ProbMon

Virginia's Probabilistic Stream Monitoring Program

Historical Perspective (1999)

JLARC and WQMIRA

1. INCREASE EFFORTS (sediment and bio)
2. STATISTICALLY ANALYZE DATA
3. MAKE DATA COMPARABLE
4. PROVIDE INFO TO DEVELOP INITIATIVES

Biomonitoring

Needed more reference sites
Needed to develop and test new methods
Lacked an appropriate database for testing.

1999

Virginia DEQ started a process to redesign the state's water quality monitoring programs

Our chemical monitoring program was strongly based on targeted bridge sampling.

Site-Specific Monitoring Stations

- Expensive
- Limited statistical analysis
- Not well suited for statewide assessment or statewide initiatives.

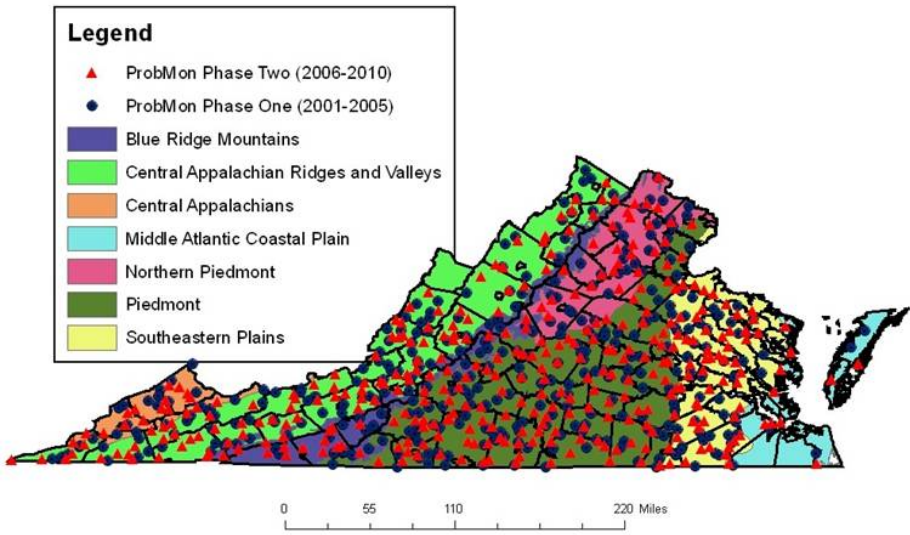
2001

Virginia DEQ initiated ProbMon as a component of our program

Bridge sampling is still the focus of our rotating watershed program

Experimental Design

* EPA-EMAP Design
* 50 stations/year
* Weighted by stream order 1, 2, 3, 4 & ≥5



Chemical, Habitat, Biological, and Landuse Parameters

ProbMon is intended to be a comprehensive sampling of chemical, biological and physical habitat conditions.

