303(d) LIST AND AGRICULTURE

Office of Water

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ADEQ

ARKANSAS

Department of Environmental Quality

Presentation Outline

1) CWA Reporting Requirements
2) Designated Uses/Criteria
3) Monitoring Networks/Parameters
4) Assessments
5) Agriculture related causes for impairment
6) TMDL's and alternatives

Section 303(c) of the Clean Water Act

- States are required to adopt water uses (Designated Uses) consistent with the Clean Water Act
- States are required to establish water quality standards for waterbodies
- Water quality standards define the goals for waterbodies in the state by designating uses for each waterbody and setting criteria necessary to protect the uses

Assessed Designated Uses Include

- Fisheries (Aquatic Life)
- Primary Contact Recreation (Swimming)
- Secondary Contact Recreation (Wading)
- Domestic Water Supply (Drinking Water)
- Agriculture and Industrial Water Supply

❖ Fish Consumption - not a designated use

Based on the designated uses, water quality criteria are established for each waterbody

Water Quality Criteria

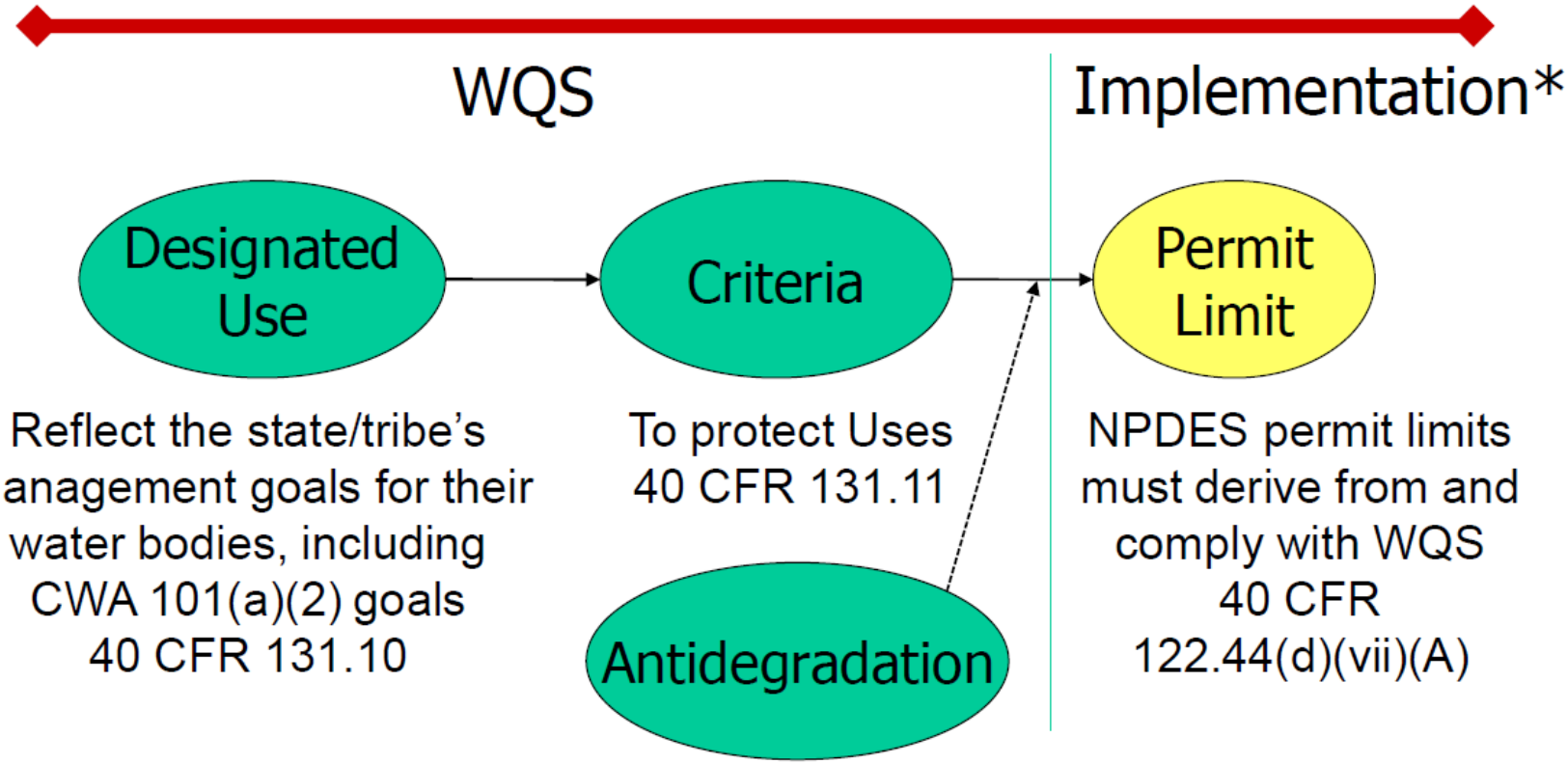
- Numerical criteria, Regulation 2.504 for pH:

