Tennessee’s Water Quality Standards
Narrative Nutrient Criteria

- Rule 0400-03-.03(3)(k) Nutrients
- The waters shall not contain nutrients in concentrations that stimulate aquatic plant and/or algae growth to the extent that aquatic habitat is substantially reduced and/or the biological integrity fails to meet regional goals.
- Additionally, the quality of downstream waters shall not be detrimentally affected.
Tennessee’s Ecoregions
Tennessee’s Water Quality Standards
Narrative Nutrient Criteria

- Rule 0400-03-.03(3)(k) Nutrients
  - The waters shall not contain nutrients in concentrations that *stimulate aquatic plant and/or algae growth* to the extent that aquatic habitat is substantially reduced and/or the *biological integrity* fails to meet regional goals.
  - Additionally, the quality of downstream waters shall not be detrimentally affected.
Do nutrients stimulate aquatic plant and/or algae growth?
Tennessee Diatom Index (TDI)

- % Abundance of Sensitive Taxa ↓*
- % Taxa indicating Low Total Nitrogen ↓*
- % Taxa requiring 50% O₂ Saturation ↑*
- % Taxa tolerant to Land Disturbance ↑*
- % Navicula taxa (motile genus tolerant of fine sediment) ↑*
- % Taxa tolerant of High Phosphorus ↑*
- % Centric lentic taxa tolerant of nutrients ↑*
- % Abundance of highly Tolerant Taxa ↑*

*Response to Stress ↑ or ↓
Tennessee Diatom Index Target by Ecoregion

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<thead>
<tr>
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<td>67g, 71i, 74b</td>
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<td>71eh</td>
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Tennessee’s Water Quality Standards
Narrative Nutrient Criteria

• Rule 0400-03-.03(3)(k) Nutrients

• The waters shall not contain nutrients in concentrations that stimulate aquatic plant and/or algae growth to the extent that aquatic habitat is substantially reduced and/or the biological integrity fails to meet regional goals.

• Additionally, the quality of downstream waters shall not be detrimentally affected.
Does Biological Integrity Fail to Meet Regional Goals?

Semi-Quantitative Single Habitat Macroinvertebrate (SQSH)

Riffle Kick

Bank
Macroinvertebrate Bioregions
SQSH Metrics

TN Macroinvertebrate Index (TMI)

- Taxa Richness
- EPT Richness
- % EPT – Cheumatopsycha
- % Oligochaetes & Chironomidae
- NCBI modified North Carolina Biotic Index
- % Clingers – Cheumatopsycha
- % TN Nutrient Tolerant Organisms

Cheumatopsycha
TN Nutrient Tolerant Organisms

Cheumatopsyche

Stenelmis

Caenis

Isopoda

Gastropoda

Polypedilum

Cricotopus & Cricotopus/Orthocladius

Oligochaeta
Tennessee’s Nutrient Criteria continued

• Examples of **parameters** associated with criterion include but are not limited to:
  – Nitrogen
  – Phosphorus
  – Potassium
  – Calcium
  – Magnesium

• And various forms of each
Tennessee’s Nutrient Criteria continued

- Interpretation of this provision may be made using the document Development of Regionally-based Interpretations of Tennessee’s Narrative Criterion and/or other scientifically defensible method.
Regionally-based Interpretations of Tennessee’s Narrative Criterion (Guidance)

Nitrate + Nitrite nutrient regions

- 73a = 0.34
- 74a = 0.22
- 74b = 1.10
- 65a, 65b, 65e, & 65i = 0.34
- 65j = 0.22
- 71e = 3.48
- 71f = 0.38
- 71g, 71h & 71i = 0.94
- 68a = 0.23
- 68b = 0.45
- 68c = 0.31
- 69d = 0.27
- 67f, 67g, 67h & 67i = 1.22
- 66d = 0.48
- 66e, 66f & 66g = 0.30
Regionally-based Interpretations of Tennessee’s Narrative Criterion (Guidance)

