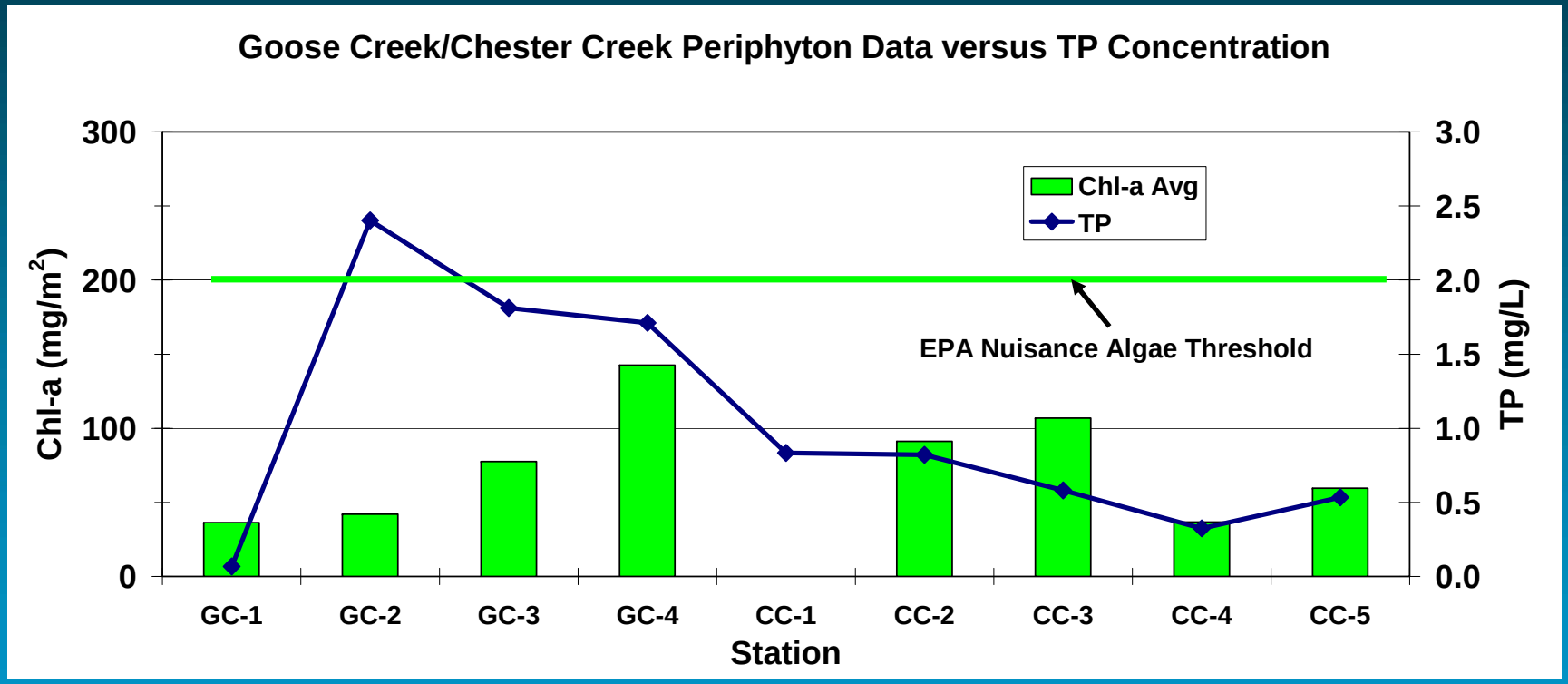
LINEAR REGRESSION



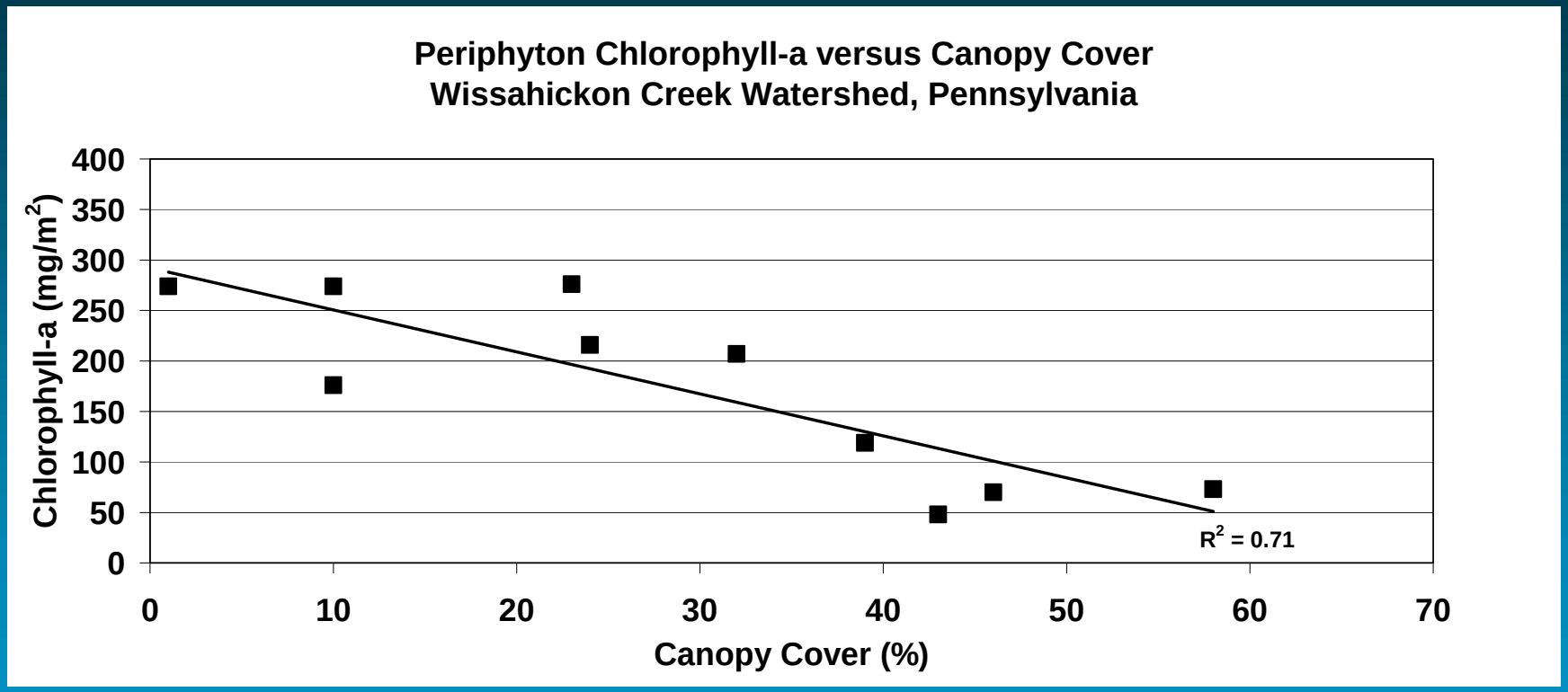
Regressions based on World/Eco-Regional Data cannot predict Site-Specific responses

