

EPA Nutrient TMDL Workshop Quantitative Approaches for Linking Nutrient Concentrations to Response Indicators for TMDL Development

New Orleans, LA
February 15 – 17, 2011

Tim Wool
US EPA – Region 4



- Life of a TMDL Developer
 - Listing for Nutrients
 - Got Listed
 - What is the Standard ?
 - Total Nitrogen
 - Total Phosphorus
 - Chlorophyll a
 - Dissolved Oxygen
 - What do you mean a narrative criteria
 - Imbalance, huh?
 - Free From
 - I need a number!



40 years of protecting health and the environment
United States Environmental Protection Agency



- Is a TMDL Target the Same as WQS?
 - No, it is an interpretation of a narrative
 - Imbalance of flora and fauna
 - Free from . . .
 - May not consider all aquatic life use support
 - May not consider downstream protection
- TMDL is not a Standards Setting Action



Pro's

- Expert Solicitation
 - Local knowledge
 - Could be historical Condition
- Could build consensus with stakeholders for endpoints
- May bring key scientific information about the system

Con's

- Does not determine assimilative capacity
- May not consider all stressors
- May not consider all aquatic life use support
- May not consider downstream uses



Pro's

- Make use of large availability of data
 - Accounts for spatial variability
 - Represents range of nutrient conditions
- Can be easily done
 - Percentile Ranking

Con's

- Data availability
 - Certain regions
- Does not take into account local conditions
 - Light
 - Nutrient species
- Differentiate between endpoints
 - Chl a
 - Benthic Algae
 - Dissolved Oxygen



40 years of protecting health and the environment

United States Environmental Protection Agency



Pro's

- Relatively easy to do
- Uses stream conditions from surrounding area
 - Least Impacted
 - No anthropogenic sources
 - Not impaired
- Could take into account local conditions
 - Hydrology
 - Environmental

Con's

- Like waterbody might not be impaired
- May not consider all ALUS
- May not consider downstream uses
- Difficult to define reference stream
- Limited by data



40 years of protecting health and the environment

United States Environmental Protection Agency



Pro's

- Easily done
- Links stressors to response variables
- Uses site specific data for the waterbody

Con's

- May not account for all response variables
- Constrained by the data availability
- Confidence in the statistical fit
- Difficult to extrapolate to other conditions
- May not protect downstream



Pro's

- Linkage between stressors and response variables
 - Chlorophyll a (algae, benthic algae, macrophytes)
 - Light
 - Dissolved Oxygen
- Can extrapolate
 - Environmental Conditions
 - Current vs. WQS Condition
 - Response in Time
 - Duration and Frequency

Con's

- Time consuming
- Costly
- Can be misapplied



- TMDL Targets should in the future
 - Relate Stressors to Response Variables
Consider Aquatic Life Use Support (or most critical)
 - Consider Downstream Use
 - Should be Explained as a Concentration and/or load that would have an appropriate magnitude, frequency and duration of concentration that can be assessed to determine impairment