Nutrient TMDL Issues in Kentucky

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KY's Nutrient Limits

- Where eutrophication problems may exist, nitrogen, phosphorus, carbon, and contributing trace element discharges shall be limited in accordance with:
  - The scope of the problem;
  - The geography of the affected area; and
  - Relative contributions from existing and proposed sources

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Minimum Criteria

- Surface waters shall not be aesthetically or otherwise degraded by substances that:
  - (c)Produce objectionable color, odor, taste, or turbidity;
  - (e)Produce undesirable aquatic life or result in the dominance of nuisance species;

- Biologists must interpret the information

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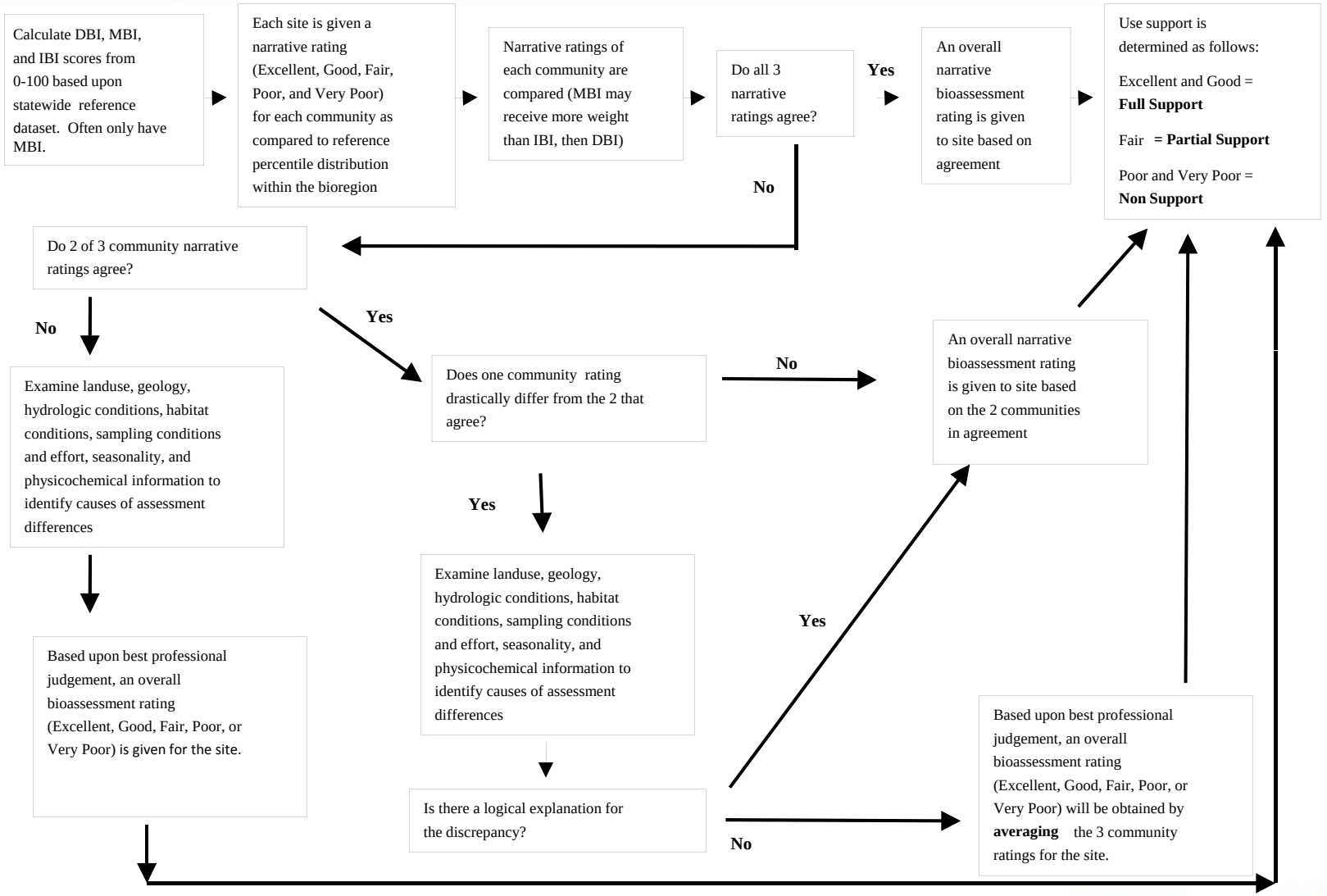
Aquatic Life Impairment



Note : For cautionary purposes, a site may not be given a formal bioassessment rating if it does not fall into a discrete category that may list it as impaired or not impaired. In this instance, a resample of the stream segment may be warranted. This also results in a Category "3" assessment.

