

A Proposed Lentic Benthic Bioassessment Procedure for California: A Case Study from the Aquatic Pesticide Monitoring Program (APMP)

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Rationale for Protocol

- Lentic water bodies under-represented in statewide assessment
 - Streams focus
 - Lack of standardized protocol
- 305b requirements (SWAMP)
- Need cost-effective rapid assessment tool

Presentation Goals

- Body of work to build upon
- Initiate review and discussion
- Build user consortium
- Can protocol be expanded for universal use? Adaptable for SWAMP?

APMP Bioassessment

- Funded by CA SWRCB
- Diagnostic monitoring of aquatic pesticides
- Two year dataset:
 - Develop research lentic protocols
 - BMI, Epiphytic Invertebrate, Phytoplankton monitoring
 - Multi-metric analyses
 - Peer-review: Brian Anderson, Jim Harrington, Victor DeVlaming, Charles Goldman, Bruce Thompson

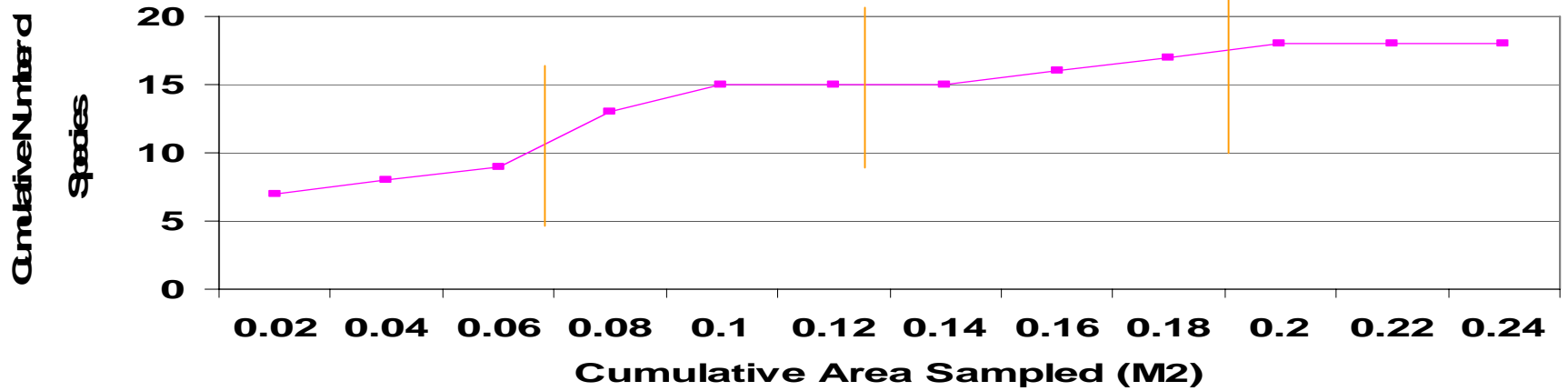
Proposed Lentic Protocol

- Lakes, reservoirs, ponds
- BMI's only
- Random, standardized sampling design
- Ambient monitoring