ProbMon started in our Biological Monitoring Program

ProbMon can help all phases of water quality management

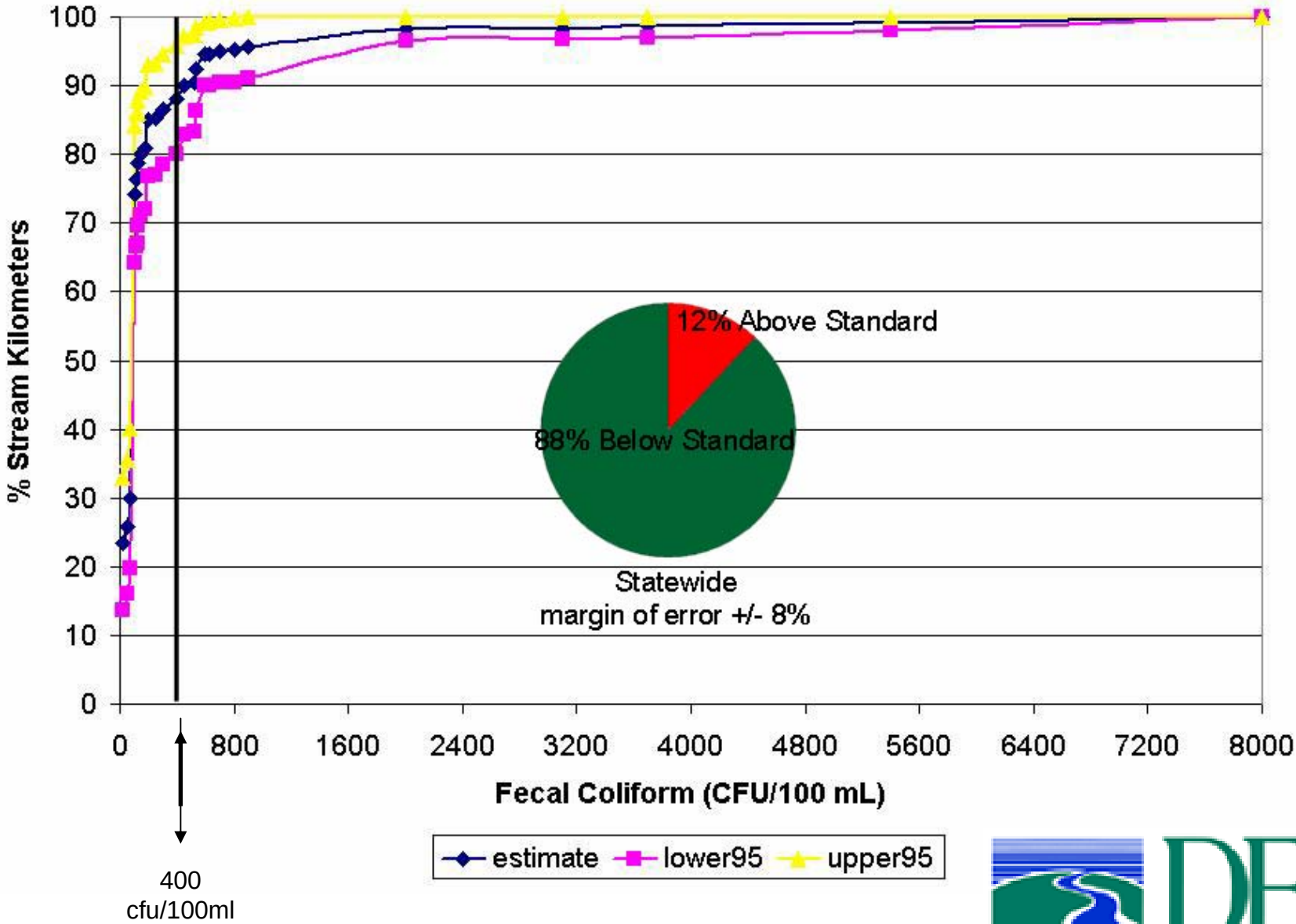
Assessments

1st complete 305(b) chapter in 2008

How many river miles exceed criteria limits?