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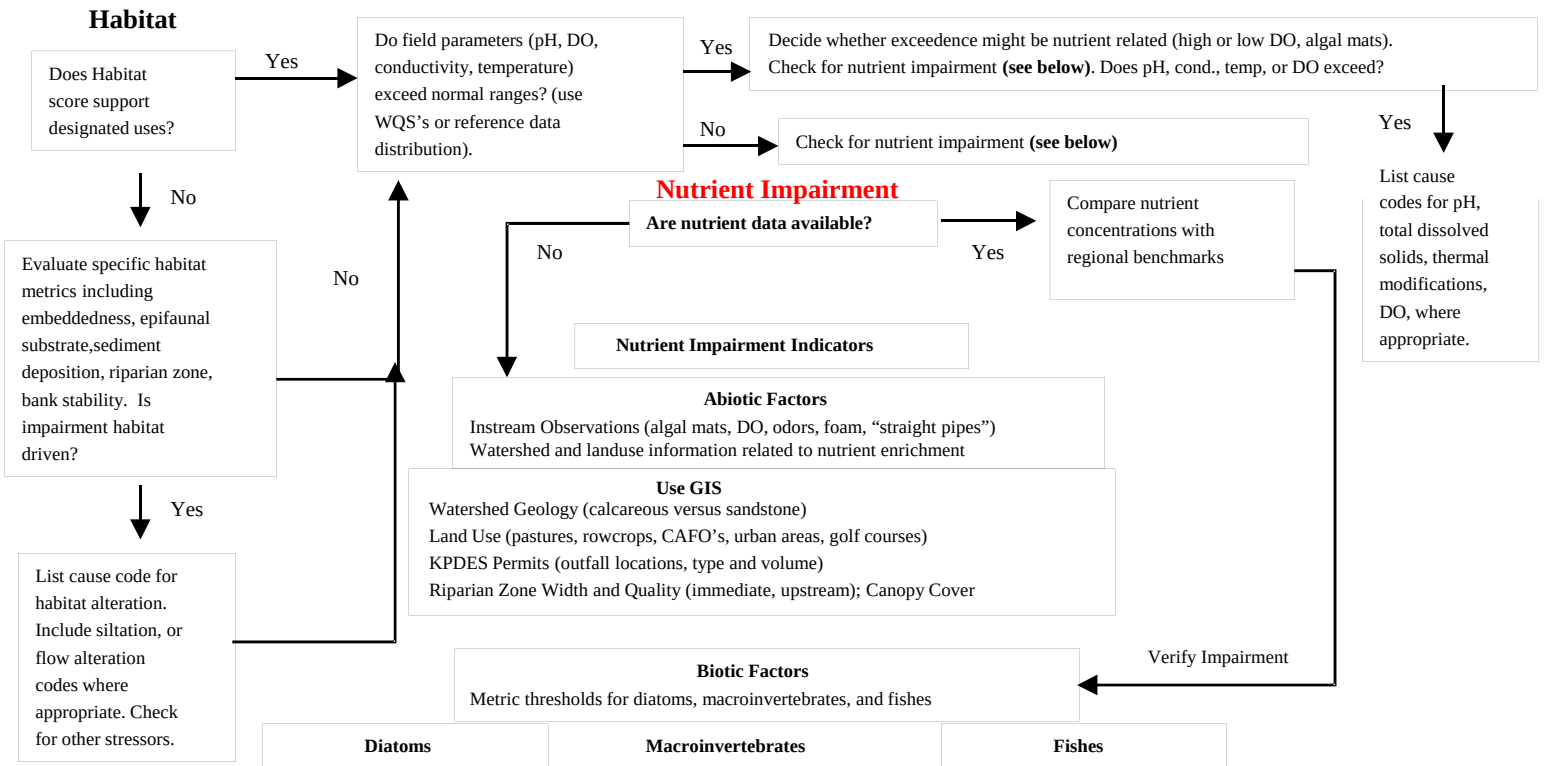
Nutrient Impairment



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303(d) Listings

- Un-ionized Ammonia (8)
- Nitrate/Nitrite (14)
- Nitrates (1)
- Total Nitrogen (13)
- Nutrient/Eutrophication Biological Indicators (335)
- Total Phosphorus (34)
- Total Kjeldahl Nitrogen (6)

- 17% of current listings

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Historic Nutrient TMDL Development

- 3 Approved TMDL documents for 4 segments and 1 lake (1997 and 2000)
- Wadeable Stream TMDLs
  - For low flow condition 7Q10=0, assumed LA=0.
  - Applied TP permit limit of 1 mg/L to get WLAs.