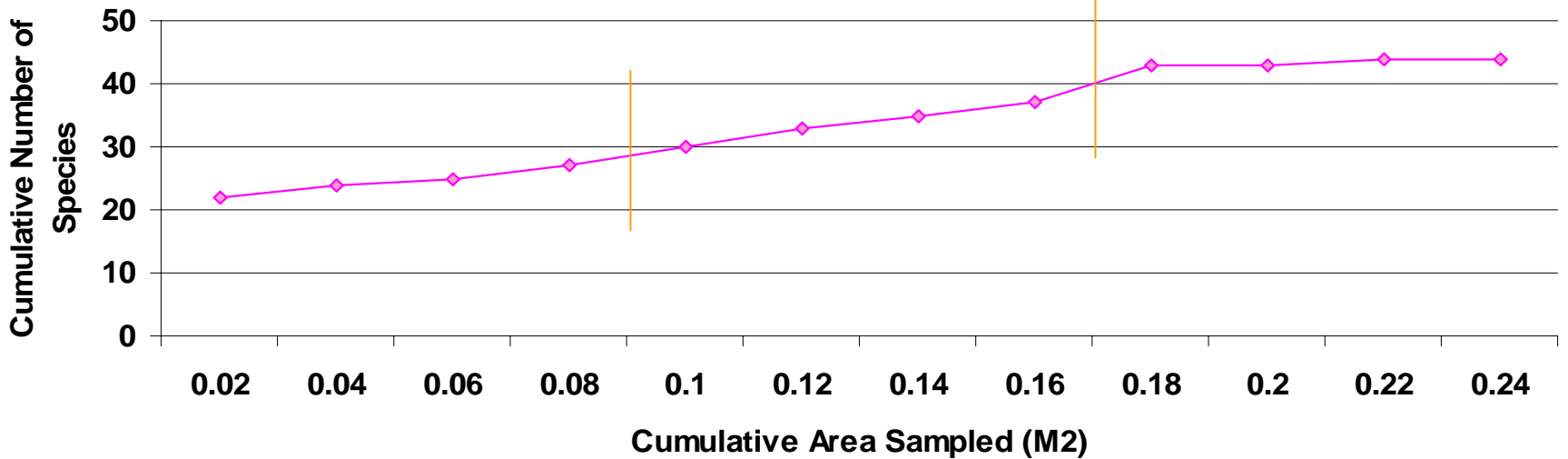
Sampling Summary

- Habitat: Sublittoral zone in 2-4 m water depth
- Gear: Petite Ponar or Ekman (tall)
- Sieve size: 0.5 mm mesh
- Sampling Coverage:
 - 3-6 transects per site/sampling area if <500ac, 6-10 transects if >500ac

