



pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION



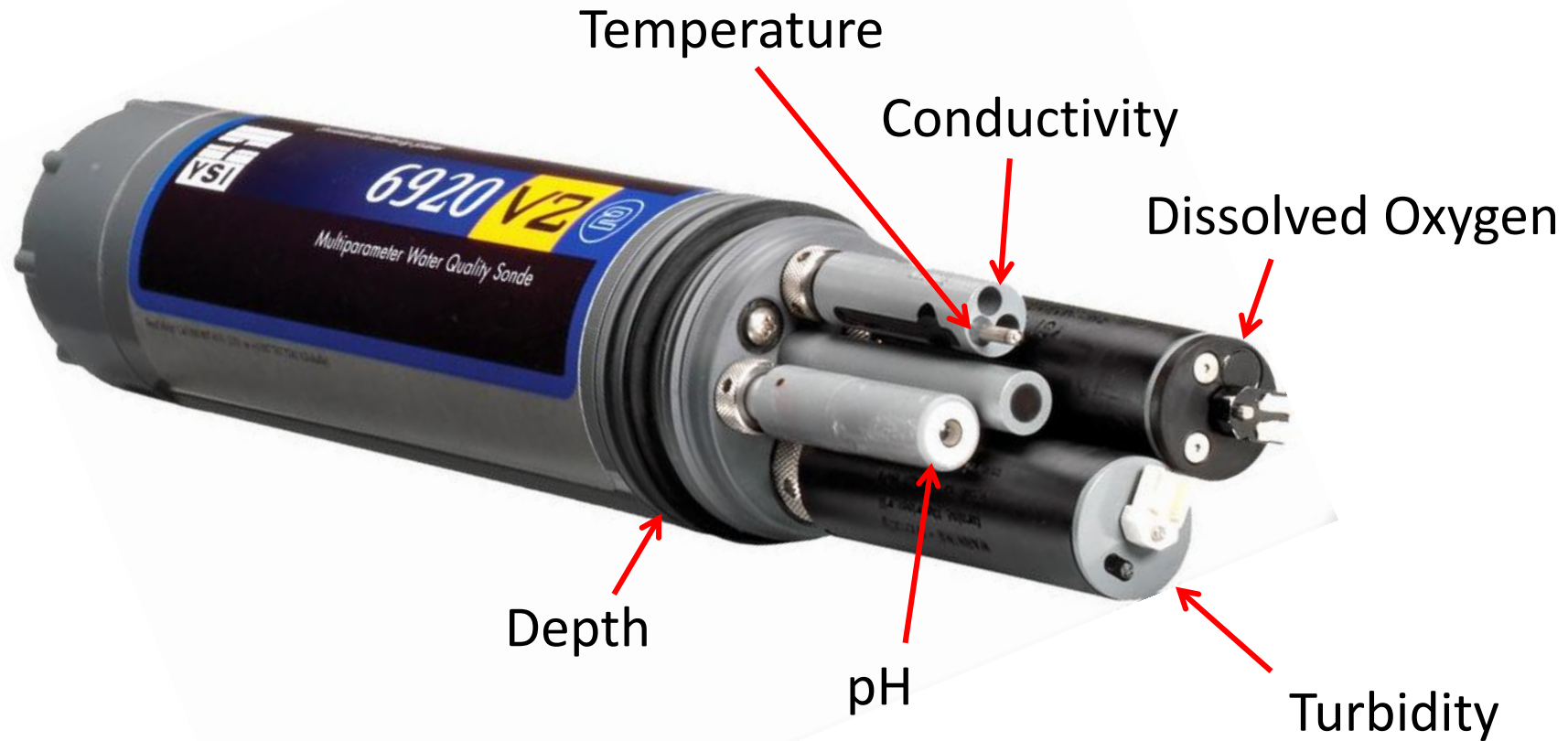
Bureau of Clean Water

Continuous Physiochemical Assessment Method

Water Resources Advisory Committee Meeting

January 25, 2018

Continuous Data Sondes

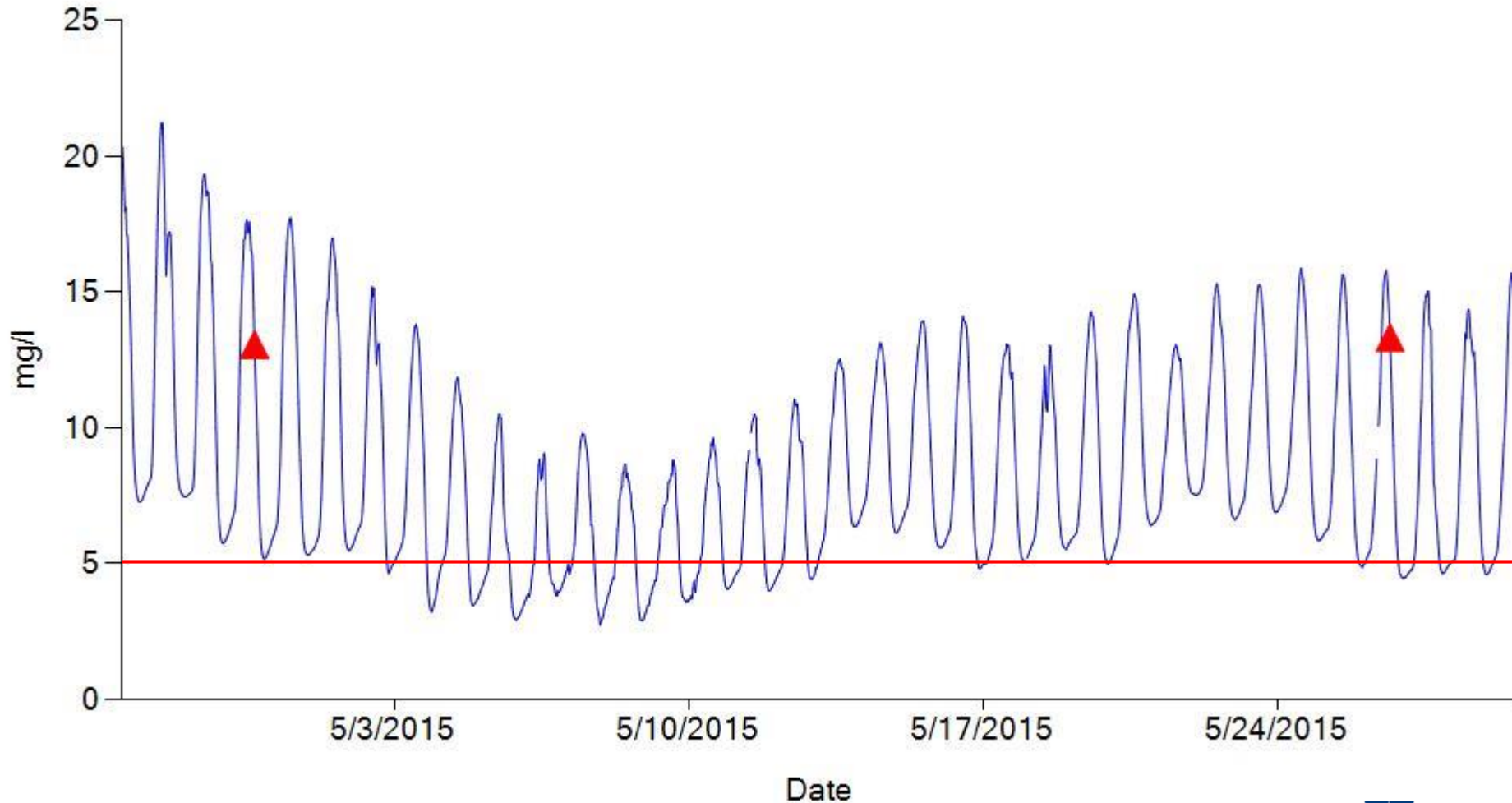


Model-based parameter examples:

- Osmotic pressure
- Total dissolved solids (TDS)

Representativeness of Samples

▲ Discrete Sample — Dissolved Oxygen



Quality Assurance Requirements

- Regular fouling and calibration checks
- Discrete readings with independent meter
- Corrections and removal of “bad” data
- Cross-section transects to ensure data are representative.