SITE-SPECIFIC DATA
GOOSE CREEK



TP not causing Nuisance Periphyton Growth

CRITICAL FACTOR IGNORED



CONDITIONAL PROBABILITY

EPT Taxa; Change Point = 38 ug/L

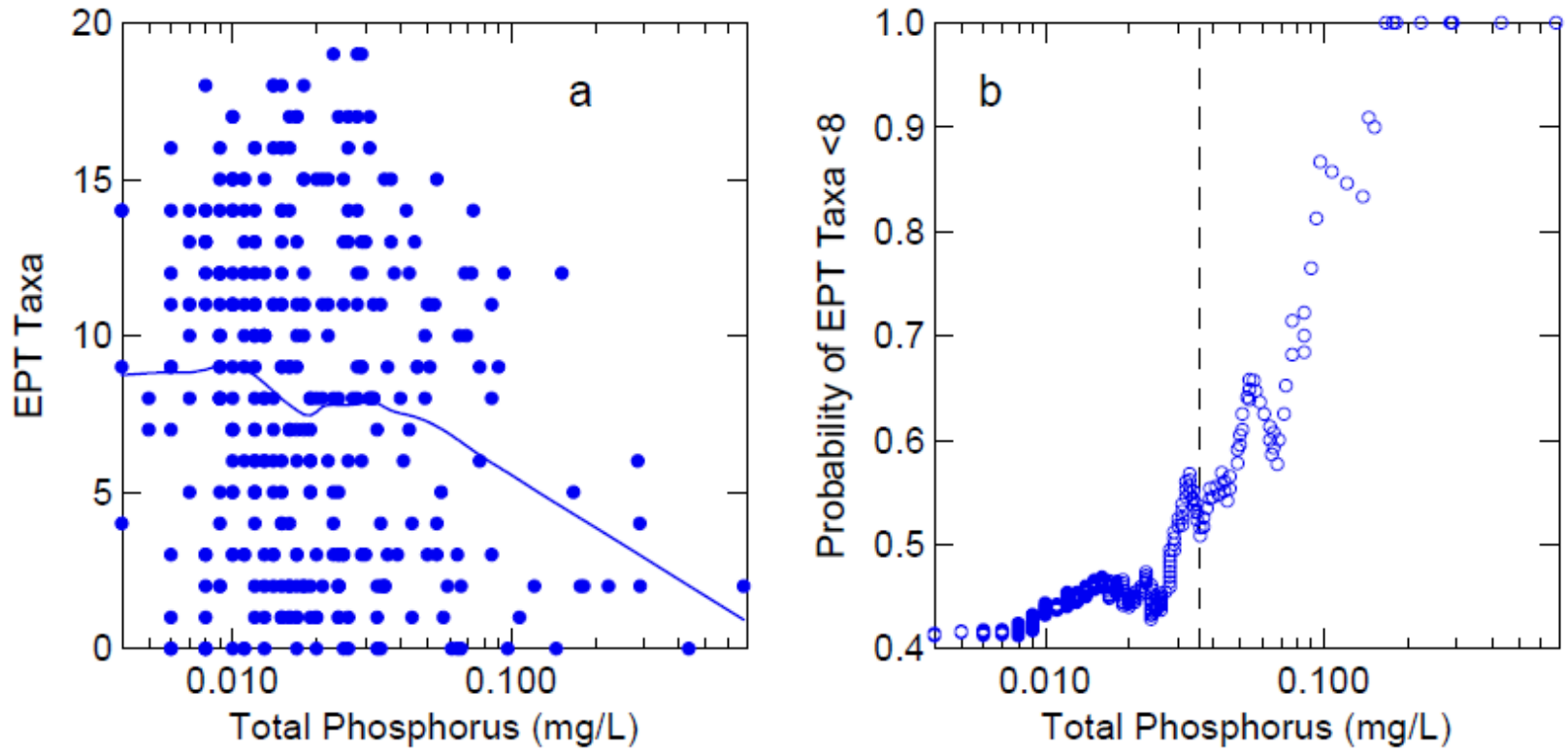
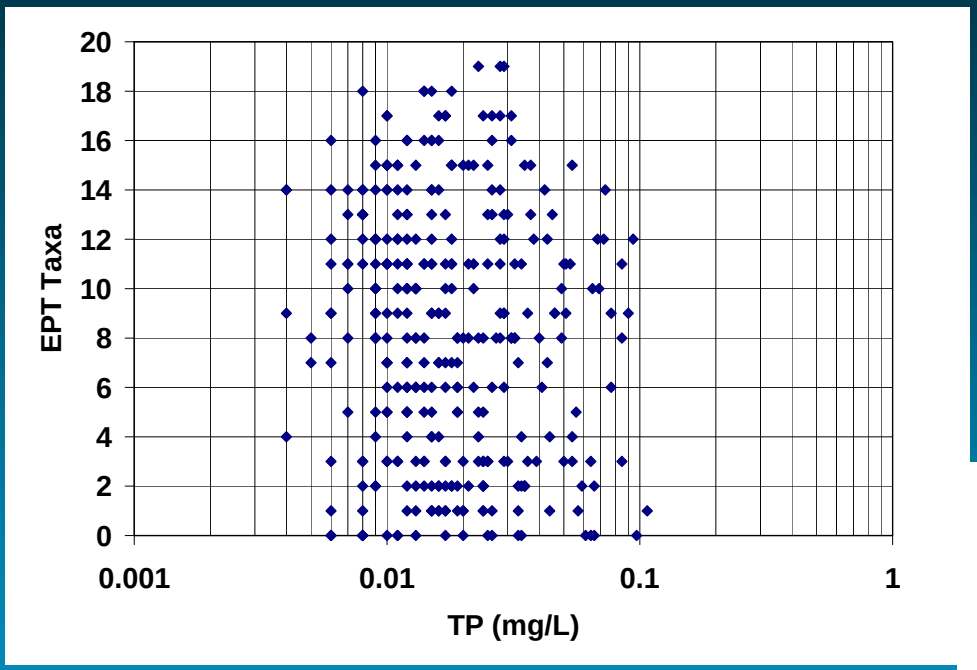


Figure 6 - Response of EPT taxa metric to the phosphorus gradient in the Northern Piedmont Ecoregion. Figure on the right shows the conditional probability of having fewer than 8 EPT taxa as TP concentrations increase.