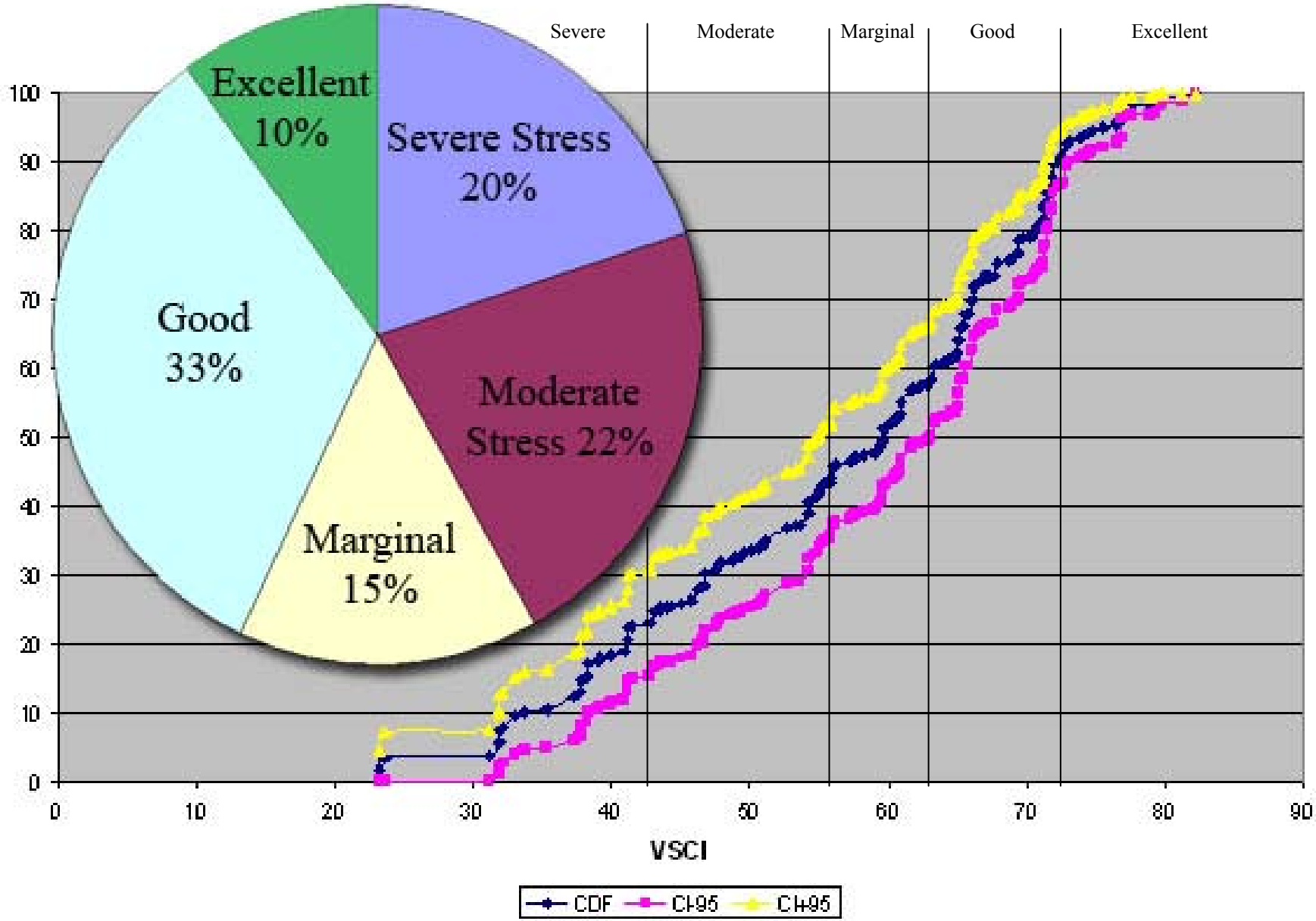
The EMAP design answers that question in a new way…

Results - Fecal Coliform



VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Virginia Stream Condition Index



ProbMon has doubled the number of biomonitoring reference sites statewide,

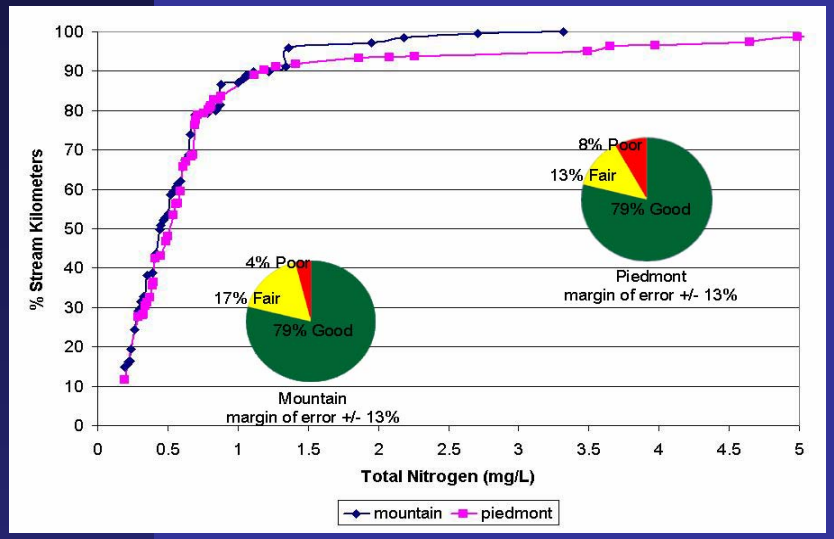
and

tripled the number of reference sites in the piedmont.