Total Phosphorus nutrient regions

Legend:
- 73a = 0.25
- 74a = 0.12
- 74b = 0.11
- 65a, 65b, 65e & 65i = 0.04
- 66j = 0.04
- 71e, 71f, & 71g = 0.05
- 71h = 0.10
- 71i = 0.22
- 68a & 68c = 0.03
- 68b = 0.07
- 69d = 0.02
- 67f, 67h, & 67i = 0.04
- 67g = 0.09
- 66d, 66e, & 66g = 0.01
- 66f = 0.03
Monitoring for Nutrients

SQSH

Diatoms

Field Parameters: DO, pH, Temp. & Conductivity

Nutrients: NO$_3$+NO$_2$, TP, NH$_3$, TKN
Monitoring Workplans Nutrient Sampling

Number of Stations

- SQSH
- Diatoms
- Quarterly Nutrients
- Monthly Nutrients

FY 23-24
## Assessment Summary

### Biology Results

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<th>Waterbody ID: T06S020001124_0101</th>
<th>Name: Dobbs Branch</th>
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**Index BR**

Sediment Dep.: 8
Flow Status: 2
Bank Stab LDB: 3
Bank Stab RDB: 3
Sediment Dep.: 3

**Comments**

-10% of the site was in poor condition: Planpet Mud, Silt

### Field Observation

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<th>High disturb</th>
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- 10% of the site was in poor condition: Planpet Mud, Silt

### Field Parameters/Bacteriological/Nutrient Results

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<th>DO</th>
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</table>

- 10% of the site was in poor condition: Planpet Mud, Silt

---

**DOBB5000.3HM 9/13-20/2019 DO mg/L**

- [Graph showing DO levels over time]
**Data Used to Assess Nutrient Impairment**

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<tr>
<th>Method</th>
<th>Org</th>
<th>Sampler</th>
<th>SOP</th>
<th>TR-BR</th>
<th>EPT-BT</th>
<th>Intol-BR</th>
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## Waterbody Assessment Report

### Waterbody Information
- **AU ID**: TN060200011244, 0100
- **Cycle Year**: 2024
- **AU Name**: Dobbs Branch
- **Cycle Last Assessed**: 2024
- **River Name**: Dobbs Branch from Chattanooga Creek to headwaters, Ecoregion 67 Hamilton County
- **Federal Water Use Category**: 5

### Designated Use Support Information

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<tr>
<th>Use Name</th>
<th>Use Support</th>
<th>Threatened</th>
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<td>Livestock Watering and Wildlife</td>
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<td>Recreation</td>
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### Impairment Information

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<th>Associated Actions</th>
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<td>ESCHERICHIA COLI (E. COLI)</td>
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### Listing History
- **WATERBODY**: Chattanooga Creek from Nickajack Reservoir to Georgia state line.

**ASSESSMENT**: 2015 TDEC benthic station at mile 0.3 (just above mouth). Zero EPT families, zero intolerant, 5 total families. Biorecon score = 3. Habitat score = 101. Conductivity elevated (502).

2014-2015 TDEC chemical station at mile 0.3 (just above mouth). Two low DOCs (4.89 & 4.93 mg/L). Four out of 11 E. coli observations over 941 cfu. Elevated ammonia (but not criteria violations). Elevated conductivities: NO2=NO3, TKN, and some total phosphorus.

2009-2010 TDEC chemical station at mile 0.3 (just above mouth). Two low DOs (3.78 & 4.4 mg/L). Three out of 9 E. coli observations over 941 cfu. July-August 2009 geo mean of 5 E. coli observations = 250.3 cfu. Elevated ammonia, NO2=NO3, and total phosphorus.

2005-06 City of Chattanooga pathogen monitoring at mile 0.8 (u/s mouth). Seven out of 17 E. coli observations over 941 cfu.
Questions?

Kim Laster
TDEC | DWR | Watershed Planning Unit
Kim.Laster@tn.gov  615.770.1805