# Establishing a Baseline – Why and How

State Level Nutrient Reduction Strategies Workshop

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# Presentation Objectives

- Define what a baseline is
  - Programmatic
  - Environmental
- Describe how a baseline informs water resource management decisions
- Discuss importance of baseline measurements in State nutrient strategies

# What is a baseline?

- "A measurement, calculation, or location used as a basis for comparison" [1]
- It is not:
  - Regulation
  - Enforceable
  - A water quality standard or criterion

[1] The American Heritage Dictionary

# Overall Goal

- Establish a series of baseline measurements that relate resource management actions to changes in:
  - Nutrients on the landscape
  - Nutrients reaching water
  - Ecological responses
- Use information feedback to adjust work

# Classification of Indicators

- Administrative
  - Management system output units
- Stressor
  - Nutrients reaching water
- Exposure
  - Organism uptake
- Response
  - Ecological condition changes

# Programmatic Baselines

- Simple administrative actions
  - The dollars spent, acres or linear feet of any conservation practice installed
  - Generally these measures have no direct relationship to water quality, for example:
    - Linear feet of livestock fencing
    - Filter strips under CREP, CP #21

# Programmatic Baselines (2)

- Administrative measures with quantifiable water quality responses
  - Linear feet of in-stream habitat improvements
    - Ohio EPA's Qualitative Habitat Evaluation Index
  - Certain practices under NRCS field office technical guide, examples:
    - Filter strips, #393
    - Conservation cover, #327

# Environmental Baselines

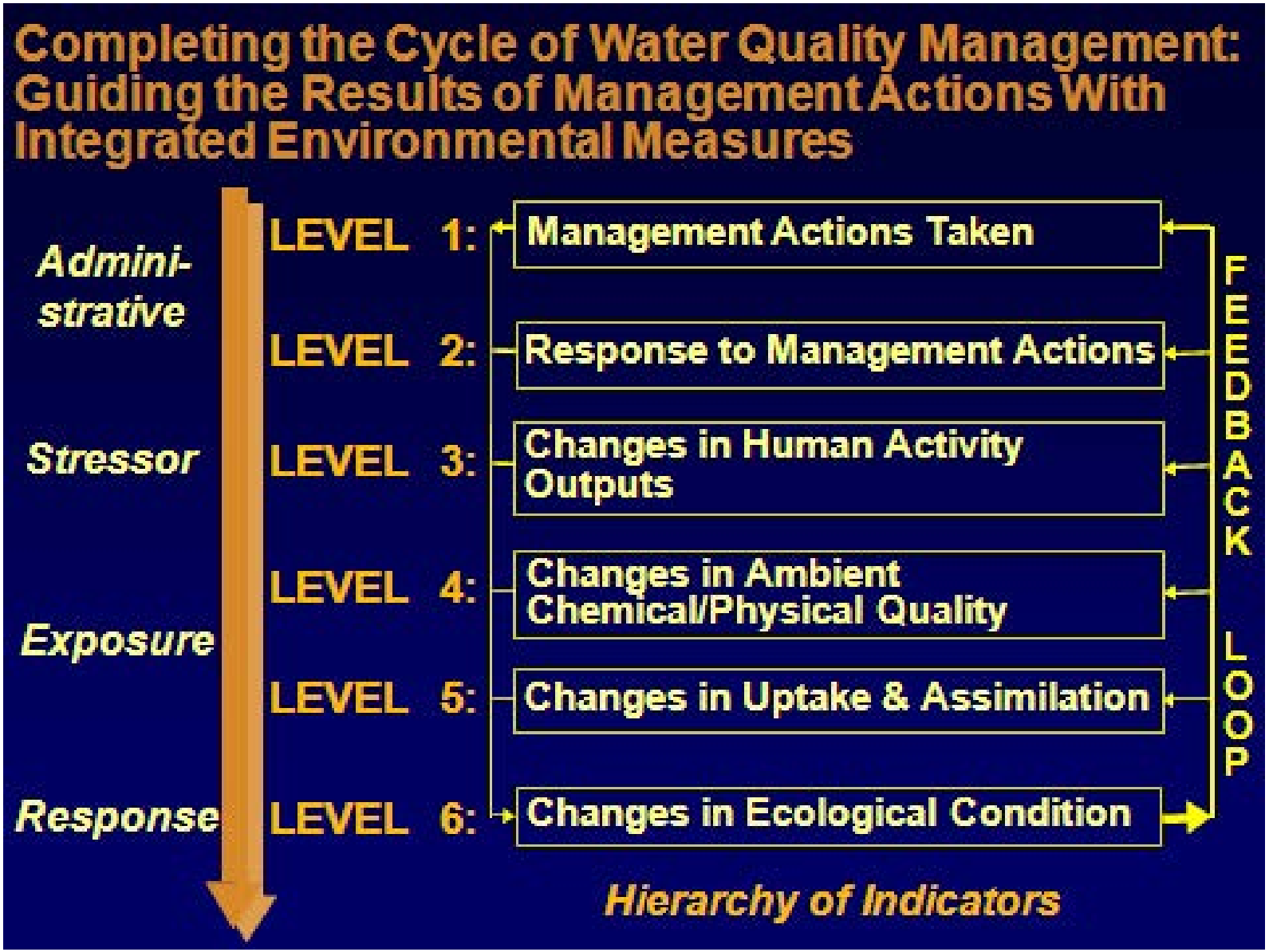
- Nutrients on the landscape
  - Manure & fertilizer application rates
  - Soil nutrient levels
- Nutrients in water column
  - Compare to regional reference conditions
- Nutrients exported from watershed

# Environmental Baselines (2)

- Changes in receiving water biology
  - Algae biomass
  - Chemical/physical responses to productivity
  - Community structure, number & diversity
- Diagnose nutrient problems with multiple lines of evidence
  - Ohio's draft nutrient standard

# Ohio's Draft Multi-metric Assessment

- $TIC = P_{chl\ a} + P_{DO} + B + N$
  - Where:
    - TIC = trophic index criterion.
    - $P_{chl\ a}$ = primary productivity as measured by chlorophyll a concentrations.
    - $P_{DO}$ = the impact of primary productivity as measured by dissolved oxygen concentrations and ranges.
    - B = the response of stream biology as measured by biological survey results.
    - N = the degree of enrichment as measured by TP and DIN concentrations.


Completing the Cycle of Water Quality Management: Guiding the Results of Management Actions With Integrated Environmental Measures
Admini-strative
Stressor
Exposure
Response
LEVEL 1:
Management Actions Taken
LEVEL 2:
Response to Management Actions
LEVEL 3:
Changes in Human Activity Outputs
LEVEL 4:
Changes in Ambient Chemical/Physical Quality
LEVEL 5:
Changes in Uptake & Assimilation
LEVEL 6:
Changes in Ecological Condition
FEEDBACK LOOP
Hierarchy of Indicators

# Why Baselines are Key in State Nutrient Strategies

- Establish a problem exists
- Convince decision makers
- Means to assess results of actions taken
  - Self correct, adaptive management
- Inform public and decision makers on progress

# Thank You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