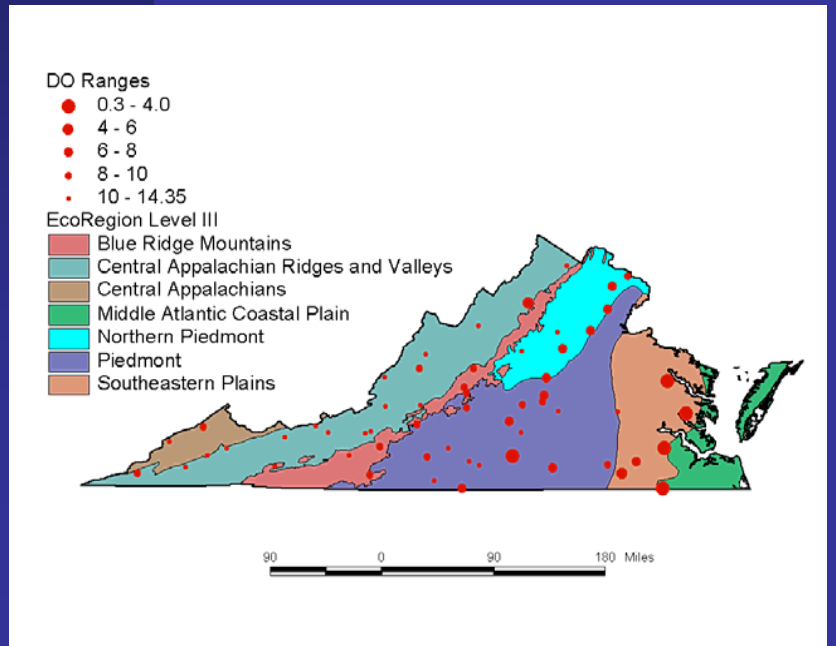
See Jason Hill, Session J, Room A6 for more on how ProbMon has helped Biomonitoring in Virginia

