Developing Numeric Nutrient Criteria for Mississippi

Stakeholder Update

MDEQ Amite Street Offices
Jackson, MS
November 20, 2014

Criteria are required by law

- Water quality standards (WQS) are required by the Clean Water Act for waterbodies in MS
  - A water quality standard = A designated use + **criteria** to protect the use + policy to prevent degradation
  - MDEQ has many criteria to protect designated uses from different pollutants

Water Quality Criteria

- A concentration, level, or narrative statement
- Represent a level of water quality that supports a particular designated use
- States must adopt criteria that protect the designated use(s)
  - Based on a sound, scientific rationale
  - Sufficient parameters to protect the designated use
  - Must support the most sensitive use

Nutrient Criteria

- Nutrients are a major pollutant contributing to impairment of waters nationwide
- EPA developed an Action Plan for nutrients in 2001 that included states developing numeric nutrient criteria to protect uses from nutrient pollution
- Early on…MDEQ developed a task force and a plan for developing nutrient criteria
- MDEQ's Mission:

  Develop appropriate and protective numeric nutrient criteria for Mississippi's waters that are scientifically defensible.

MS Nutrient Task Force

- Initiated criteria planning in 2000
- Decided that criteria should be developed based on water body type
  - Lakes and Reservoirs
  - Streams and Rivers
  - Estuaries and Coastal Waters
- Established different committees to focus on different water body types
- Developed the first Nutrient Criteria Development Plan for Mississippi

Implementing Our Plan

- Took action on the Task Force's recommendations
- Data and information gaps were identified by the Task Force
- Efforts were initiated to address these gaps
  - Data collection across various water body types
  - Establishing biological indicators
  - Preliminary nutrient criteria analyses

Data Collection Efforts

- Data collection efforts were developed to fill data and information gaps
- MDEQ-led data collection:
  - Data collection efforts in all water body types across the state
  - EPA GMPO grant for intensive nutrient study of St. Louis Bay watershed
  - Continued sampling of benthic macroinvertebrate communities within wadeable streams throughout the state (M-BISQ)
  - Sampling of benthic communities and DO data within Delta waters
  - 319/BMA Projects

Tool Development

- MDEQ has developed and continues to develop and evaluate multiple tools in an attempt to make the connection between nutrient concentrations and biological response
  - M-BISQ Recalibration
  - Benthic Index for Coastal Waters
  - Benthic Index for Delta Waters
  - Fish data for Delta waters

Timeline

- MDEQ in process of revising Nutrient Criteria Development Plan and Timeline
  - Previous plan (Oct 2010) listed June 30, 2013 as date for non-Delta waters to go to Public Comment
- Current Efforts
  - Evaluating latest science and NNC guidance and efforts
  - Implementation planning
  - Addressing stakeholder questions/concerns
- Non-Delta Waters do not have a revised date for draft at this time, MDEQ exploring "sequencing":
  - Lakes and Reservoirs
  - Wadeable Streams; Non-wadeable Streams
  - Coastal and Estuarine Waters
  - Delta Waters
- Adoption by Commission
- Approval by EPA

MS Nutrient Technical Advisory Group

- MDEQ is committed to a defensible, science driven process for deriving protective criteria
- At the core of this process is the input, review, and guidance of technical work by a committee of research, state and federal agency scientists with technical expertise relevant to nutrient science
- MDEQ formed the Nutrient TAG to be this committee
- TAG's Mission:

  Provide technical expertise and regional knowledge to MDEQ for the development of scientifically defensible numeric nutrient criteria.

MS Nutrient Technical Advisory Group

GULF COAST RESEARCH LABORATORY
THE UNIVERSITY OF SOUTHERN MISSISSIPPI

United States Department Of Agriculture
Agricultural Research Service

Nutrient Criteria Analysis

- Goal: scientifically defensible, protective criteria developed using a transparent, well-documented process

- Methods based on USEPA Nutrient Criteria Guidance
  - Data Compilation
  - Classification of Waters
  - Data Analysis using Multiple Lines of Evidence
  - Criteria Derivation

Data Analysis: Multiple Lines of Evidence

- Using multiple lines of analysis to define a specific endpoint
- Alternative to single analysis approaches
- Especially useful with complex systems

"A weight of evidence approach that combines any or all of the three approaches above will produce criteria of greater scientific validity"

-USEPA 2000, SAB 2010

Lines of Evidence

- Distributions of nutrient values in minimally disturbed sites and sites attaining designated uses
- Stressor-response empirical models of nutrients versus biological/chemical responses
- Mechanistic water quality model output
- Scientific literature on nutrient effects

Status of Technical Efforts Inland Waters

Streams

Option 1- Single values

Magnitude:
TP: 0.060 - 0.150 mg/l
TN: 0.75 - 1.20 mg/l

Duration: Geometric annual mean
- Based on underlying data

Frequency: Not to be exceeded more than 2 out of 5 years
- Based on variability analysis

Streams

Option 2 – Combined criteria with site specific adjustment

Magnitude:
TP: 0.040 - 0.2 mg/l
TN: 0.45 - 1.40 mg/l

Duration: Geometric annual mean

Frequency: Not to be exceeded more than 2 out of 5 years

Implementation: As long as MBISQ/DO/nuisance criteria are met and nutrients are within range or below, nutrient criteria not violated.