  pH values for water in streams/lakes shall not be below 6.0 or above 9.0

- Narrative criteria, Regulation 2.509 for nutrients:

  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…'

Water Quality Standards Schematic



** NPDES is just one example of implementation*

Clean Water Act Reporting Requirements

Water Quality Monitoring Report

Required by Section 305(b)

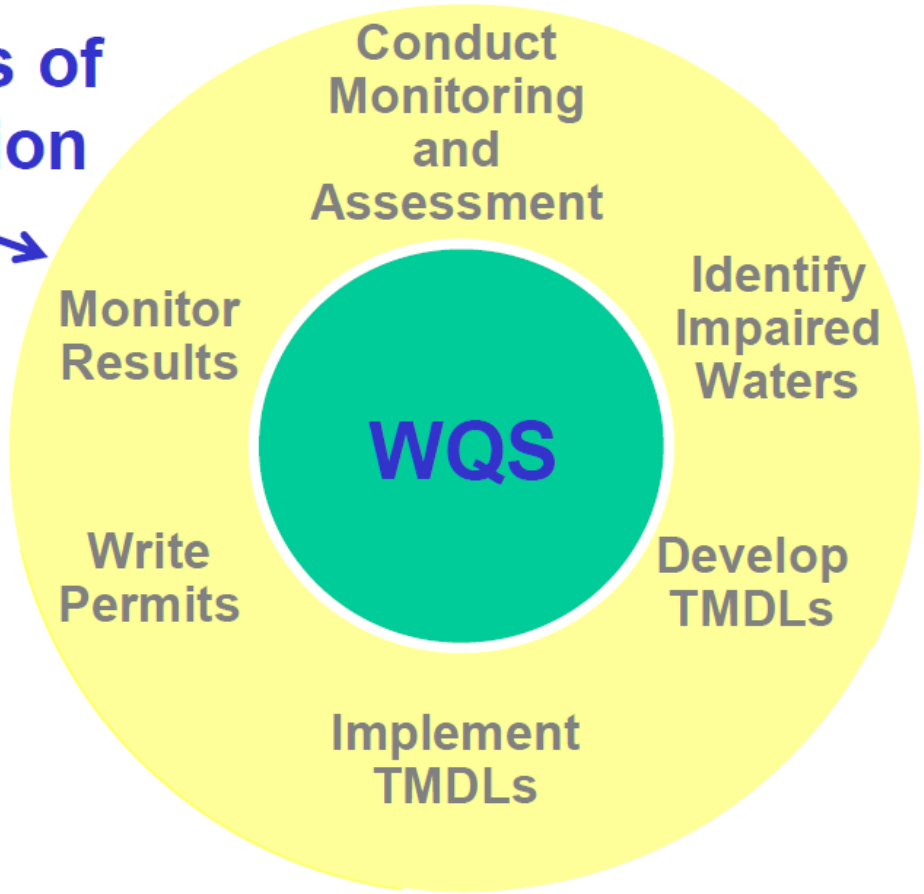
- Assessment of Rivers and Streams
- Assessment of Lakes and Reservoirs
- Assessment of Ground Waters
- Report on the water quality condition
- List of waterbodies not meeting water quality standards or designated uses (303(d) List)

What is the 303(d) List?