Water Quality Standards

§93.7(a), Table 3

- pH: 6.0 - 9.0 units
- Dissolved Oxygen: minimum 5.0 mg/L

Model-derived parameters

- Examples: osmotic pressure (ALU), TDS (PWS)
- Probability of exceedance $\geq 90\%$

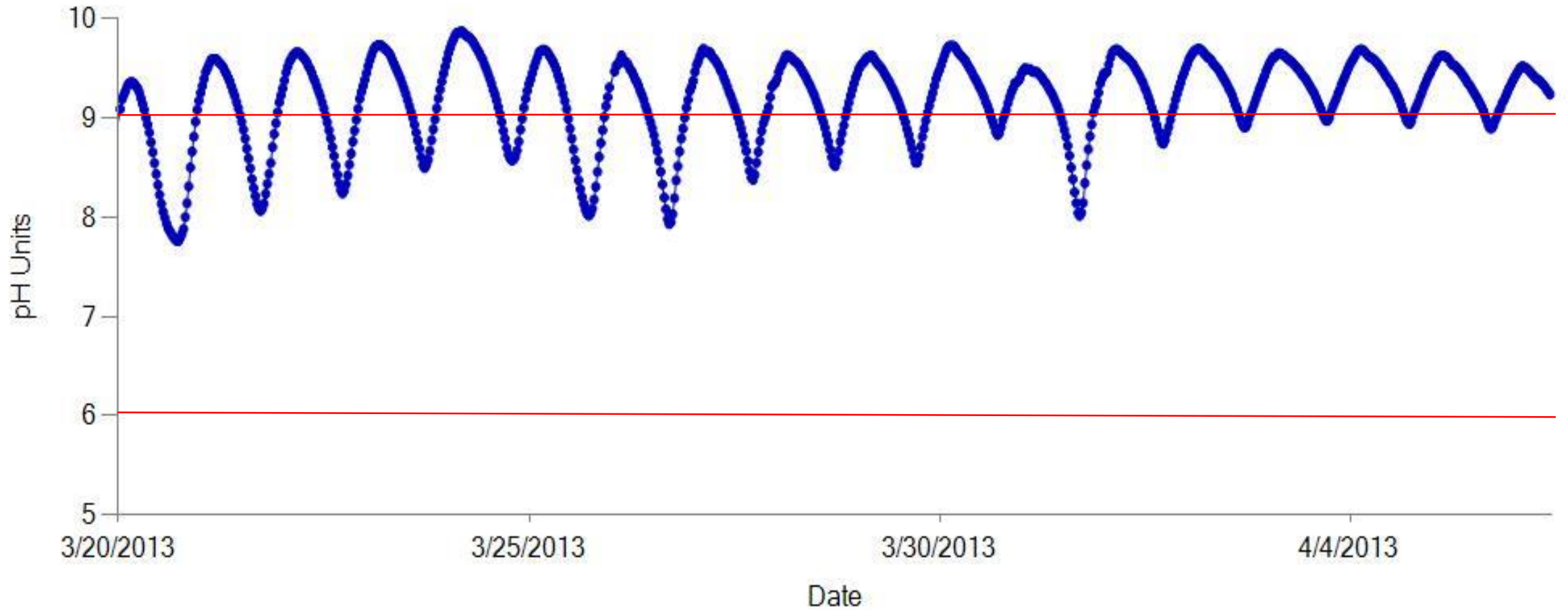
99% Rule

§96.3(c): “[criteria] shall be achieved in all surface waters at least 99% of the time”

Discrete grab samples

- Sample represents 1 day
- 4 samples = violation (4 days / 365 days = 1.1%)

