A Review of the Water Quality in Beaver Lake Watershed
What is the 303(d) list?

- List of waters currently **not**
  - Supporting a designated use or
  - Attaining water quality standards or criteria

- ADEQ must compile a 303(d) list every 2 years and submit the list to EPA for approval
Designated Uses and Water Quality Standards

Section 303(c) of the Clean Water Act:

- Requires states to adopt water uses (Designated Uses) consistent with the Clean Water Act
  - Designated uses are those uses specified in water quality standards for each waterbody whether or not they are being attained
  - Existing uses are those uses actually attained in a waterbody on or after November 28, 1975, whether or not they are included in the water quality standards
- Requires states to establish water quality standards to protect the designated uses of each waterbody
Designated Uses

- Extraordinary Resource Waters (ERW)
- Ecologically Sensitive Waterways (ESW)
- Natural and Scenic Waterways
- Fisheries (Aquatic Life)
- Primary Contact Recreation (swimming)
- Secondary Contact Recreation (wading)
- Drinking Water
- Agriculture and Industrial Water Supply
DESIGNATED USES: OZARK HIGHLANDS ECOREGION
(Plates OH-1, OH-2, OH-3, OH-4)

**Extraordinary Resource Waters**
Current River (OH-4)
Eleven Point River (OH-4)
Strawberry River (OH-3, OH-4)
Spring River, including its tributaries: Field Creek, Big Creek, English Creek, Gut Creek and Myatt Creek (OH-4)
South Fork Spring River (OH-3, OH-4)
North Sylamore Creek (OH-3)
Buffalo River (OH-2, OH-3)
Kings River (OH-2)
Bull Shoals Reservoir (OH-2, OH-3)

**Natural and Scenic Waterways**
Strawberry River from headwaters to Sharp-IZard County Line (OH-3, OH-4)
Kings River - that segment in Madison County (OH-2)
Buffalo River (OH-2, OH-3)
North Sylamore Creek (OH-3)*

**Ecologically Sensitive Waterbodies**
Numerous springs and spring-fed tributaries which support southern cavefish, Ozark cavefish, Arkansas darter, least darter, Oklahoma salamander, cave snails, cave crunfish and unique invertebrates (OH-1, OH-2, OH-3)
Strawberry River - location of Strawberry River darter (OH-3, OH-4)
Spring River - snufbox and pink mucket mussels; Ozark hellbender (OH-4)
Eleven Point River - location of Ozark hellbender (OH-4)
Current River - location of flat floater and pink mucket mussels (OH-4)
Illinois River - Neosho mucket (OH-1)

**Primary Contact Recreation** - all streams with watersheds of greater than 10 mi² and all lakes/reservoirs

**Secondary Contact Recreation** - all waters

**Domestic, Industrial and Agricultural Water Supply** - all waters

**Fisheries**
- **Trout**
  - Bull Shoals Reservoir - lower portion (OH-2)
  - White River from Bull Shoals Dam to Dam #3 (OH-3)
  - North Fork White River (OH-3)
  - Spring River from Mammoth Springs to South Fork Spring River (OH-4)
  - Upper White River from Beaver Dam to State Line (OH-1)

**Lakes and Reservoirs - all**

**Streams**
- Seasonal Ozark Highlands fishery - all streams with watersheds of less than 10 mi² except as otherwise provided in Reg. 2.505
- Perennial Ozark Highlands fishery - all streams with watersheds of 10 mi² and larger and those waters where discharges equal or exceed 1 CFS

* As designated in the National Wild and Scenic Rivers System
### Use Variations Supported by UAA or Other Investigations
- Railroad Hollow Creek: no fishable/swimmable uses (OH-1, #1)
- Columbia Hollow Creek: seasonal fishery March-June (OH-1, #2)
- Curia Creek: below first waterfall, perennial fishery (OH-4, #3)
- Moccasin Creek: below Highway 177, perennial fishery (OH-3, #4)
- Stennitt Creek: from Brushy Creek to Spring River, no domestic water supply use (OH-4)

### SPECIFIC STANDARDS: OZARK HIGHLANDS ECOREGION
(Plates OH-1, OH-2, OH-3, OH-4)

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<tr>
<th></th>
<th>Streams</th>
<th>Lakes and Reservoirs</th>
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<tr>
<td>Temperature °C (°F)*</td>
<td>29 (84.2)</td>
<td>32 (89.6)</td>
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<td>Trout waters</td>
<td>20 (68)</td>
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<tr>
<td>Turbidity (NTU) (base/all)</td>
<td>10/17</td>
<td>25/45</td>
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<tr>
<td>Minerals</td>
<td>see Reg. 2.511</td>
<td>see Reg. 2.511</td>
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<tr>
<td>Dissolved Oxygen**</td>
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<td>see Reg. 2.505</td>
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<td></td>
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<td>&gt;100 mi² watershed</td>
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<tr>
<td>Trout waters</td>
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All other standards (same as statewide)

### Variations Supported by UAA
- Railroad Hollow Creek: from headwaters to Spavinaw Creek - year-round dissolved oxygen - 2 mg/l (OH-1, #1)
- Curia Creek: below first waterfall, critical season D.O. 6 mg/l (OH-4, #3)
- Moccasin Creek: below Highway 177, critical season D.O. 5mg/l (OH-3, #4)
- SWEPCO Reservoir: maximum temperature 54°C (limitation of 2.8°C above natural temperature does not apply) (OH-1, #5)
- Stennitt Creek: from Brushy Creek to Spring River, TDS = 456 mg/l (OH-4, #6)
Water Quality Standards