- List of waterbodies currently not
  - Supporting designated uses ***or***
  - Attaining water quality standards
- ADEQ must submit a 303(d) list every 2 years
- For listed waters, ADEQ must, with EPA concurrence, develop water quality improvement strategies to reduce the input of the specific pollutant(s) that are restricting the waterbody use(s) in order to restore and protect the use(s).
  - TMDLs, Watershed Restoration Plans, NPDES Permit Limits, additional monitoring

Water Quality Based Approach

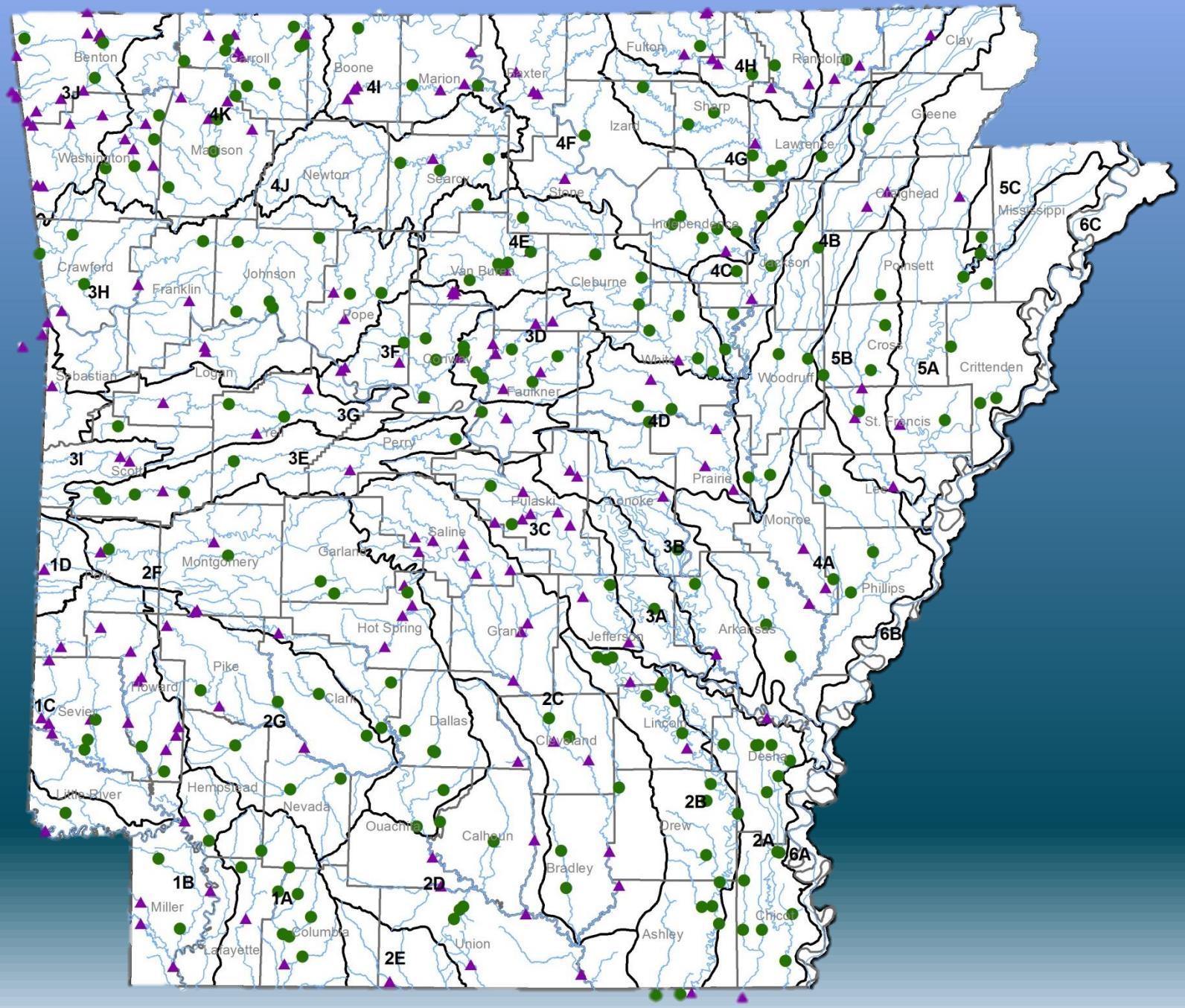
Many aspects of implementation



Inventory of Quality of All Waters of the State

Four Water Quality Monitoring Networks

- Ambient Water Quality Monitoring Network
- Special Studies
- Lakes Water Quality Monitoring Network
- Groundwater Quality Monitoring Network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Water Quality Monitoring Network
CHEMICAL ANALYSES

- Routine Analyses
  - Conventional parameters (pH, D.O., Temp.)
  - Minerals (Cl, SO_4, TDS)
  - Nutrients (forms of N and P)
  - Heavy metals (Cu, Zn, Pb, etc.)
  - Other associated ions (Na, Ca, K, etc.)
- Periodic Analyses
  - Standard Pesticide Scan (approx. 40 compounds)
  - Specialized chemical compounds