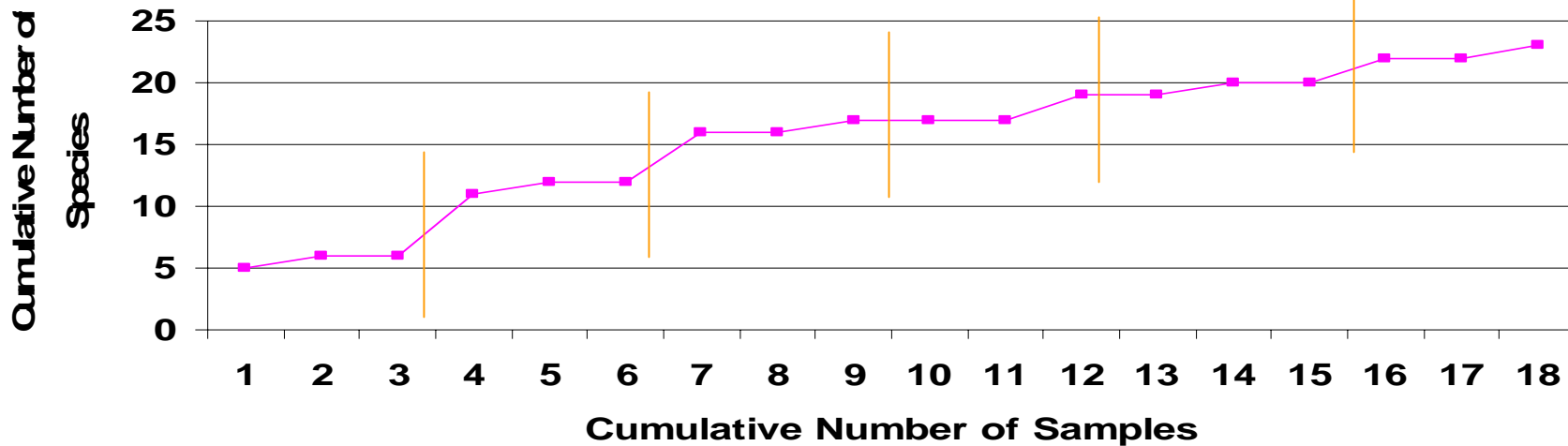
Costa Ponds 2003
5.22acres



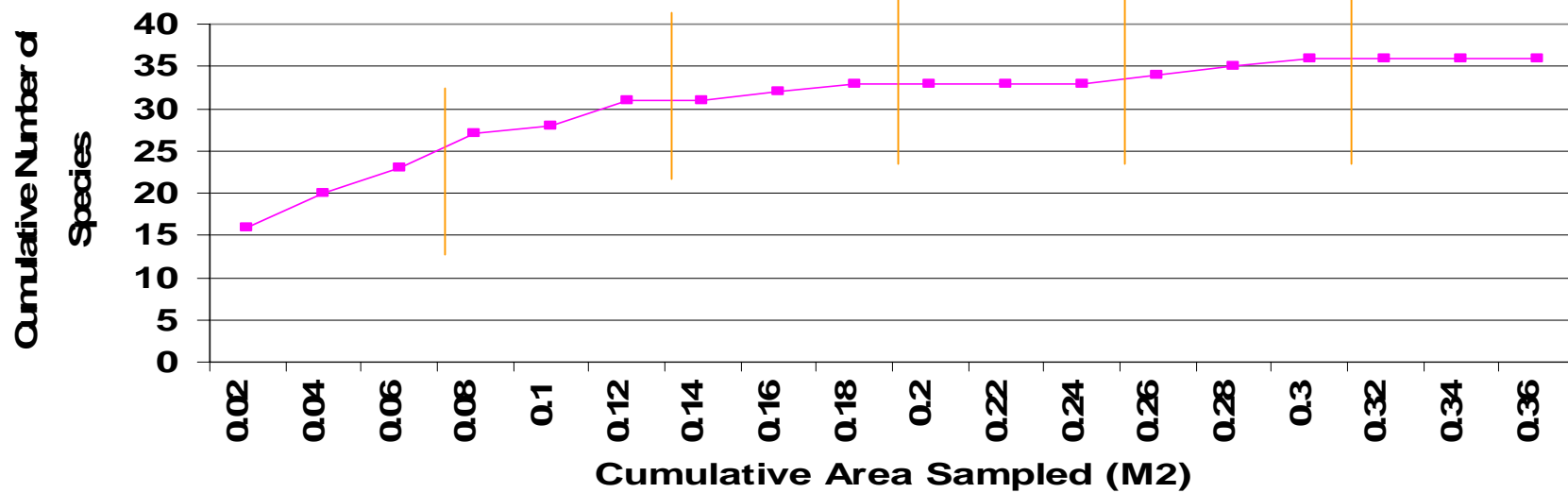