Standards Development

Preview effects of criteria values

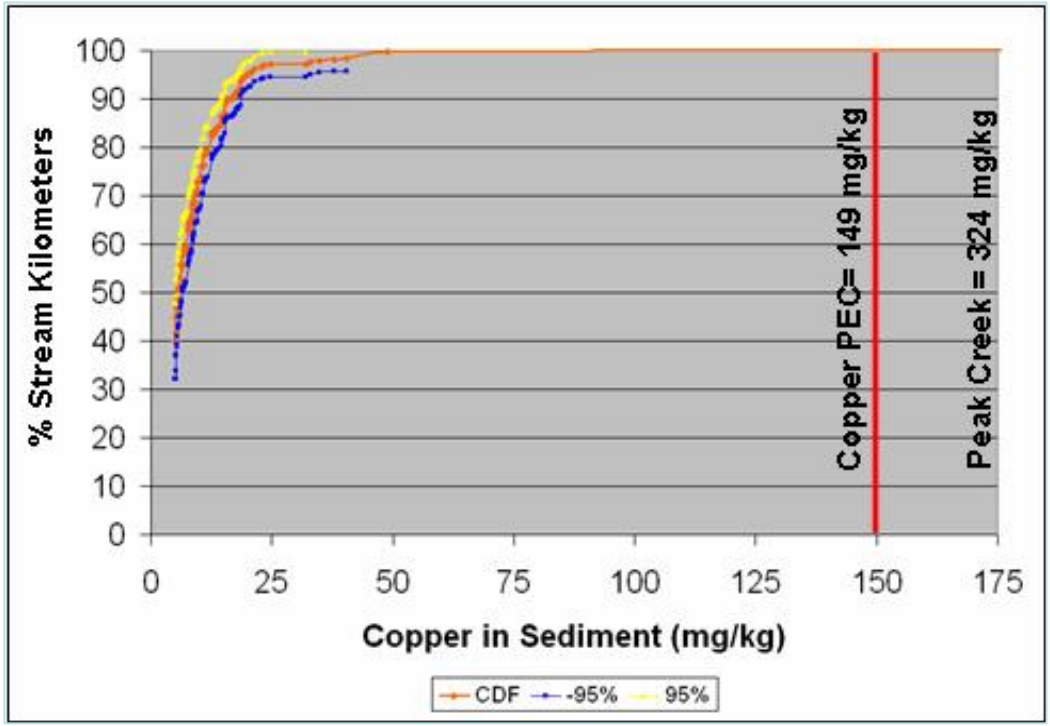


Mapping of natural conditions



Assessments, TMDLs, Enforcement Permits…

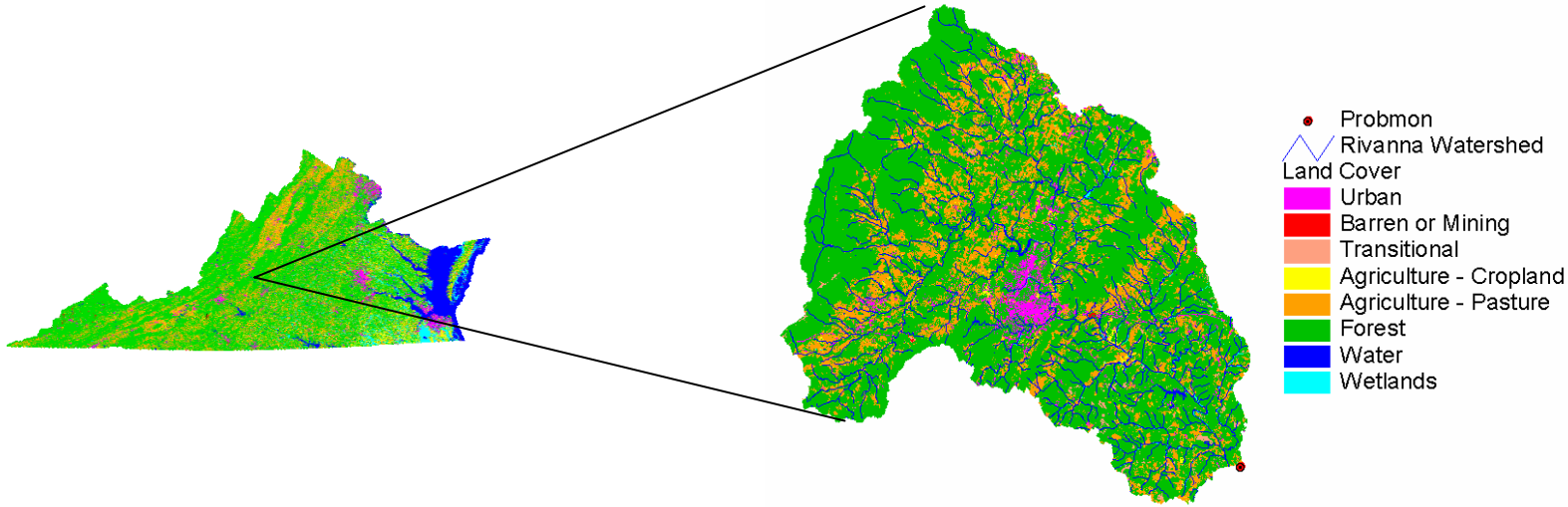
Cu in Sediment



Provides data to interpret parameters with no criteria and prioritize problems on a statewide scale by showing the statewide distribution.

New Technologies

Landuse for Biomonitoring



Supporting information like landuse, water chemistry and physical habitat data improve reference condition filters

