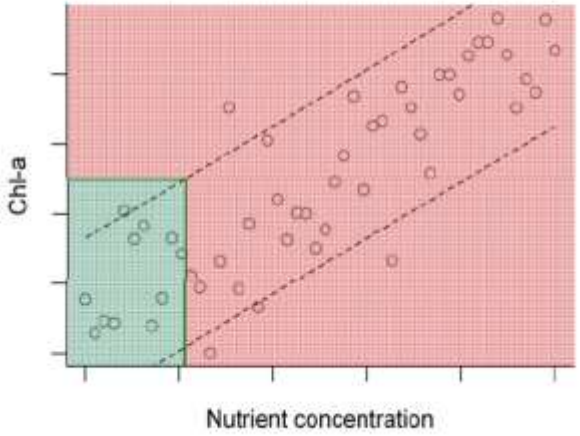
Summary of Region 5
Numeric Nutrient Criteria Workshop

Overview

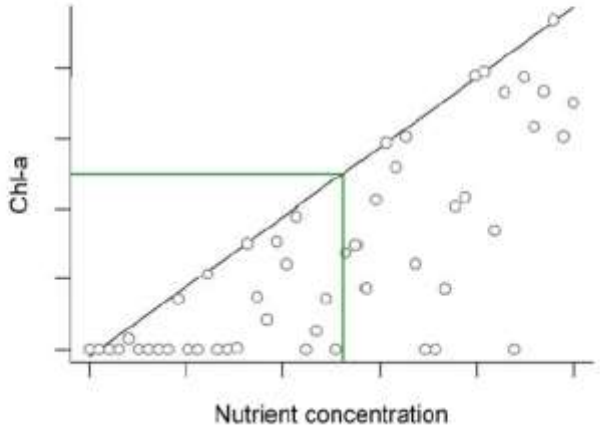
- USEPA's take on the combined criteria (bio-confirmation) approach
  - transparency in determining condition status based on approach
    - box models as decision trees
- The Michigan Example
  - the only really novel material presented at the meeting
  - an example of how we could regionally adjust criterion values
- Wisconsin NPS Performance Standards
  - an approach to dealing with the side of the load duration curve not addressed by the TIC
  - to take up when TAG moves on to implementation issues

EPA's View of Independent Application

Independent Application: A Graphical Depiction



A Less Idealized Example



EPA United States Environmental Protection Agency

Simple Matrix

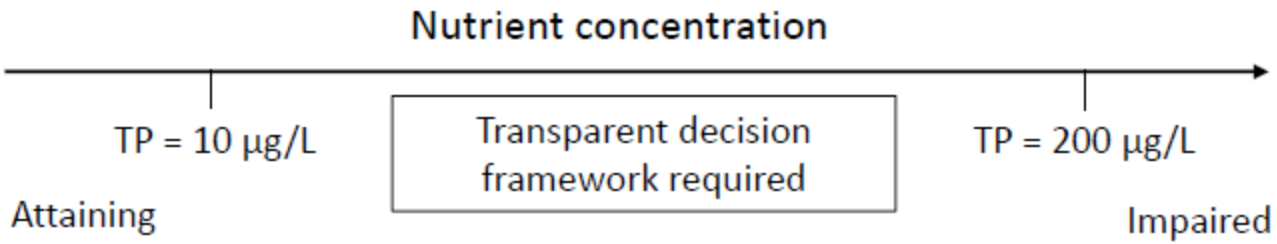
Considers a water "impaired" if causal AND any response parameter are exceeded.

	Nutrients ≤	Nutrients >
All response ≤	Not impaired	Not impaired*
Any response >	Impaired (cause not determined)	Impaired

*Site might be candidate for site-specific criteria.

Range Approach

If causal parameters are within range, response parameters are required to assess attainment.



	Nutrients < lower range	Nutrients in range	Nutrients > upper range
All response ≤	Not impaired for nutrients	Not impaired for nutrients	Impaired for nutrients
Any response >	Not impaired for nutrients*	Impaired for nutrients	Impaired for nutrients

*Site impaired for biological response condition, cause unknown.