Water Quality Monitoring Network

WATERSHED MONITORING NETWORK

Macroinvertebrate Community

Watershed Based: 20 – 30 sites
Statewide: 100+ samples/year
Plus Routine Water Quality Analyses & Flow

Fish Community

Watershed Based: 10 – 20 sites
Statewide: 30+ samples/year
Plus Routine Water Quality Analyses & Flow

Water Quality Monitoring Network

LAKES AND RESERVOIRS

- 15 lakes sampled quarterly since 2011
- Other lakes sampled regularly in order to:
  - Identify potential reference Lakes
  - Verify reference conditions
  - Collect adequate quantity of data
  - Develop improved water quality standards for lakes

Outside Data Utilized

- 24 Entities
  - (Government, Academic, Private)
- Government
  - AG&FC, ANRC, BWD, ADH
  - EPA, USGS, SWP, NPS
  - Cherokee Nation, Mississippi DEQ, Missouri DNR, Missouri DC
- Academia
  - ASU, ATU, UCA, UALR, UAPB, AWRC
- Private
  - Equilibrium, GBM^{c}, FTN, CH2M Hill, AquaTerra
  - Northbrook Power Management

Assessment Criteria

5-year period of record 4/1/2010 – 3/31/2015
Metals – 3-year period of record 4/1/2012 – 3/31/2015

Parameter	Support	Non-support
Temperature	≤ 10%	> 10%
DO	< 5 samples or ≤ 10%	> 10%
pH	≤ 10%	> 10%
Turbidity	≤ 25%	> 25%
Metals	< 2 exceedances	> 1 exceedance

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**

303(d) Report Listing Format

Five Assessment Categories of Waters

- 1 – Waterbody not impaired
  - 1a – All designated uses and water quality standards are attained.
  - 1b – All designated uses and water quality standards are attained, but a TMDL exists for at least one water quality parameter.
- 2 – Some uses and standards met, however there is insufficient data to assess other uses.
- 3 – Insufficient data to assess any uses
- 4 – Waterbody impaired, does not require TMDL
  - 4a -TMDL has already been completed
  - 4b – Other pollution control requirements will result in WQ standards attainment
  - 4c – Impairment is not caused by a pollutant

303(d) Report Listing Format

Five Categories of Waters (continued)

5 – Waters not meeting WQ Standards

- High
  - Truly impaired, TMDL needed
- Medium
  - Adoption of new regulations or standards
  - Questionable data (QA/QC)
  - Data verification needed
  - Impairment caused by a point source
- Low
  - Impairment is naturally occurring
  - Segment added by EPA

Sources of Impairment

- Agricultural Activities
- Industrial Activities
- Surface Erosion
- Urban Runoff
- Resource Extraction
- Hydropower
- Municipal Point Source
- Unknown

Primary Pollutants in Agriculture

- Turbidity
- Nutrients
  - Total Phosphorous
  - Nitrogen
  - Orthophosphate

Causes

- Bank erosion
- Sedimentation
- Lack of riparian vegetation
- Runoff
- Instream watering


Severely Eroded Stream Bank

Increased embeddedness


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New Listings for 2016

72 Pollutant Pairs

- Minerals - Cl, SO_4, TDS (19)
- Turbidity (3)
- Dissolved Oxygen (26)
- Metals - Cu, Pb, Zn, Se (13)
- Temperature (3)
- Pathogens (1)
- pH (7)

De-Listing of Waters

- Development of a TMDL
- Implement control strategies other than a TMDL
- Updated assessments indicate no known impairments
- Improved delineation of impaired waterbodies
- Revised water quality standards and assessment methodologies

