

# Nutrient Criteria Development

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Agenda Item 13a

# A Look Back At Where We Started

- Ohio River water utilities experienced increased frequency and earlier occurring taste and odor and filter-clogging problems.
- The 1998 Clean Water Action Plan called for development of nutrients water quality criteria for rivers.
- A nutrient criteria development plan was written to address these issues



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# Nutrient Criteria Development Plan

- Evaluate single set of criteria for the entire river
  - Attempt to identify cause and effect relationships
  - Identify endpoints for aquatic life, drinking water and contact recreation
  - Develop numeric nutrient criteria for the Ohio River by 2005-2006
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# ORSANCO Nutrient Monitoring

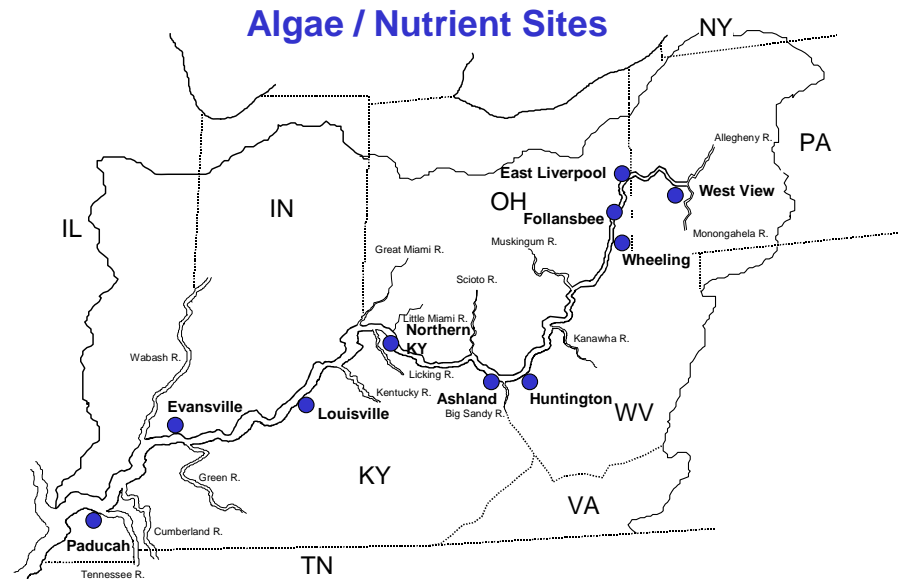
- Samples collected twice per month from 7 water utilities (originally 10)
- Nutrients, algae identification, chlorophyll *a*, and physical parameters

- Analysis includes:

Parameter	Analytical Method	Reporting Limit
Ammonia Nitrogen	350.3	0.03 mg/L
Nitrate-Nitrite Nitrogen	353.2	0.01 mg/L
Total Kjeldahl Nitrogen	351.2	0.10 mg/L
Total Phosphorus	365.1	0.01 mg/L

# Algal and Chlorophyll Analysis

- Algal counts are at the genus level
- Algae data grouped by indicators
  - Taste and Odor Algae
  - Toxin producers
  - Filter Cloggers
  - Pollution Indicators