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Historic Nutrient TMDL Development

- Taylorsville Lake
  - CE-QUAL-W2 model (COE Report)
  - 2 major point sources provide 4-7.5% of loading
  - High background load (phosphatic limestone)
  - 76% of land use is Agricultural
  - 50% reduction in existing loadings (89-100% reduction in NPS loadings)
  - 10-14 point change in Trophic State Index during average and wet years, 15-25 point change during dry years (measured at headwaters of lake).

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Historic Nutrient TMDL Development

- Taylorsville Lake TMDL

	Existing Loads (lbs/day)	Allowable Loads-TMDL-(lbs/day)	WLA (lbs/day)	LA - Background-(lbs/day)	MOS (lbs/day)	LA - Nonpoint Sources-(lbs/day)	Existing NPS Load (lbs/day)	% NPS Reduction
Spring	1402	701	100	358	140	103	944	89.1
Summer	414	207	100	97	11	0	217	100
Fall	757	379	100	186	76	17	471	96.4
Winter	1850	1850	100	443		1307	1307	0

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Current Nutrient TMDL Development

- 34 under development; all by 3rd Party contractors
- 3 by EPA -one lake and one large watershed using BASINS/WASP
- 16 stalled pending KY nutrient targets -- HSPF/QUAL
- 15 using EPA national targets--HSPF
- Building in-house modeling capacity
- Load Duration Curves—WATERS?

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Challenges to Nutrient TMDL Development

- Upper management
- No numeric criteria
  - Guidelines under development for wadeable streams
    - Multiple Lines of Evidence
      - Stressor-response (macroinvertebrates and diatoms)
      - Reference stream nutrient ranges (75^{th}/90^{th} percentile)
      - Passing MBI sites nutrient ranges (75^{th} percentile)
      - Literature values for effects or trophic status

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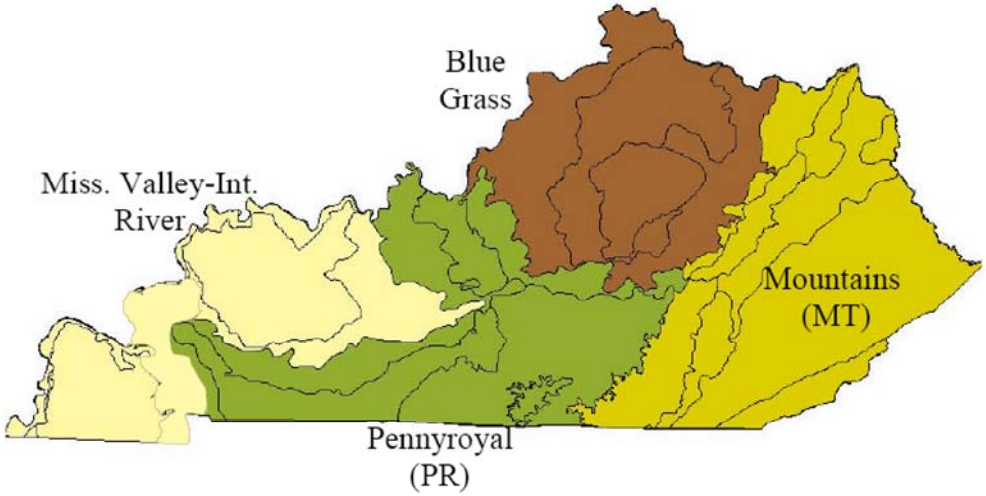
Challenges to Nutrient TMDL Development

Bioregions of KY



Draft Guidelines:
Bluegrass = .10 mg/l TP, 1.2 mg/l TN
Pennyroyal= .05 mg/l TP, 1.4 mg/l TN
Mountain= .025 mg/l TP, 0.65 mg/l TN
Miss Valley-Interior River Lowland= 0.07 mg/l TP, 1.4 mg/l TN

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Challenges to Nutrient TMDL Development

- Watershed complexity
  - Urban landscape,
  - point sources,
  - CSOs, SSOs, straight pipes, leaking sewer lines
  - karst flow