De-Listings for 2016

98 Pollutant Pairs

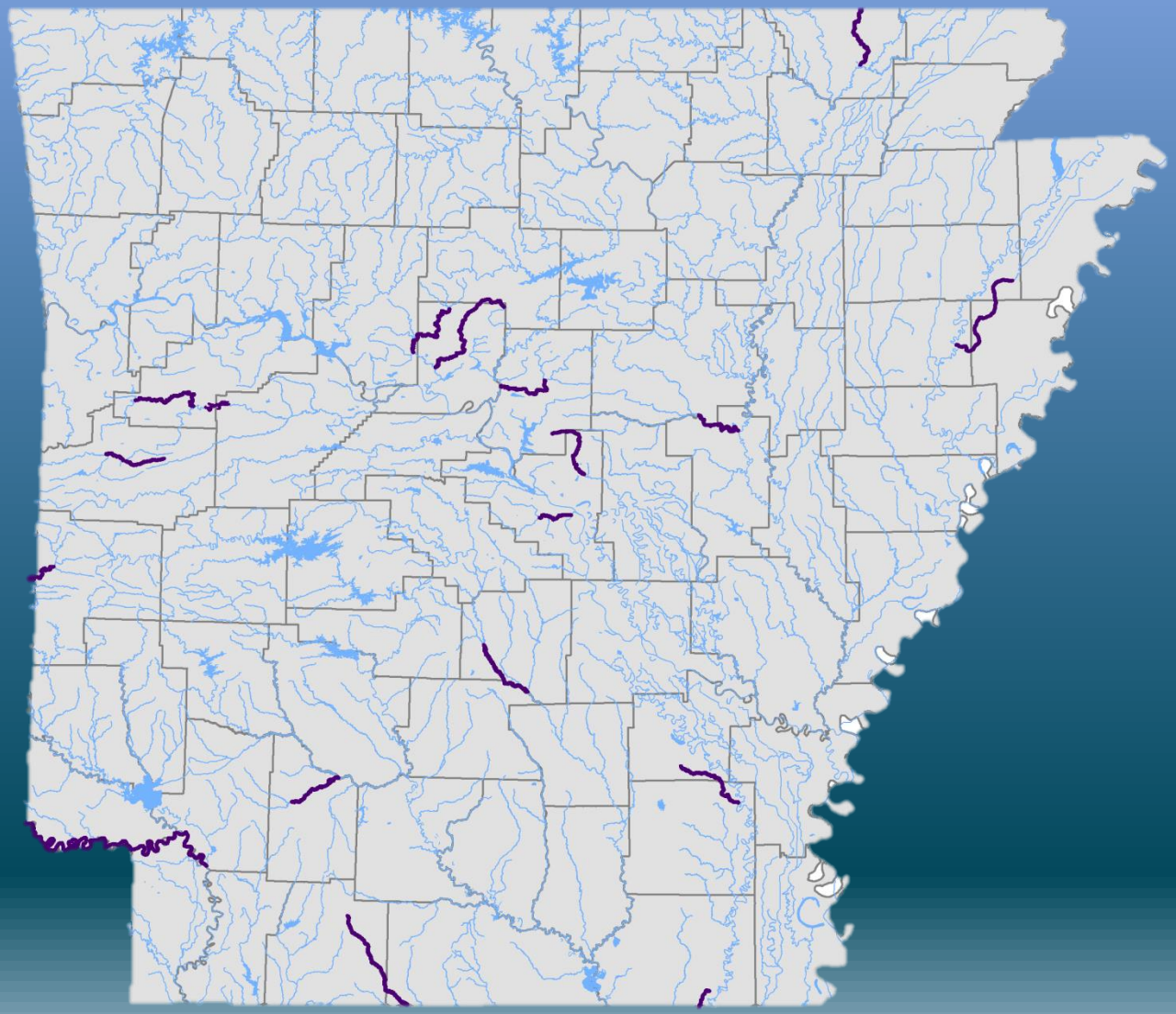
- Minerals - Cl, SO_4, TDS (31)
- Metals - Cu, Pb, Zn (27)
- Turbidity (20)
- pH (8)
- Dissolved Oxygen (4)
- Temperature (8)
- Pathogens (0)