- Numeric Standards

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<th>Substance</th>
<th>Criteria (ng/l)*</th>
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<td>Chlordane</td>
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<td>PCBs (polychlorinated biphenyls)</td>
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- Narrative Standards

Reg. 2.509 Nutrients

Materials stimulating algal growth shall not be present in concentrations sufficient to cause objectionable algal densities or other nuisance aquatic vegetation or otherwise impair any designated use of the waterbody. Impairment of a waterbody from excess nutrients are dependent
List Development

1. Collect data from stream segments, assemble and evaluate all existing and readily available water quality data.
2. Assess data based upon Regulation No. 2 and the “Assessment Methodology”
   a. Regulation No. 2 provides the value
   b. Assessment Methodology provides the procedure
3. Make a “Support” or “Non-Support” determination
4. Compile 303(d) List
5. Public Notice
6. Submit to EPA on or before April 1 every other year
Water Quality Monitoring Network

**Ambient Surface Water Network**
- Approximately 150 stations
- Chemical parameters & flow
- Sampled monthly
- ~25-30 years of data

**Roving Surface Water Network**
- Approximately 200 stations
- Waters with limited or no WQ data
- Sampled every other month for 2 years, then move on

**Special Projects**
Watershed Monitoring Network

Macroinvertebrate Community

Watershed Based
20 – 30 sites
Statewide
100+ sample/year

Fish Community

Watershed Based
10 – 20 sites
Statewide
30+ sample/year
Assessments

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<th>Parameter</th>
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<td>(&gt;10%)</td>
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<tr>
<td>DO</td>
<td>(&lt;5) samples or (&lt;10%)</td>
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<td>pH</td>
<td>(&lt;10%)</td>
<td>(&gt;10%)</td>
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<tr>
<td>Turbidity</td>
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<td>(&gt;25%)</td>
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**Example:** 60 Temperature measurements were taken at a station representing a particular stream segment during the period of record.

If 6 samples exceed the criteria, **SUPPORT**

If 7 samples exceed the criteria, **NON-SUPPORT**
Assessments

6.9 Nutrients

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<th>Lake</th>
<th>Chlorophyll a (µg/L)**</th>
<th>Secchi Transparency (m)***</th>
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<td>1.1</td>
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*These standards are for measurement at the Hickory Creek site over the old thalweg, below the confluence of War Eagle Creek and the White River in Beaver Lake.

**Growing season geometric mean (May-October)

***Annual Average
Assessments

LISTING METHODOLOGY FOR BEAVER LAKE:
The upper portion of Beaver Lake will be listed as non-support of its drinking water designated use when there are three or more (≥3) exceedances of the chlorophyll $a$ criteria within the five-year period of record. Samples collected 1.0 meter below the surface of the water will be used to make lake and reservoir attainment decisions.

The upper portion of Beaver Lake will be listed as non-support of its drinking water designated use when there are three or more (≥3) exceedances of the secchi transparency criteria within the five-year period of record.

DELISTING METHODOLOGY FOR BEAVER LAKE:
The upper portion of Beaver Lake will be listed as supporting its drinking water designated use when there are no more than two (2) exceedances of the chlorophyll $a$ criteria and no more than two (2) exceedances of the secchi transparency criteria within the five-year period of record. Samples collected 1.0 meter below the surface of the water will be used to make lake and reservoir attainment decisions for chlorophyll $a$. 
305(b) Report Listing Format

Five Categories of Waters:
1. All designated Uses and water quality standards are met
   1B: TMDL has been completed, but now meeting
2. Some uses and standards met, insufficient data to assess other uses
3. Insufficient data to assess any uses
4. Water impaired, does not require a TMDL:
   4A: a TMDL has already been completed
   4B: other pollution control requirements will result in WQ standards attainment
   4C: impairment is not caused by a pollutant
305(b) Report Listing Format

Five Categories of Waters:

5. Waters not meeting WQ standards (303(d) List)

High
- Truly impaired, TMDL needed

Medium
- Adoption of new regulations or standards
- Questionable data
- Data verification needed
- Impairment caused by a point source

Low
- Impairment is naturally occurring
- ADEQ did not support the listing (EPA added)
So, how’s the water quality?
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<th>H.U.C.</th>
<th>RCH MILES</th>
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TOTAL MILES: 488.8
MILES UNASSESSED: 10.7
MILES EVALUATED: 138.7
MILES MONITORED: 339.4
De-Listing of Waters

- Develop a TMDL
- Implement control strategies (other than a TMDL)
- Updated assessments indicate no known impairments
- Improved delineation of impaired waterbodies
- Improved water quality standards and assessment methodologies
Status of Current TMDLs

- **West Fork White River (turbidity)**
  - BWA and AWRC submitted data to ADEQ for 2016 cycle
  - Under review

- **Town Branch-Holman Creek (nitrate)**
  - No Change
Other Water Quality Activities

• Use Attainability Analyses and Third Party Rulemakings
  • White River (City of Fayetteville)
    • Proposed SSC for Chloride, Sulfate, and TDS
  • Town Branch/Holman Creek/War Eagle Creek (City of Huntsville)
    • Proposed SSC for Chloride, Sulfate, and TDS
Other Water Quality Activities

- Act 335 of 2015
  - Nutrient Trading Advisory Panel

- ADEQ developing nutrient criteria for ERWs
Questions

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wentz@adeq.state.ar.us