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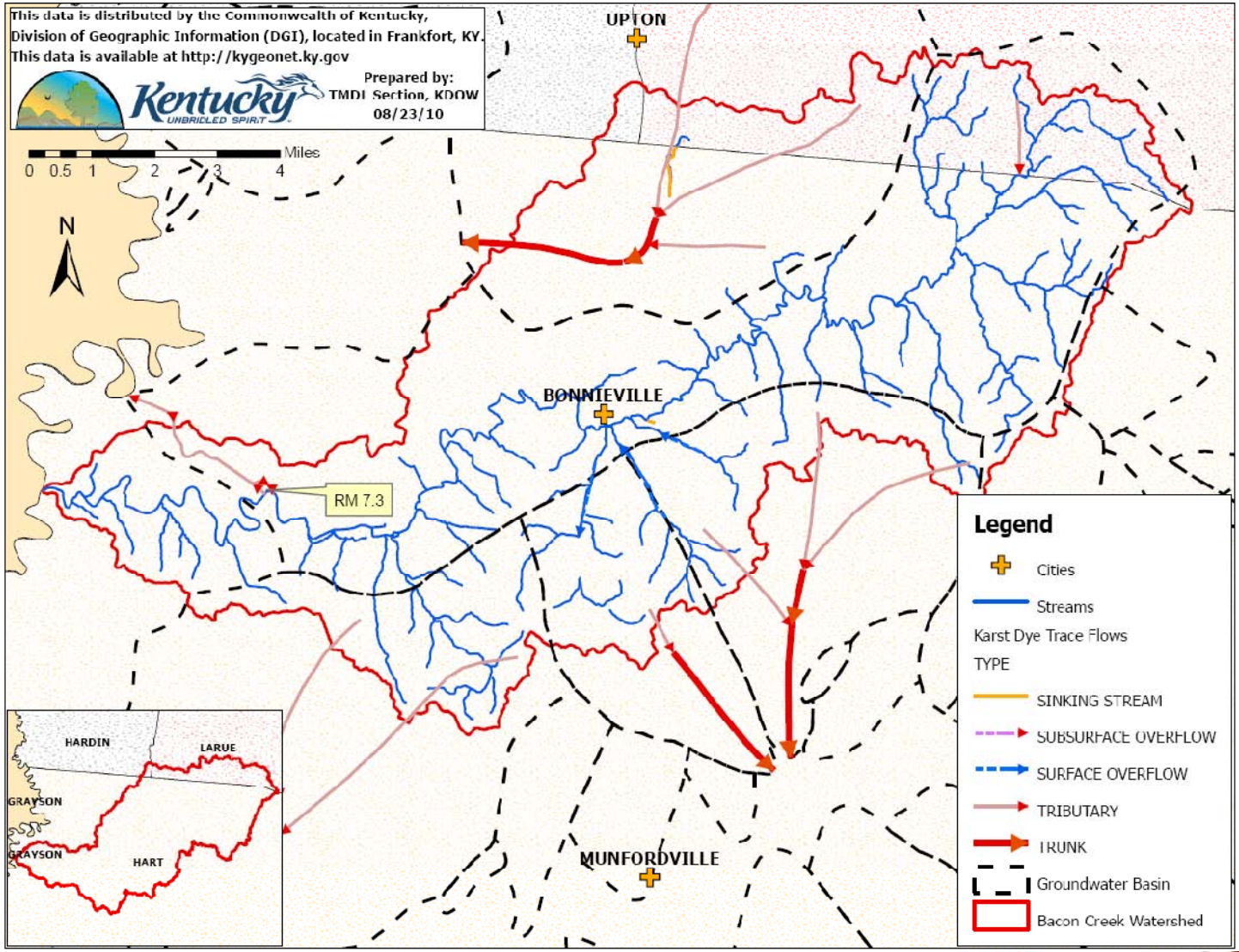
Example of Karst Flows



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Challenges to Nutrient TMDL Development

- Lack of flow gages
- Data gaps
  - Event mean concentrations
    - No storm event monitoring
  - Boundary conditions
  - Magnitude, frequency, duration and concentration for CSO & SSO events

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Challenges to Nutrient TMDL Implementation

- Undetermined NPS loadings for specific entities
  - Stakeholders claim it's not them
- Limited enforcement of the KY Agriculture Water Quality Act
- Cost associated with BMPS or facility upgrades

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Looking to the Future

- Nutrient Reduction Strategy under development
  - Identify nutrient reduction efforts in Agriculture
    - 10 years post Ag Water Quality Act implementation
  - Provide Incentives for Nutrient Reductions
  - Establish Riparian Buffer Zones
  - Monitor for nutrients in major rivers at state borders
    - Identify amount entering from other states and amount leaving KY

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Looking to the Future

- Use draft guidelines
  - As mechanism for stakeholder development
  - To prepare regulated community for eventual numeric criteria
  - As motivation for voluntary reductions
  - To set KPDES permit limits in negotiated settlements from enforcement actions
  - To establish TMDLs??

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