Draft 2016 Category 5 Dissolved Oxygen Impairments

Draft 2016 Category 5 DO Stream Impairments

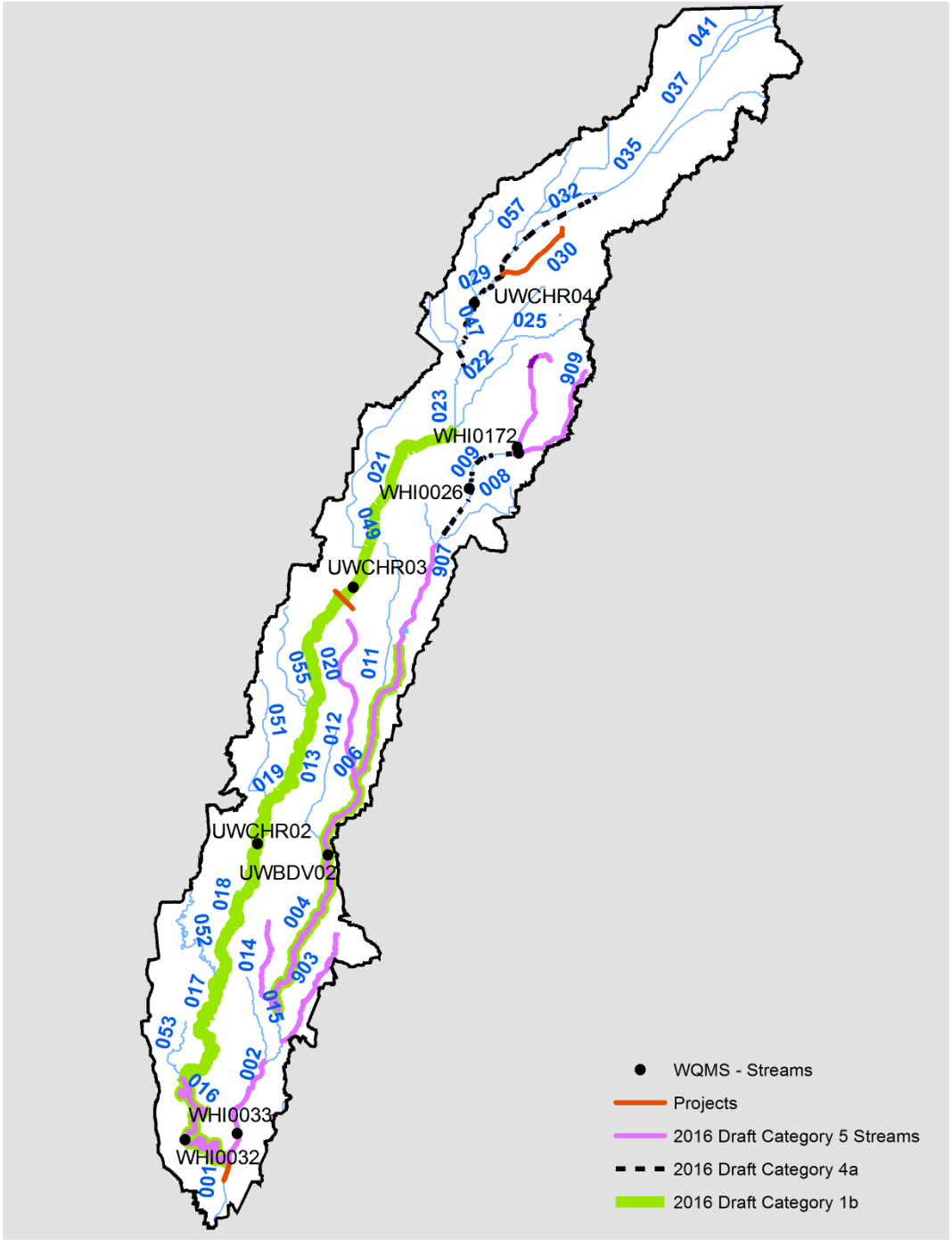
Draft 2016 Category 5 DO Lake Impairments

Draft 2016 Category 5 Silt/Turbidity Impairments



Draft 2016 Category 5 Silt/Turbidity Stream Impairments

Draft 2016 Category 5 Silt/Turbidity Stream Impairments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WHI0033
WHI0032
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WQMS - Streams
Projects
2016 Draft Category 5 Streams
2016 Draft Category 4a
2016 Draft Category 1b