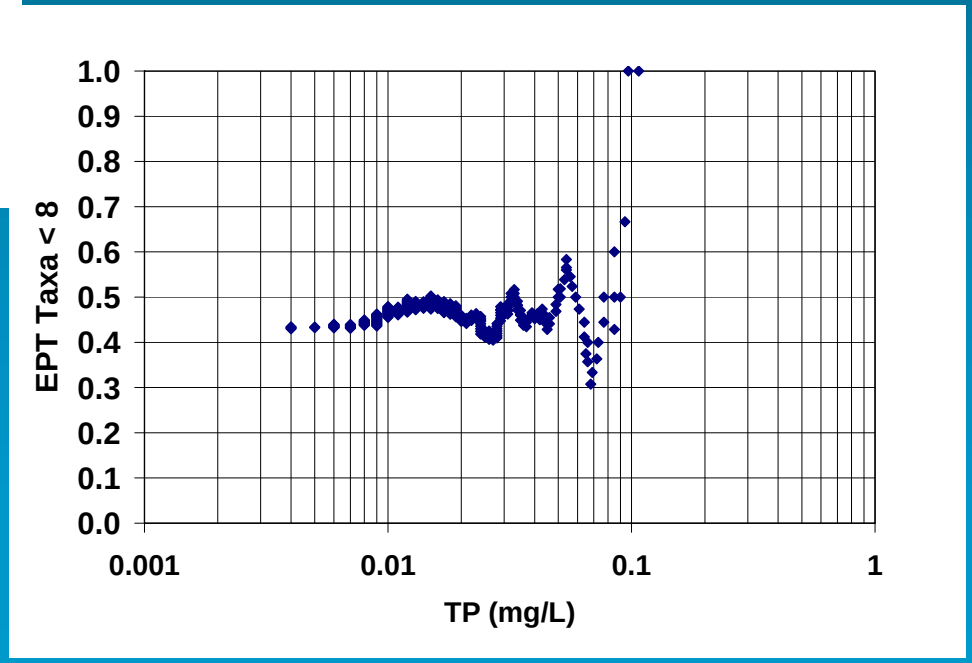
CONDITIONAL PROBABILITY TP < 0.1 MG/L



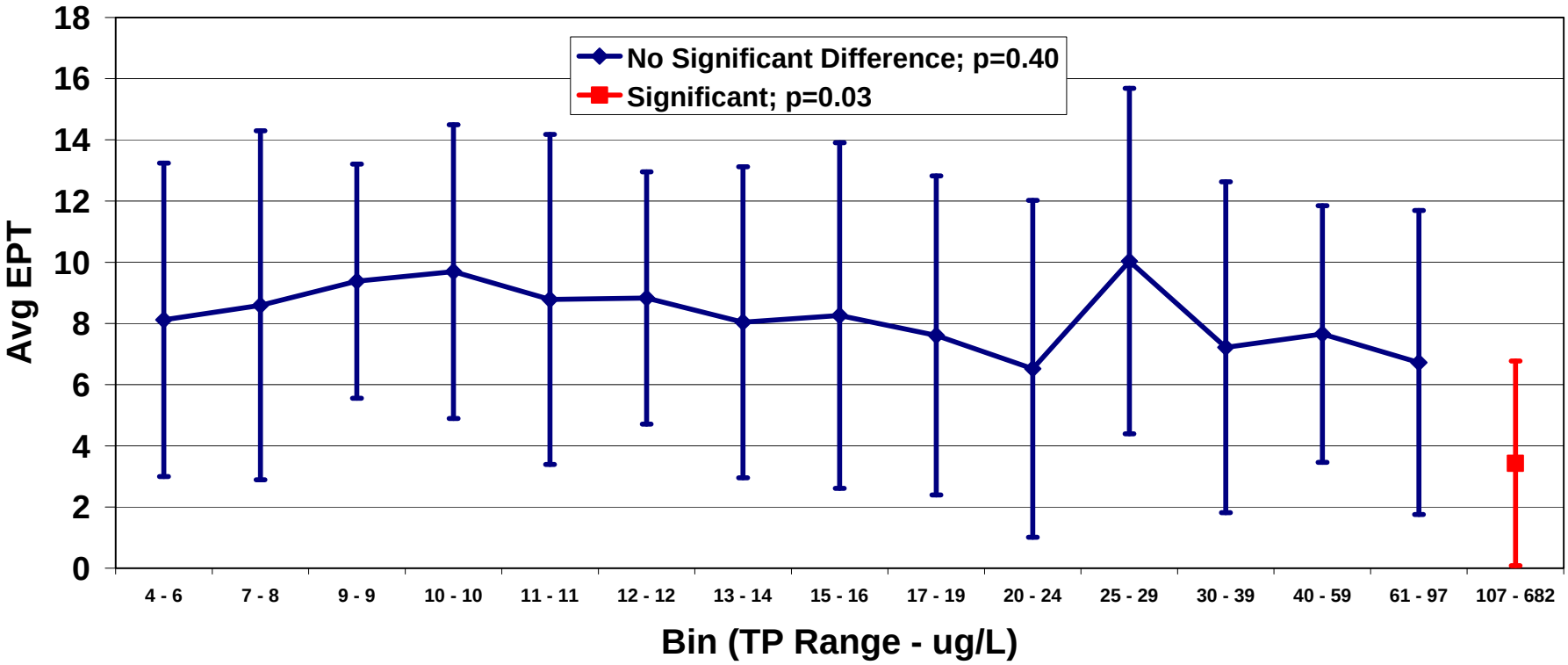
Raw data scatter plot

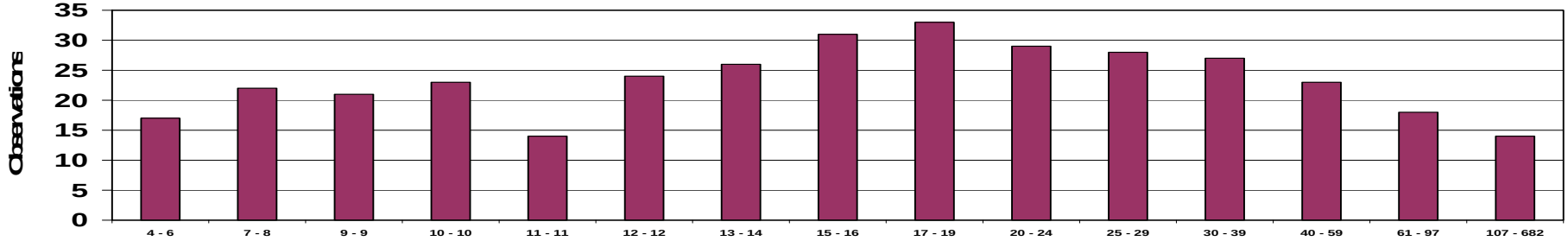
Conditional Probability Plot

Change Point > 95 ug/L



MBSS EPT DATA ANALYSIS OF VARIANCE





CONDITIONAL PROBABILITY

(Riffle Diatom TSI; Change Point = 36 ug/L)