Lagunitas Reservoir 2004
300 acres



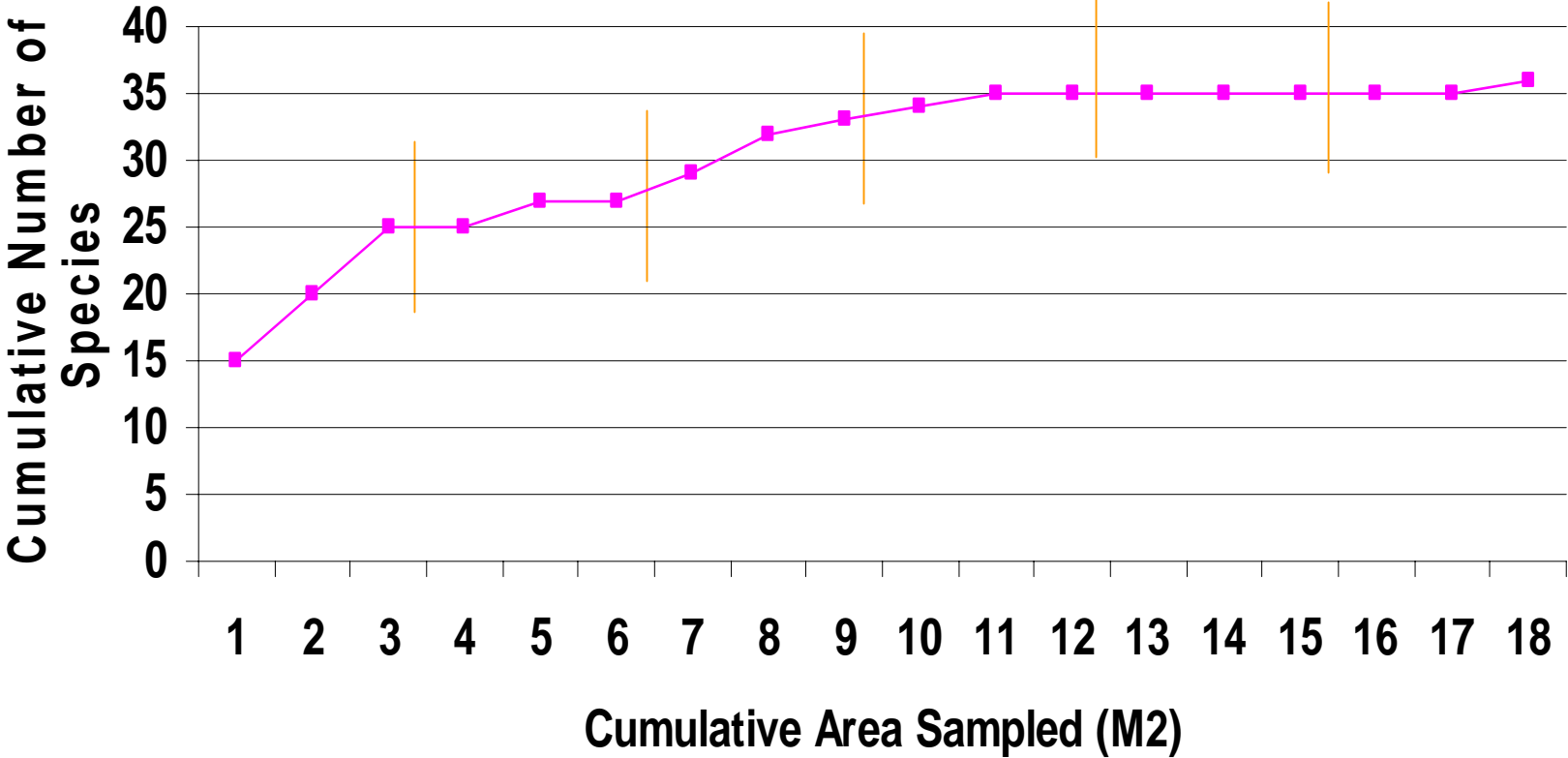
Bon Tempe Reservoir Late Spring 2003 640 acres