Total Maximum Daily Load

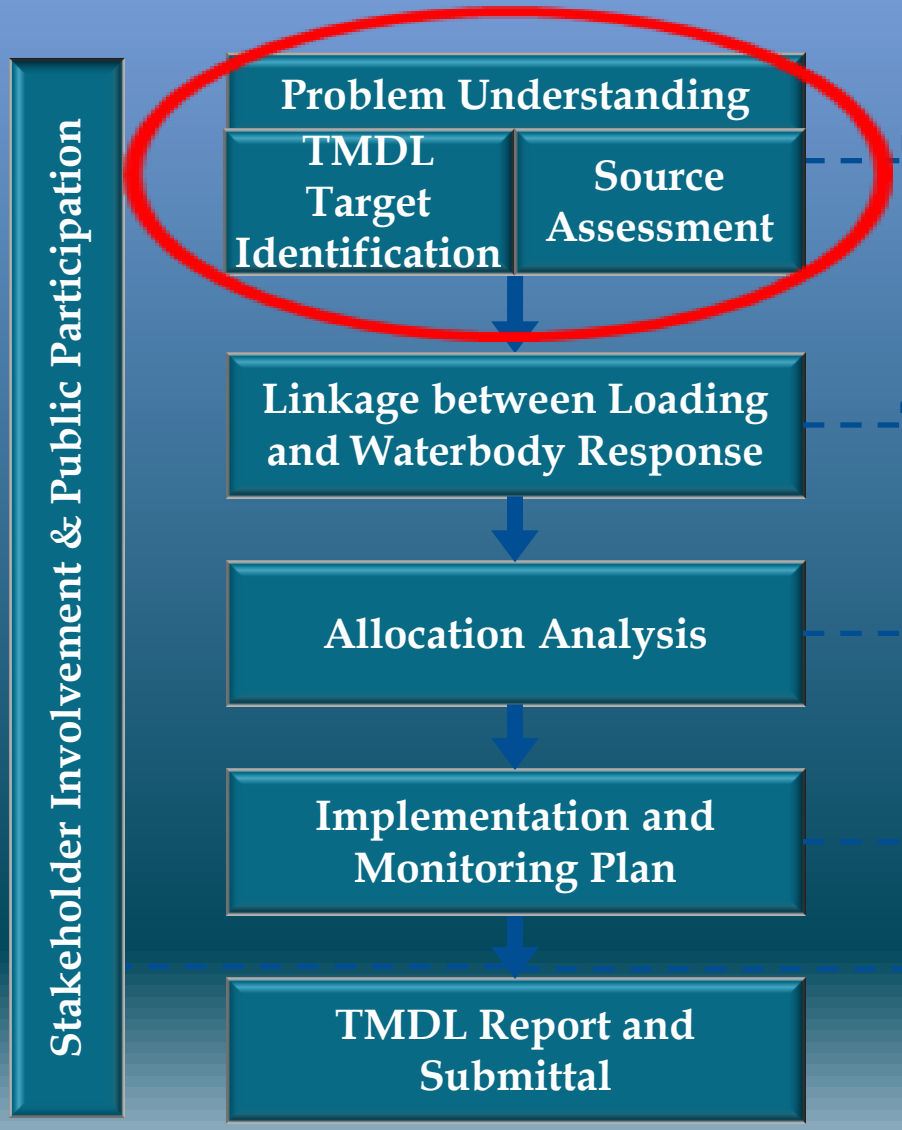
Total Maximum Daily Load (TMDL) is a calculation of the maximum amount of a specific pollutant that a waterbody can receive and still meet its water quality criteria and maintain its designated uses.

$$TMDL = WLA + LA + MOS$$

TMDLs become the basis for effluent limitations and discharge permit limits.

WLA = Waste Load Allocation; LA = Load Allocation; MOS = Margin of Safety

TMDL Process



EPA Recommended Elements in a TMDL Submittal

1. Description of waterbody, pollutant of concern, pollutant sources, and priority ranking
2. Water Quality Standards and numeric WQ target*
3. Loading Capacity- Linking WQ and Pollutant Sources* (including critical conditions*)
4. Load Allocations (LAs)*
5. Wasteload Allocations (WLAs)*
6. Margin of Safety (MOS)*
7. Seasonal Variation*
8. Reasonable Assurances+
9. Monitoring Plan+
10. Implementation Plan+
11. Public Participation*

** Required by regulation (40 CFR 130.7)*
+ Recommended through guidance

From *Guidelines for Reviewing TMDLs under Existing Regulations issued in 1992* (May 20, 2002): http://www.epa.gov/owow/tmdl/guidance/final52002.html

Impairment
What are the options now?

- TMDL
  - Formulaic
  - Designed to meet WQ standards
- TMDL Alternative
  - Flexibility in implementation
  - Still must show meeting WQ standards in timeline
- Watershed Protection Plan
  - Category 4b - Other pollution control requirements will result in WQ standards attainment

Differences of TMDLs/Watershed Protection Plan

TMDL and TMDL I-Plan	WPPs
Results in automatic removal from 303(d) list	Can result in removal from 303(d) list though 4b process
TMDL approved by State and EPA TMDL I-Plan only approved by State	WPP acceptance by State and EPA (i.e., determination of consistency with nine-element guidance)
Focused on singular pollutants in most cases	Pollutant focus is determined by stakeholders
TMDLs are set at full permitted flow allowing for more generous WLA	End points and flow conditions must be consistent with EPA nine element guidelines
Implementation of point source control measures currently compulsory	Implementation of point source control measures currently voluntary
Annual stakeholder meeting required following development to evaluate implementation progress	Quarterly stakeholder meetings generally held to assess and maintain implementation efforts