Count Exceedances

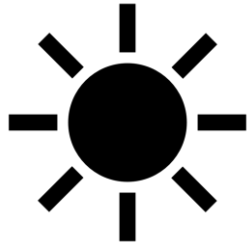


99% with CIM

$$\%Y=100 \left[\frac{n * i}{k} \right]$$

Interval	# Readings > 1% of Year
15 min	351
30 min	176
60 min	88

Critical Periods



- Open canopy vs closed
- Pre- vs post-leaf emergence

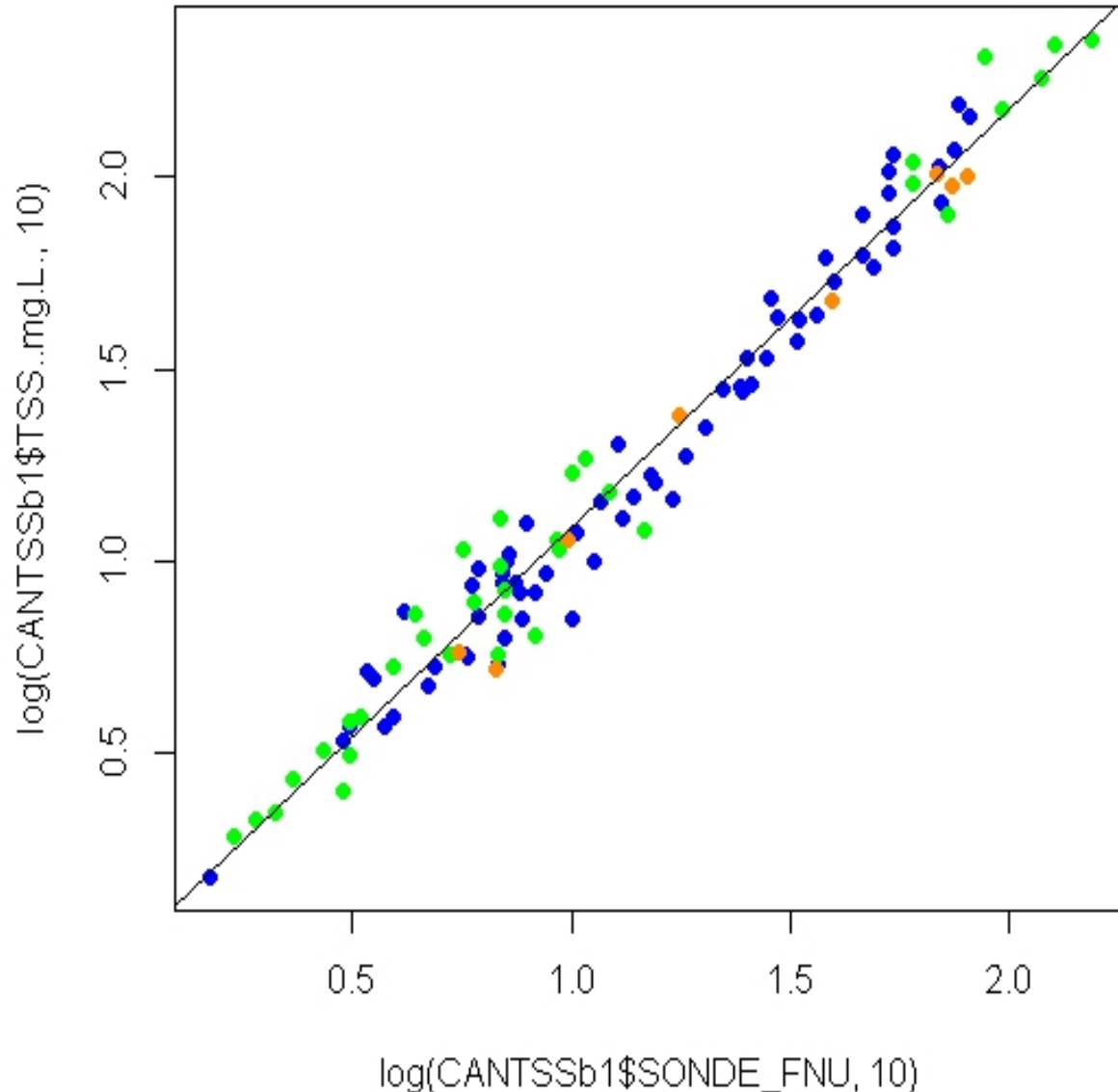


- Solubility of oxygen



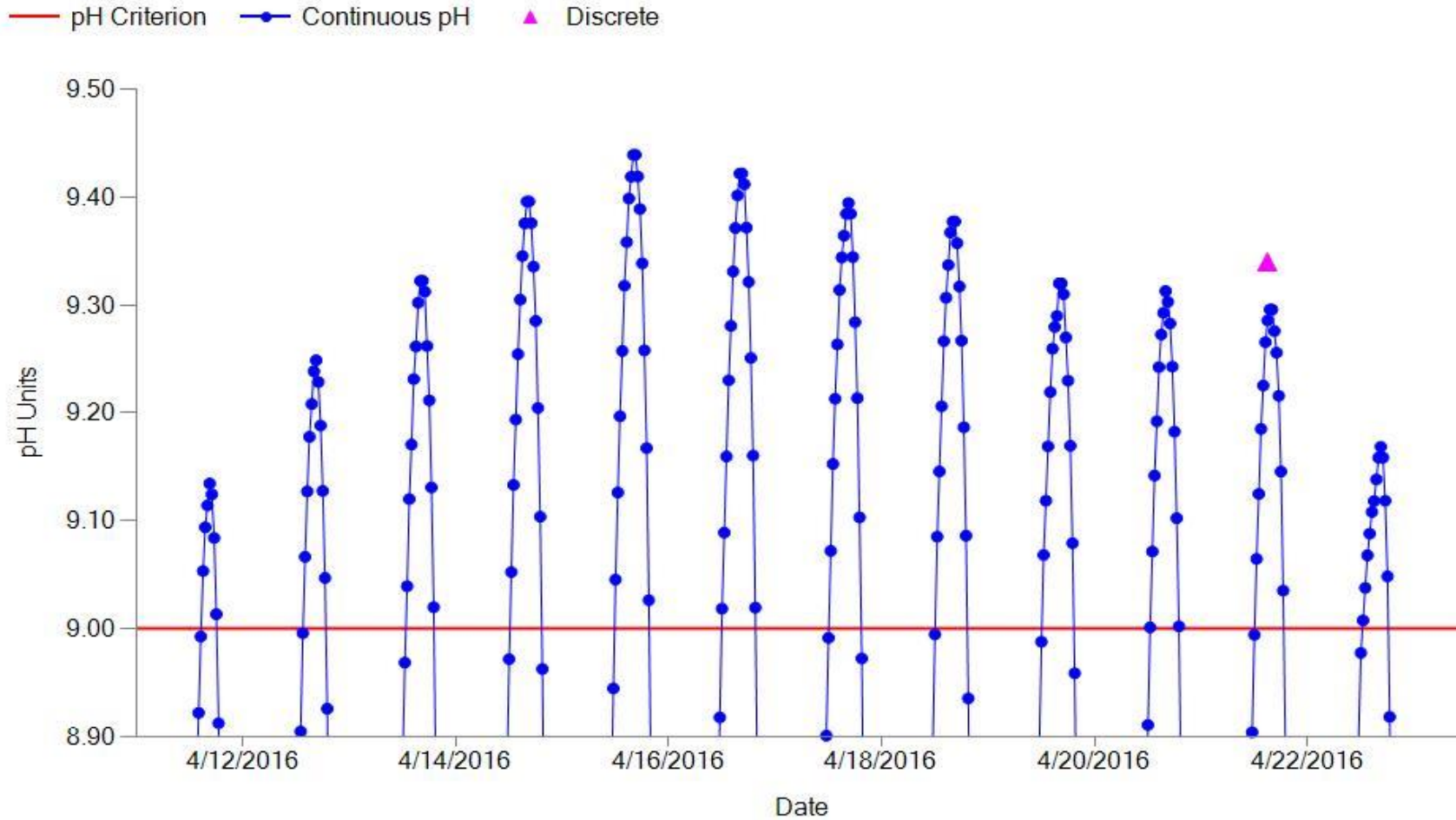
- Moderates conditions
- Scour of photosynthetic organisms