Bon Tempe Reservoir Summer 2003



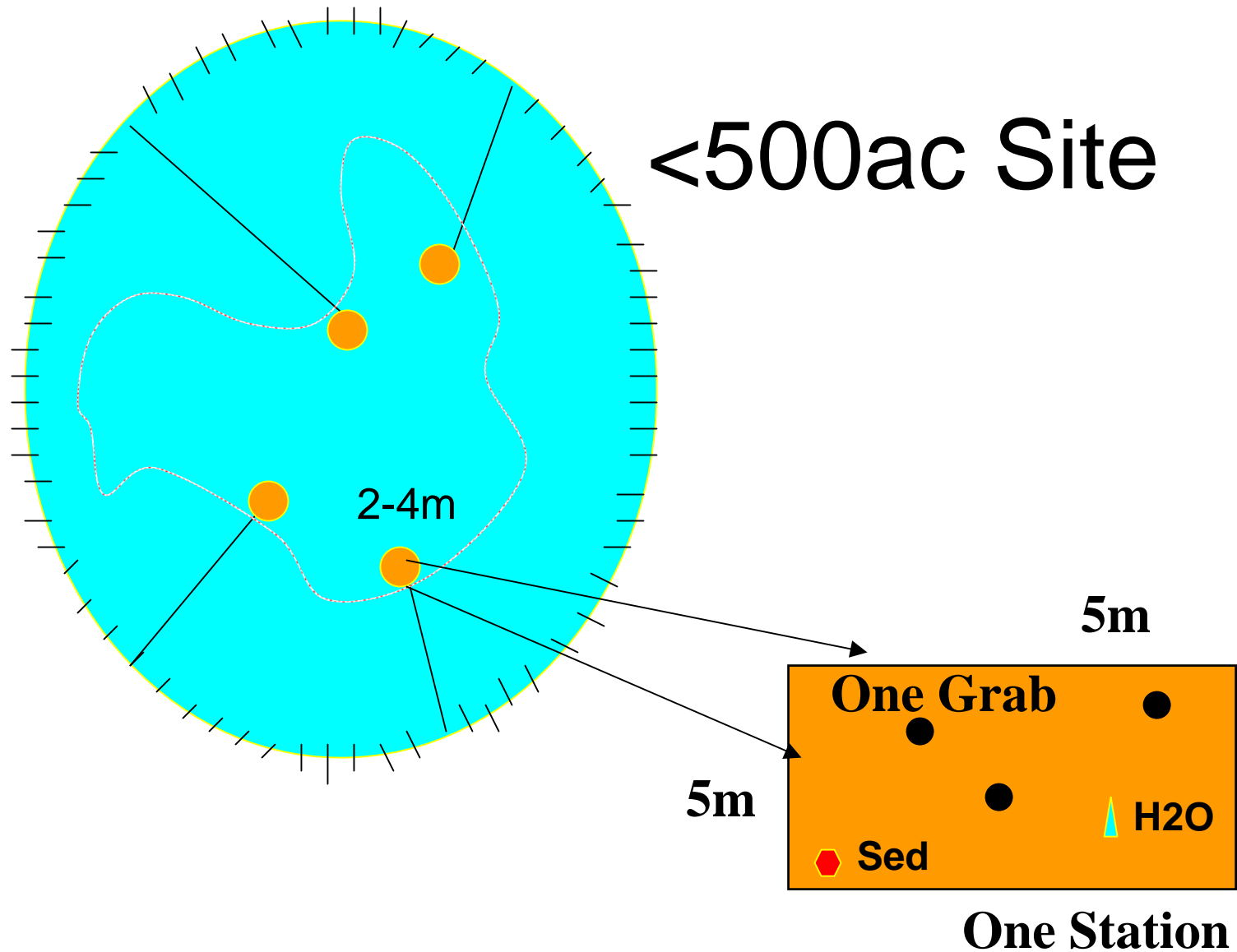
Big Bear Reservoir 2003
2300 acres



Replication Rationale

- Protocol: 3 replicate grabs at one station/transect
- APMP:
 - 1st yr -3 reps
 - 2nd yr - 4 reps
- No decrease in variability with increased replication
- High intra and inter-station variability