Arkansas Department of Environmental Quality

2015 Make a Splash

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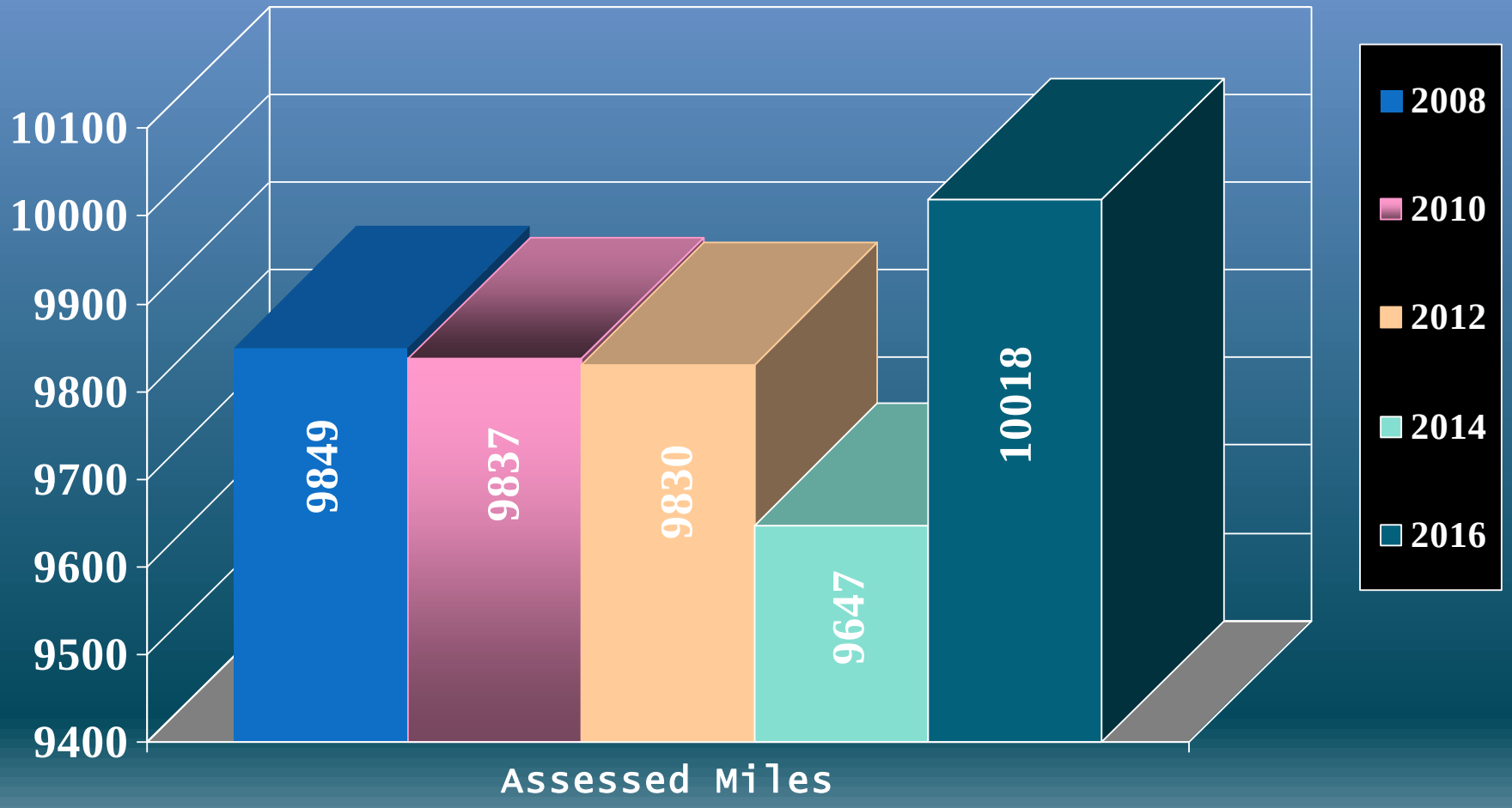
"To protect, enhance, and restore the natural environment for the well-being of all Arkansans."

2016 MILES ASSESSED



2016 Designated Use Support & Water Quality Standards Attainment