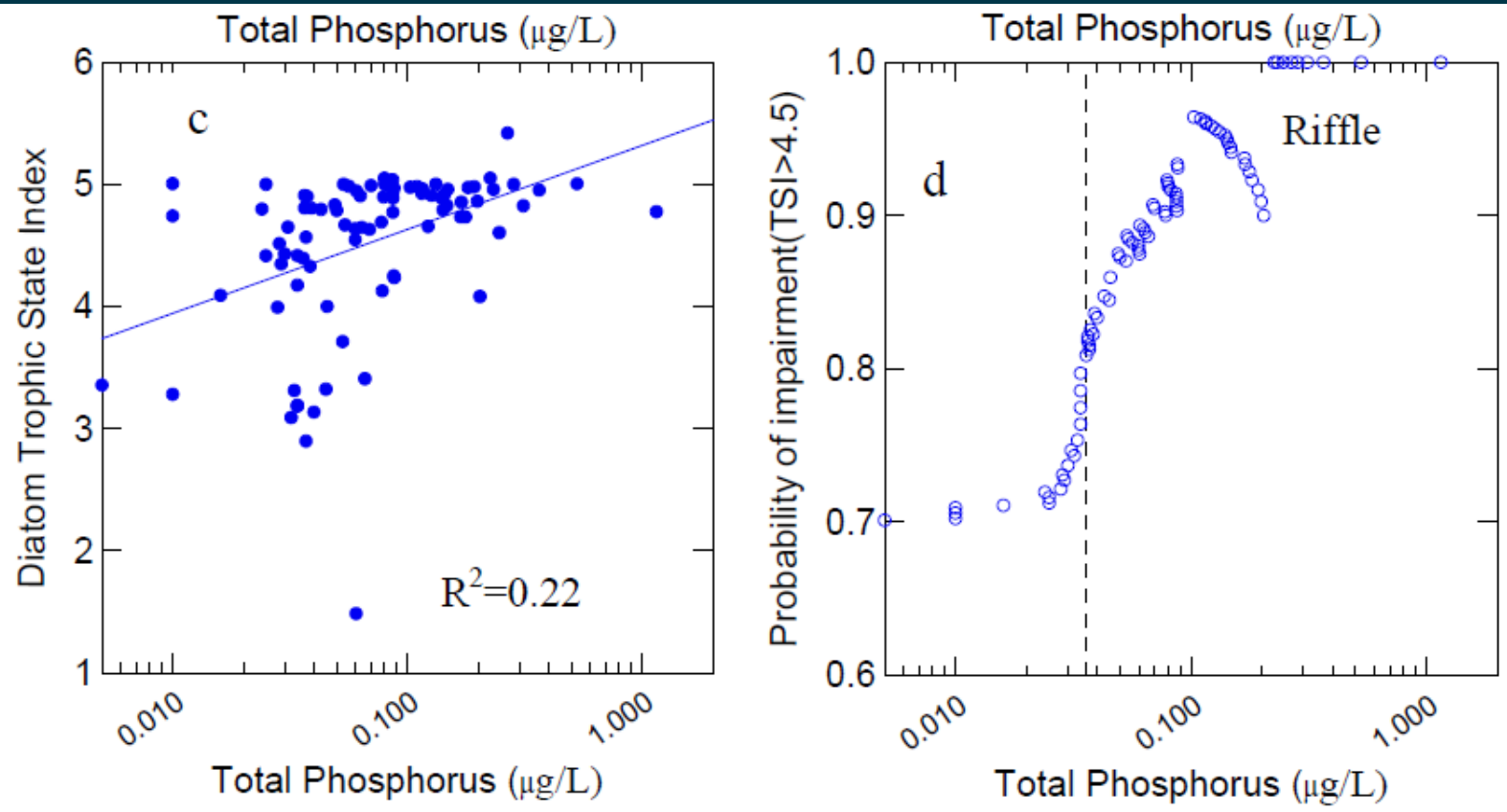
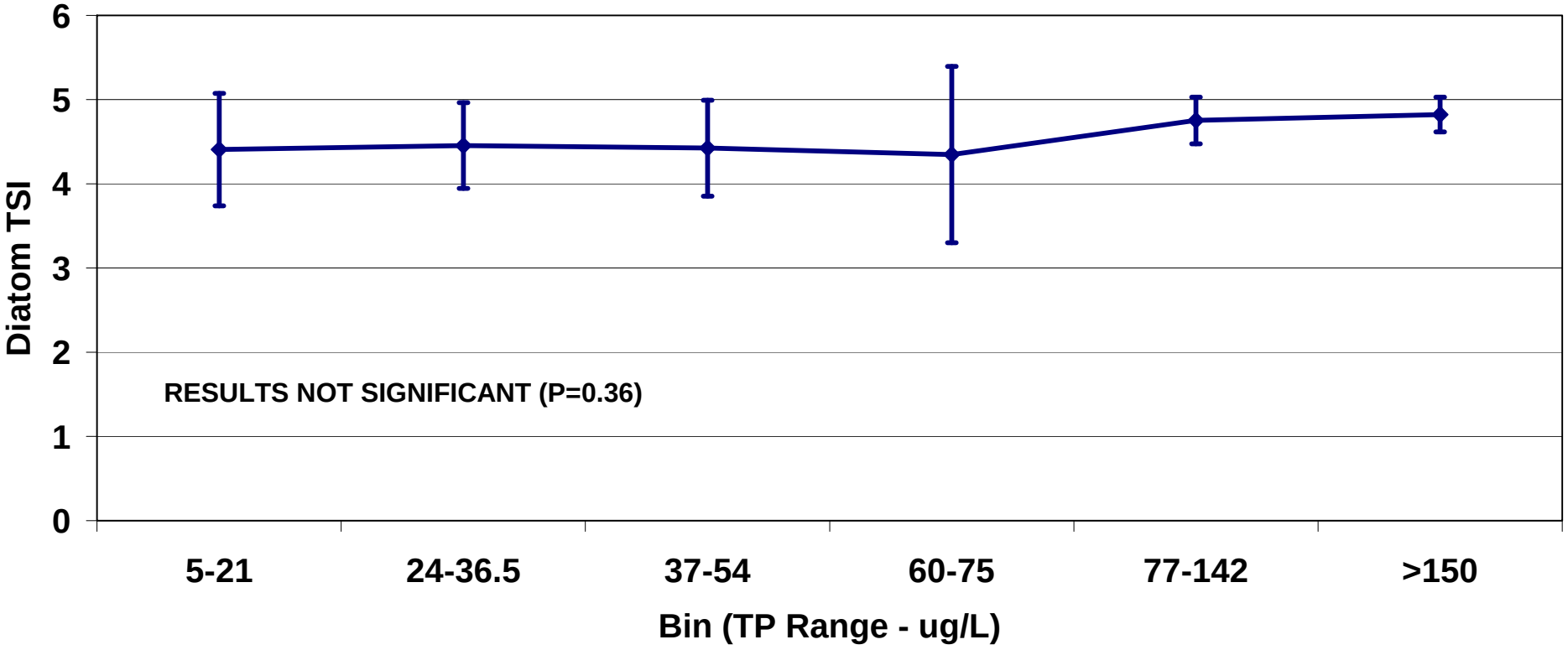