The TIC Decomposed as a Box Model

Biology	Response (D.O. and Chlorophyll)	Nutrients	Outcome	Notes
Passing	Normal	Low or Elevated	Attaining	
		High *Low probability event	Evaluate potential for downstream impact	Interpretation within broader context of survey may explain result
Passing	Elevated	Attenuated	Attaining	Attenuation documented within survey
		Elevated or High	Evaluate potential for downstream impact; evaluate reasonable potential for projected increases in nutrient concentrations	Directs sampling priority if no data exist for downstream reaches
	High (D.O. range > 9 mg/l) *Low probability event	Low or High	Reasonable potential	Unique site-specific conditions or follow-up sampling may override RP
Marginal	Normal	Low or High	Other locally limiting factors, or evaluate for downstream impact	Directs sampling priority if no data for downstream reaches
	Elevated or High	Low or High	Threatened by over-enrichment	Reasonable potential exists
Failing	Normal	Low or High	Other limiting factors	Document cause of impairment
	Elevated	Low or High	Impaired by over-enrichment	Other limiting factors ruled out as proximate stressors, or not manageable
	High	Low or High	Impaired by over-enrichment	Unequivocal

TIC vs. Box Model

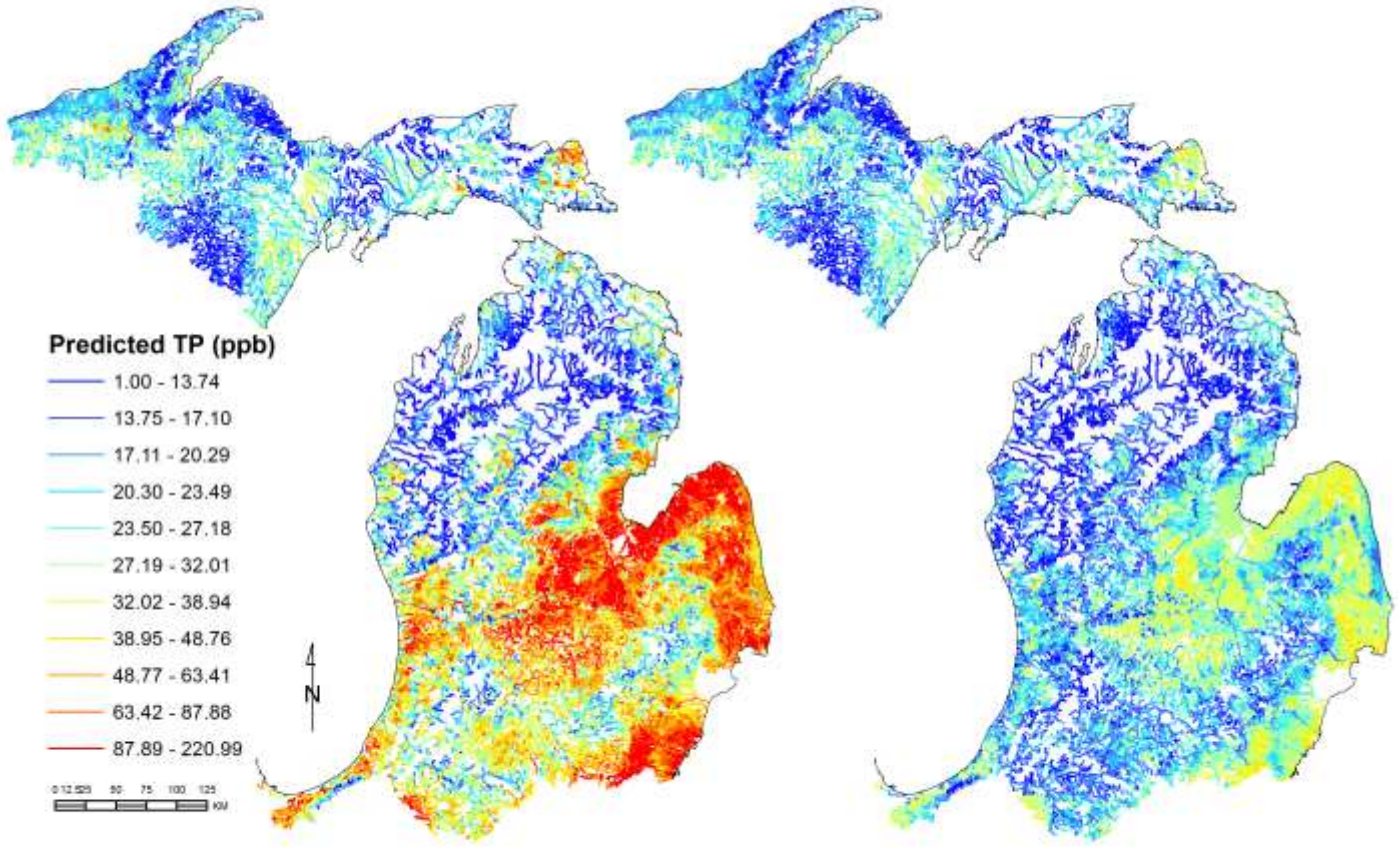
TIC

- Pros
  - Ordinal translation of enrichment continuum
  - Categorical levels of numeric scale easily translated into management options
- Cons
  - Blind application of a number
  - Less flexibility around categorical margins

Box Model

- Pros
  - Decision framework more structured
  - Ability to transparently specify off-ramps for marginal or ambiguous cases
- Cons
  - Not plug-n-chug
  - Less resolution against enrichment continuum

Statistical Models (BRTs) of N&P =f(Land Use, Sources, Natural Factors)



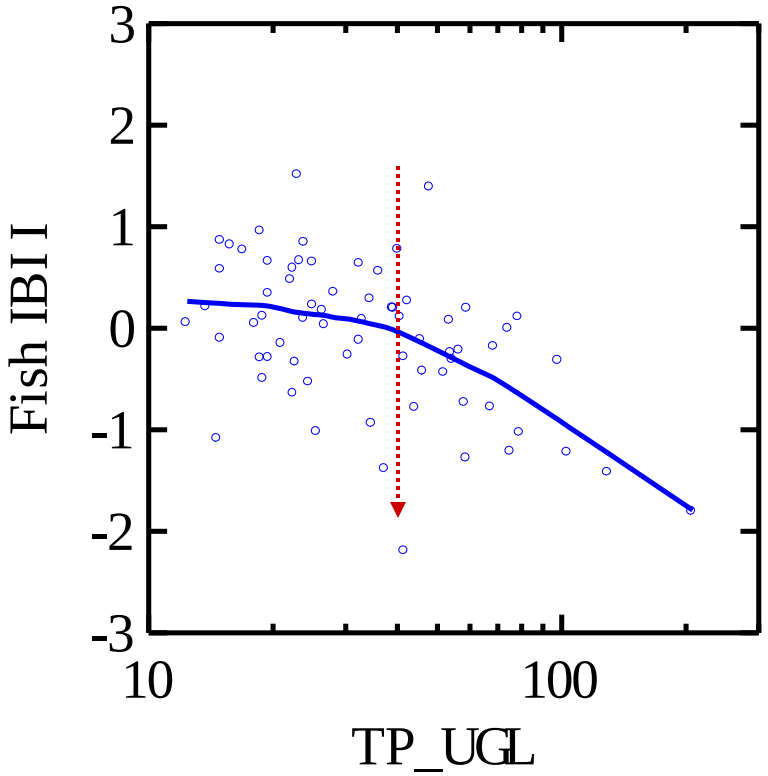
Existing Condition

Minimally Disturbed Condition

Esselman et al. (in prep)

BRT=Boosted Regression Trees

Biological Condition of Michigan Stream Fish Correlations with TP (MRI Data)