New Technologies

SPMDs

Virtual fish for toxic organic chemicals

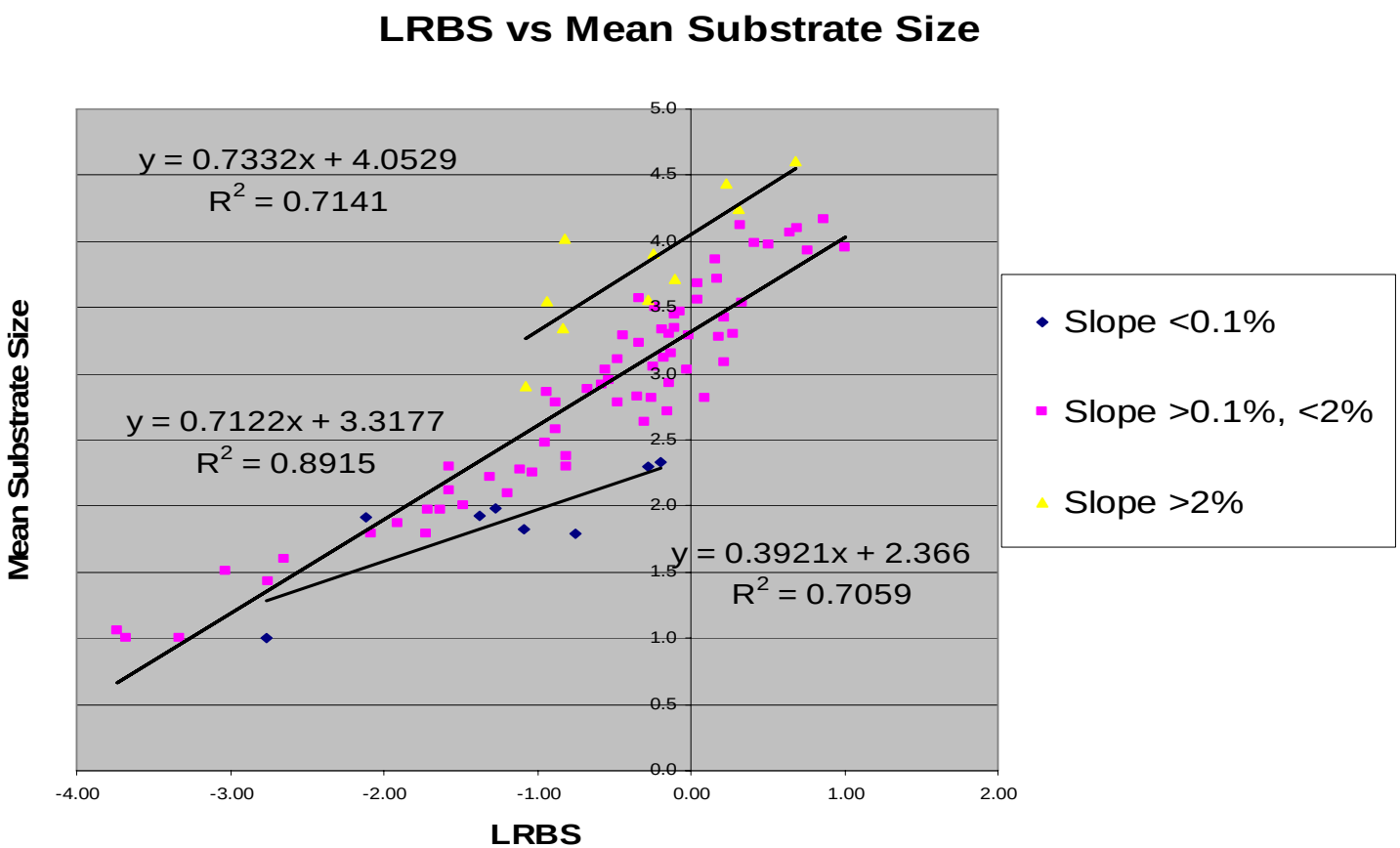
Set-up and deployment of an SPMD.

Is sediment an anthropogenic effect or is it natural for some streams?

New Technologies

Relative Bed Stability

(RBS) estimates the stability of the stream by comparing the mean sediment size present to the sediment size predicted by channel shape and slope.



Virginia Stream Diversity

ProbMon helps us describe the natural variability of Virginia streams.

Probabilistic Monitoring is the best way to measure the effectiveness of management efforts

MORE INFORMATION:

http://www.deq.virginia.gov/probmon

Cost Savings

ProbMon allows sampling of a small number of stations to achieve a statewide assessment.

In 1999 we were sampling sediment organics at 1000 sites @ $1000/site

ProbMon allows us to reduce that number to 50 sites saving the state $950,000.00/year

Through a combination of savings and grant monies received ProbMon has resulted in a financial gain:

$532,000 grant money received

$950,000/year savings

Over $5 million in 5 years!