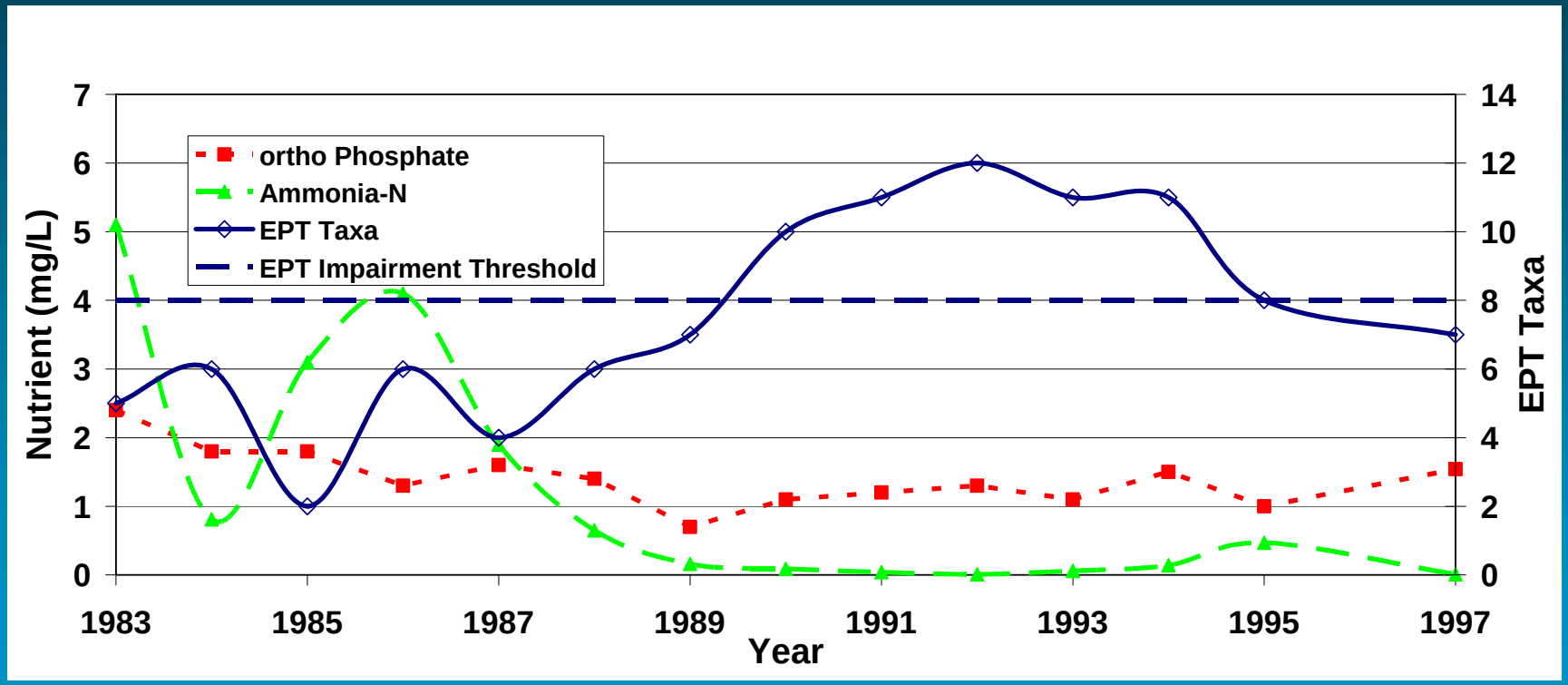