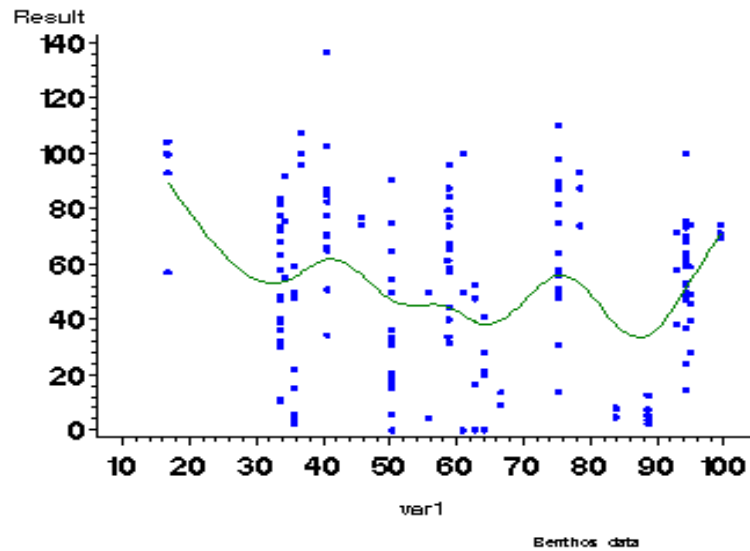
Sample Design



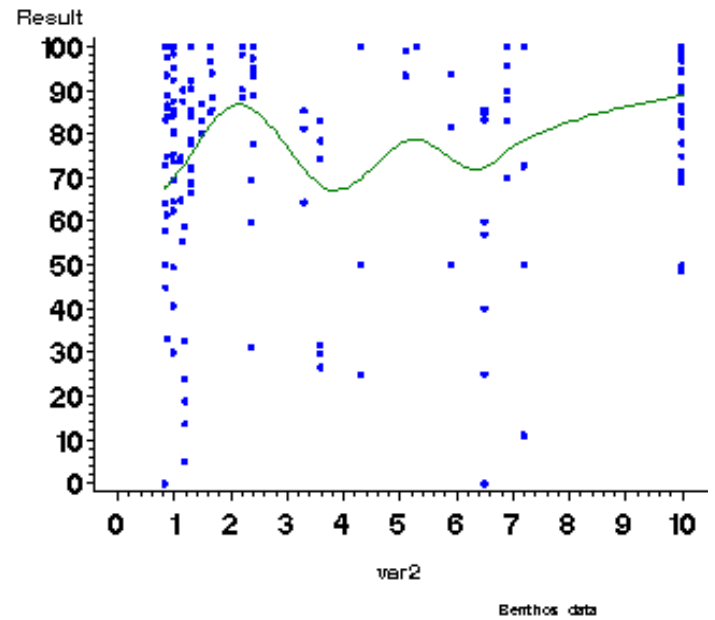
Habitat Measures

- Rapid, qualitative measurement
- Physical Habitat
 - Other efforts - CRAM
- Water Quality
- Sediment Quality
 - Qualitative vs. quantitative

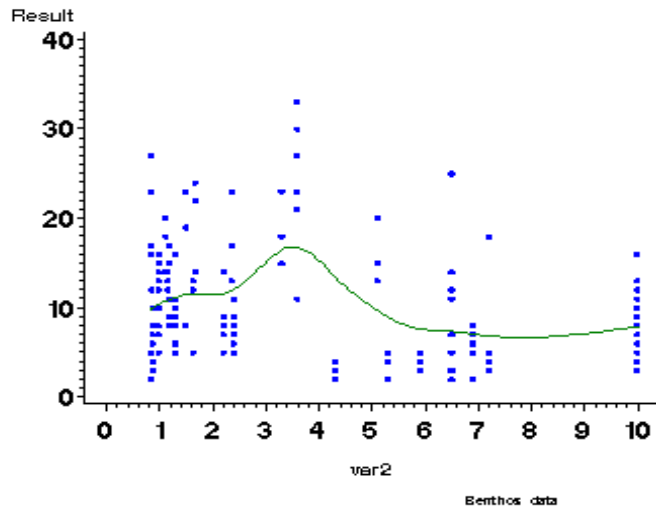
Benthic Metrics vs. Percent Fines
Metric= Percent Oligochaeta



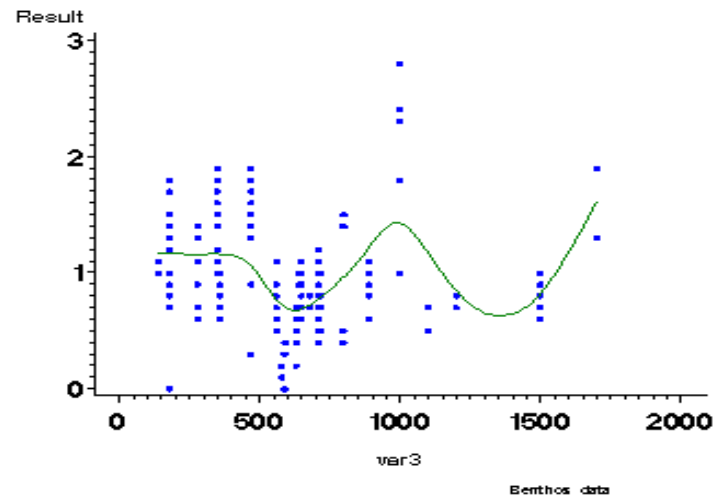
Benthic Metrics vs. Total Organic Carbon
Metric= Percent Tolerant Taxa



Benthic Metrics vs. Total Organic Carbon
Metric= Species Richness



Benthic Metrics vs. Total Nitrogen in Sediment
Metric= Shannon-Weiner Diversity



Laboratory Processing

- Sub-sampled to 300 organisms
 - 10% QA/QC
- Taxonomy to Genus
 - Most groups- CAMLnet Level 1
 - Chironomid to genus - EPA WEMAP
 - Oligochaetes to genus
 - 10% QA/QC
- Data analysis
 - BMI Taxa List & Counts by Site
 - Metrics

Protocol Considerations

- Index Period
- Inclusion of other biological assemblages
- Lentic IBI's / Reference condition
- Extensive physical habitat
- Acceptable levels of variability

Questions??