Model-Derived Parameters

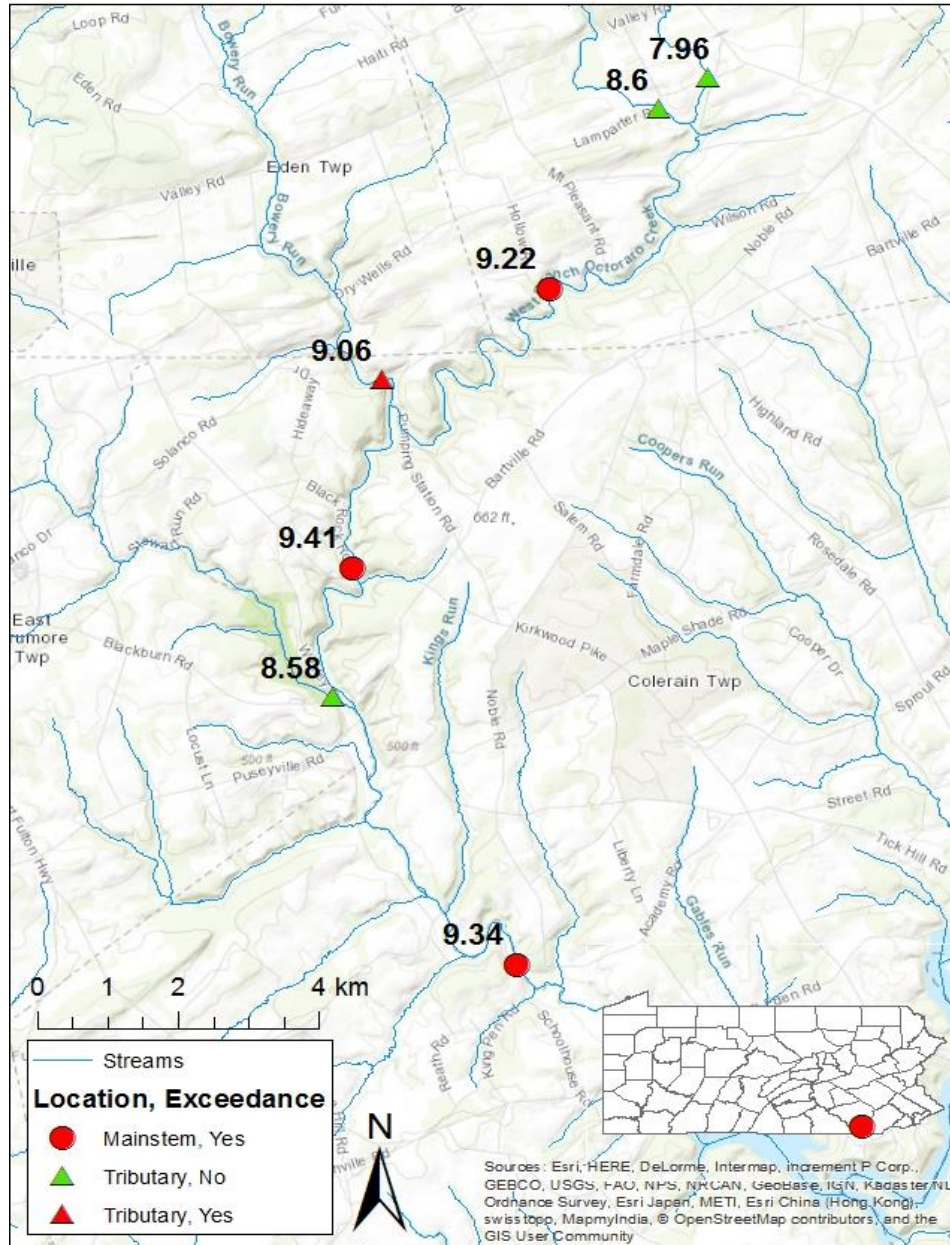


- Discrete samples
 - Over CIM deployment
 - Throughout range
- Methods follow USGS guidelines
- Site specific
- Probability of exceedance $\geq 90\%$

Delineating Spatial Extent



Delineating Spatial Extent



Method Summary

1. Data sondes collect CIM data
2. QA procedures to verify data
3. Assessment decision
 - Count exceedances of criterion
 - Convert to percentage of a year
 - Not attaining if $> 1\%$ of a year
4. Determine spatial extent through discrete data

Questions or Comments

Bureau of Clean Water
Division of Water Quality

Mark Hoger
(717) 783-7573
mhoger@pa.gov