Figure 5 - Response of diatom trophic state index (MSU_TSI) to total phosphorus concentrations in depositional habitats and riffles. The figures on the right show the conditional probability of exceeding a TSI value of 4.5 with increased TP concentration.

EMAP AND NAWQA DATABASE ANALYSIS OF VARIANCE

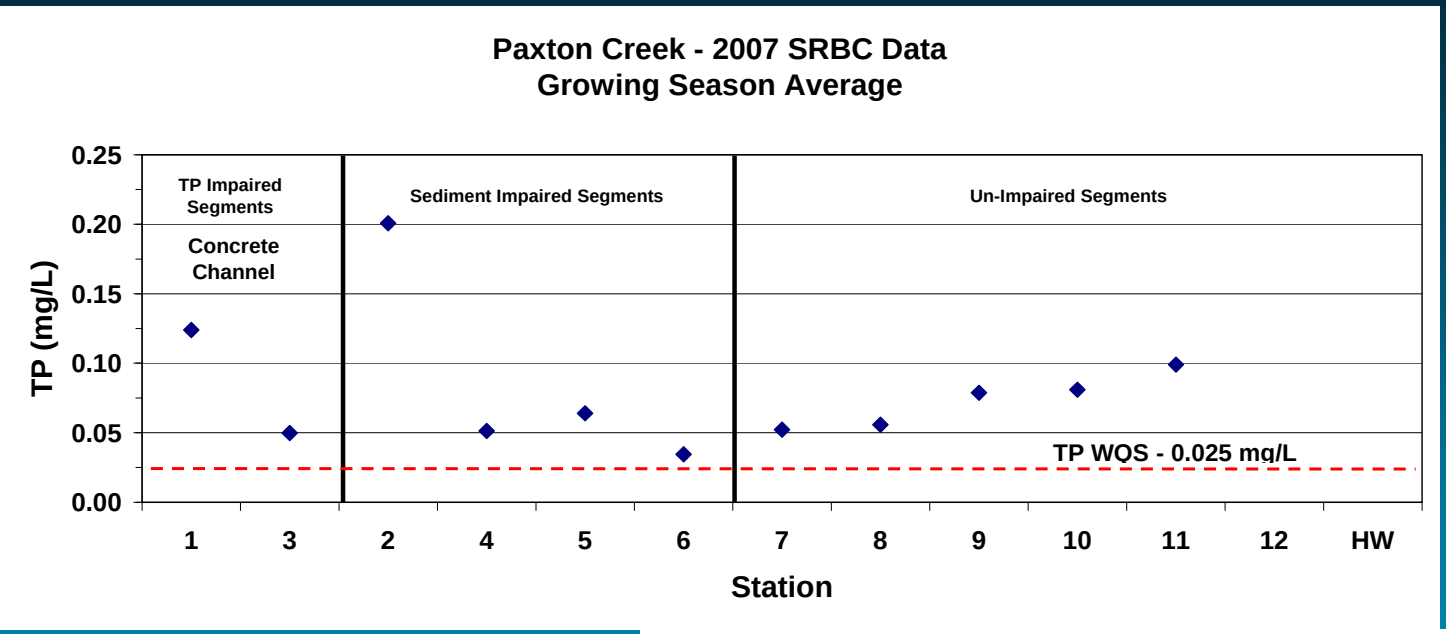


SITE-SPECIFIC EPT RESPONSE GOOSE CREEK

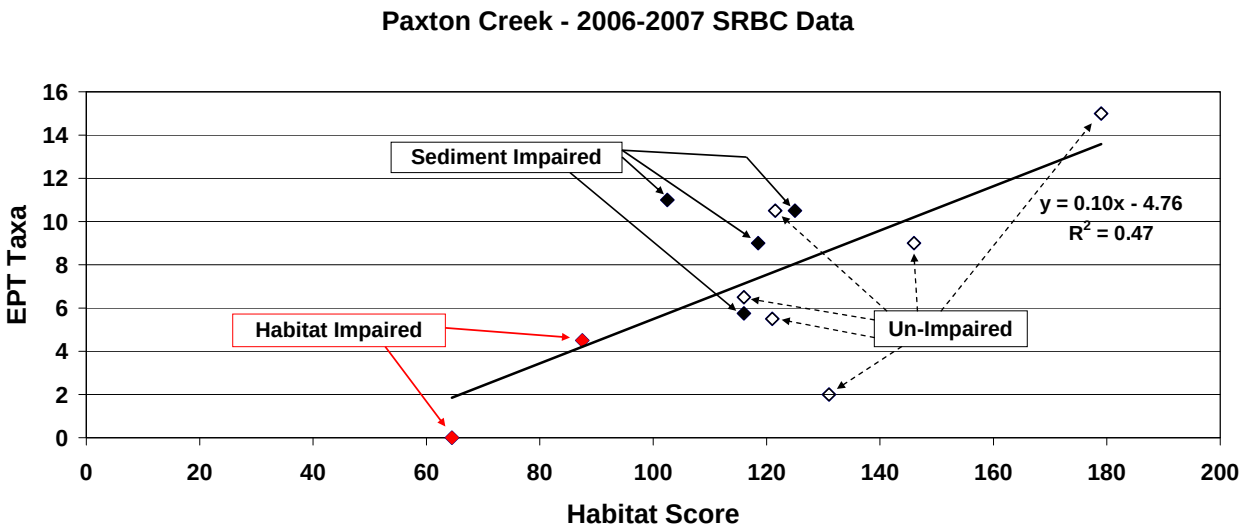


No TP: Invertebrate Relationship

PAXTON CREEK



No TP: Impairment Relationship



CONCLUSIONS

- Linear Regressions inadequate
  - Regional data cannot be used to represent site-specific conditions
  - Failure to consider site-specific data yields inappropriate conclusions
- Conditional Probability Analysis unreliable
  - Results conflict with traditional statistical evaluations
  - Endpoints do not reflect site-specific data; biological significance unknown