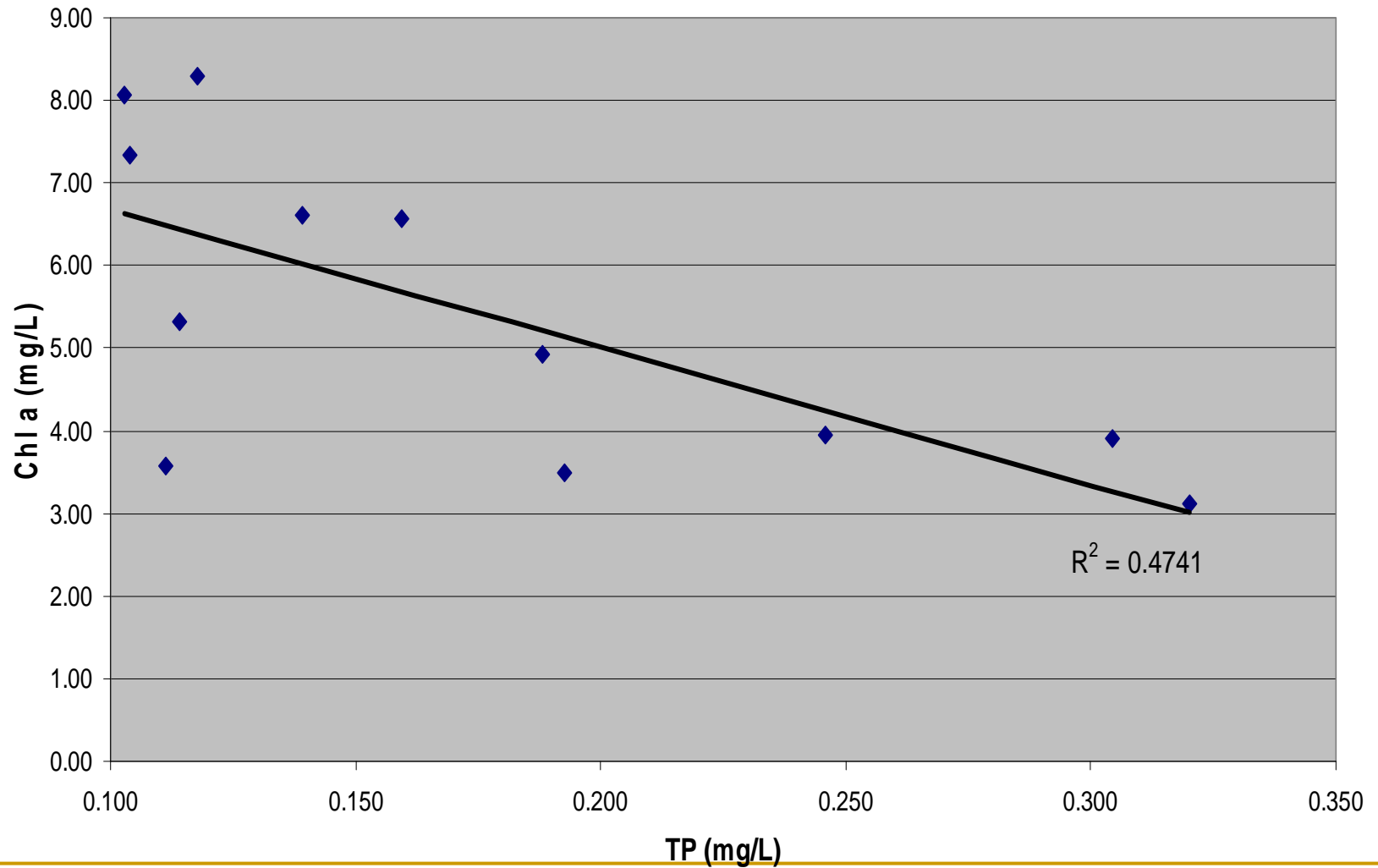


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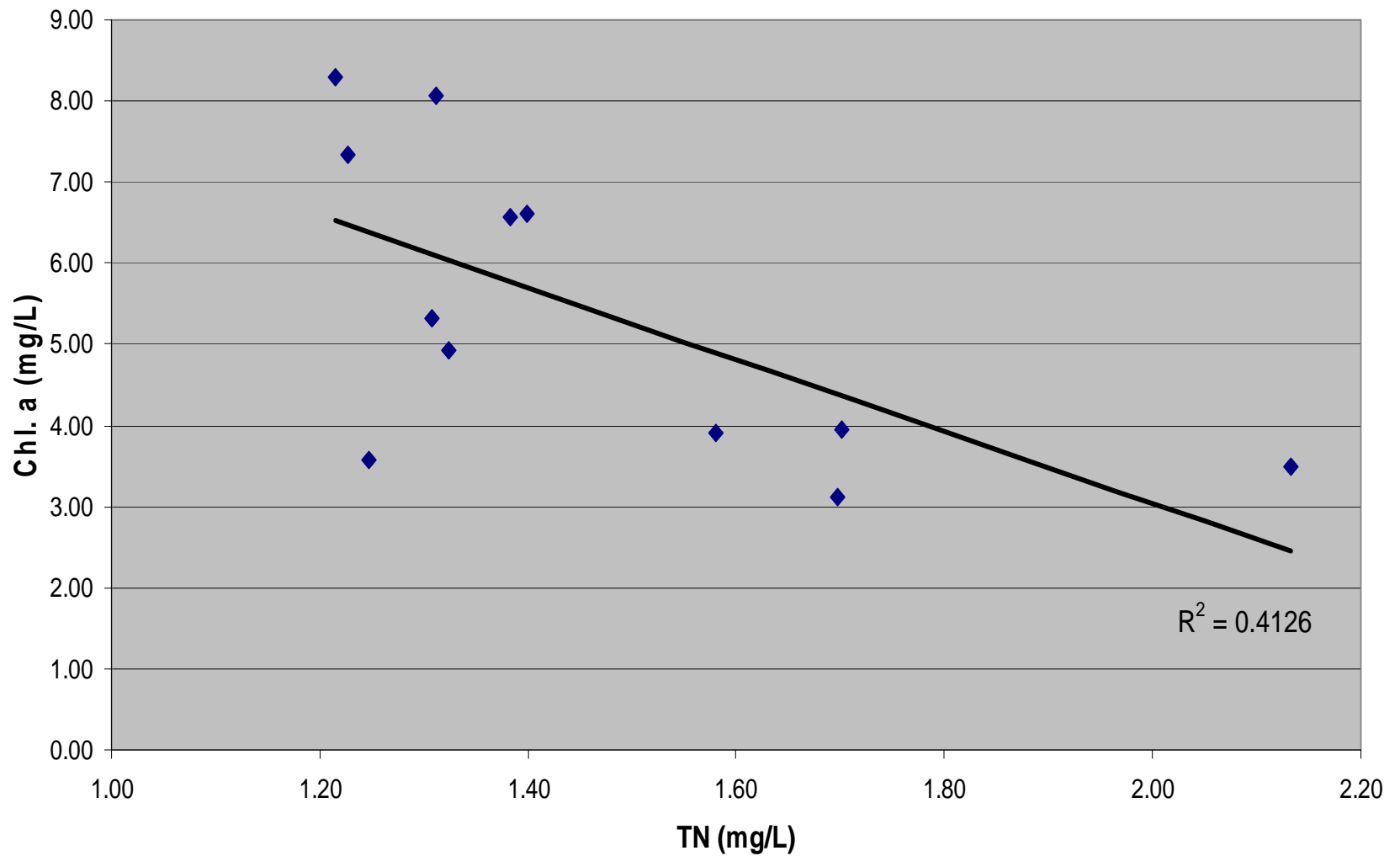
# Data Analysis

- Look for relationships between cause and response variables
    - TP and TN vs Chlorophyll, algae counts
    - TP and TN vs pollution indicators
    - TP and TN vs taste and odor producers
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## Chl a vs TP (River-wide Monthly Averages)



**Chl a vs TN (River-wide Monthly Averages)**





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# Multiple Lines of Evidence Approach