Wiley and Riseng, unpubl. data

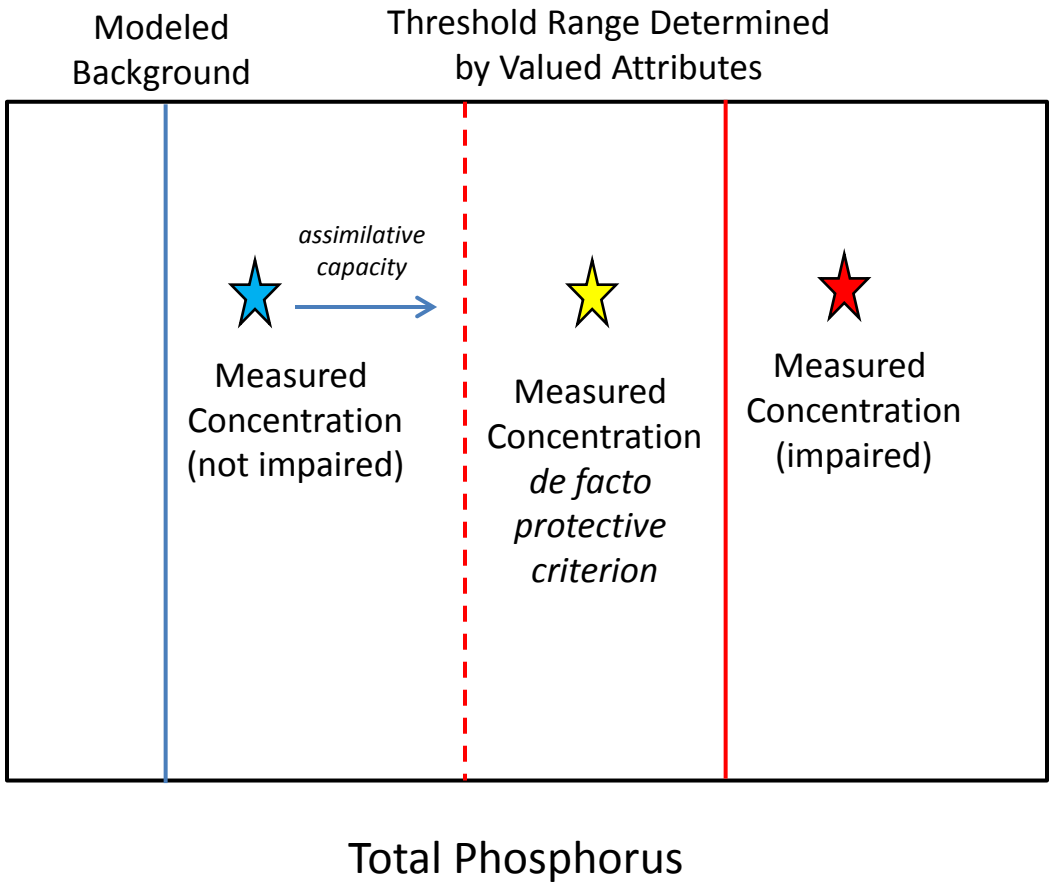
TP Benchmark Summary for MI Streams

(Less Sensitive Waters)

Database	Parameter	TP Thold
SAIN-MI	Diatoms escape grazing	40
MRI Data	All and native fish taxa decrease	40
MRI Data	ModTol Fish taxa decrease	40
MRI Data	Fish IBI I and II decrease	40
ILWIMI	Dissolve Oxygen decreases	40
STORET	Water Col Chl a increases	45
STORET	Invert EPT metrics and P51	>50
MRI Data	NM Cool/Warm Water Fish Taxa decre	60
MRI Data	Increasing loss of many fish	60
MRI Data	Minimum restoration Target for Fish	80

Michigan Approach to Numeric Criteria

(Miltner's Rendering, Don't Quote)



Wisconsin's Nonpoint Rule

2. Reducing nonpoint sources

- Nonpoint source performance standards codified in NR 151
  - Set back requirements, minimum soil loss and phosphorus index requirements, nutrient management plan requirements, manure management prohibitions, etc.
  - Typically County Land and Water Conservation Departments implement
- Cost-share must be provided to enforce performance standards
  - Trading and AM dollars can be used as cost-share