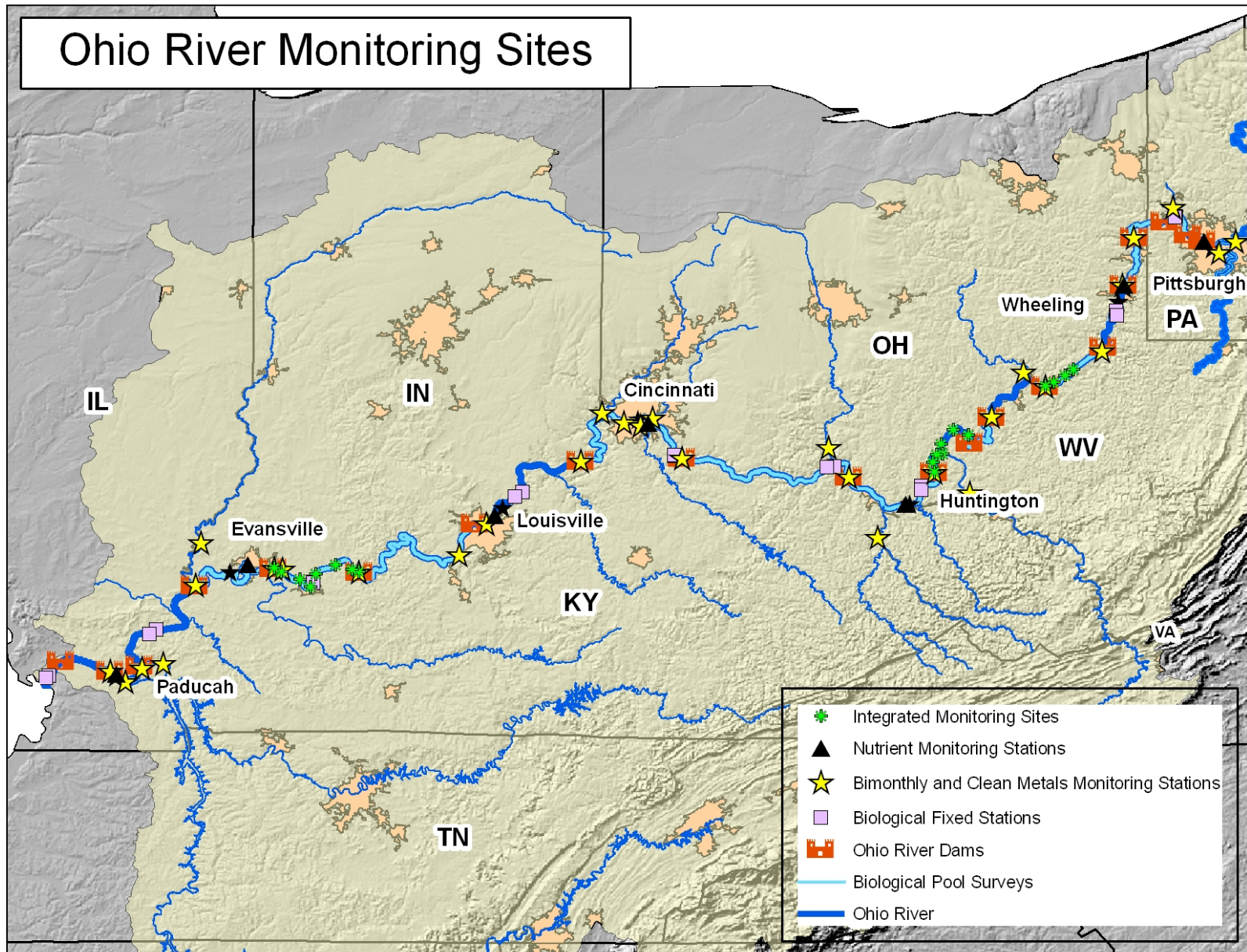
- Distribution of data
    - The “original” EPA approach
  - Literature review
  - Case studies
  - Conditional Probability Analysis
    - EPA Tech Support through N-STEPS
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# US EPA Technical Support

- Tetra Tech, Inc., uses “conditional probability” approach
  - Data provided from many programs
    - Bi-monthly
    - Nutrients/Algae
    - Biological Programs –fish/macroinvertebrate
    - Integrated Assessment
    - Special studies (DO, Continuous monitoring)
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# Ohio River Monitoring Sites



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# Where's the Beef?

- Contract problems with Tetra Tech now resolved
    - Results by end of summer?
  - SAB panel to address conditional probability method
  - Proposed criteria in 2010
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