Site specific nutrient numeric adjusted to the long-term 75th percentile seasonal geometric mean within the range for assessment moving forward.

If there are no data on responses, a default single numeric value (e.g., within the range) would be used

Streams

Option 3 – Combined Criteria with no adjustment

Magnitude:
TP: 0.040 - 0.2 mg/l
TN: 0.45 - 1.40 mg/l

Duration: Geometric annual mean

Frequency: Not to be exceeded more than 2 out of 5 years

Implementation: As long as MBISQ/DO/nuisance criteria are met and nutrients are within range or below, nutrient criteria not violated.

If there are no data on responses, a default single numeric value (e.g., within the range) would be used

Lakes/Reservoirs

Option 1- Single values

Magnitude:
TP: 0.090 mg/l
TN: 1.25 mg/l
Chlorophyll a: 20 ug/l

Duration: Seasonal (June-October) Geometric Means
- Consistent with assessment periods for DO
- Acute could be considered

Frequency: Not to be exceeded more than 2 out of 5 years
- Based on stream criteria nutrient variability analysis

Lakes/Reservoirs

Option 2 – Combined criteria with site specific adjustment

Magnitude:
TP: 0.050 – 0.160 mg/l
TN: 0.680 – 1.70 mg/l
Chlorophyll a: 20 ug/l

Duration: Seasonal (June-October) Geometric Means
- Consistent with assessment periods for DO
- Acute could be considered

Frequency: Not to be exceeded more than 2 out of 5 years
- Based on stream criteria nutrient variability analysis

Implementation: As long as chl a criterion/DO/nuisance criteria are met and nutrients are within range or below, nutrient criteria not violated.

And, site specific nutrient numeric adjusted to the long-term 75th percentile seasonal geometric mean within the range for assessment moving forward.

If there are no data on responses, a default single numeric value (e.g., within the range) would be used

Lakes/Reservoirs

Option 3 – Combined Criteria with no adjustment

Magnitude:
TP: 0.050 – 0.160 mg/l
TN: 0.680 – 1.70 mg/l
Chlorophyll a: 20 ug/l

Duration: Seasonal (June-October) Geometric Means
- Consistent with assessment periods for DO
- Acute could be considered

Frequency: Not to be exceeded more than 2/5 years
- Based on stream criteria nutrient variability analysis

Implementation: As long as chl a criterion/DO/nuisance criteria are met and nutrients are within range or below, nutrient criteria not violated.

No site specific adjustments made.

If there are no data on responses, a default single numeric value (e.g., within the range) would be used

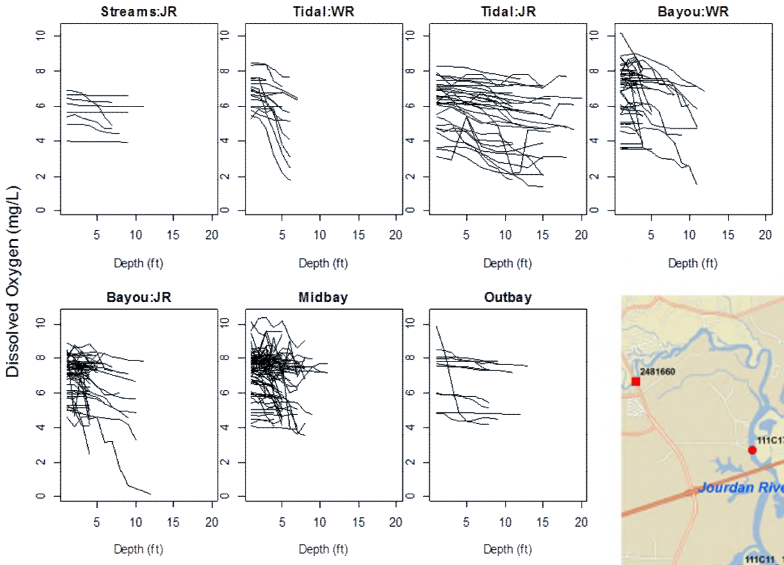
Coastal Waters

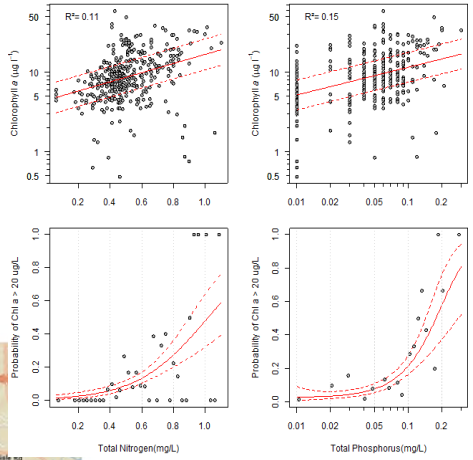
Coastal Waters Update

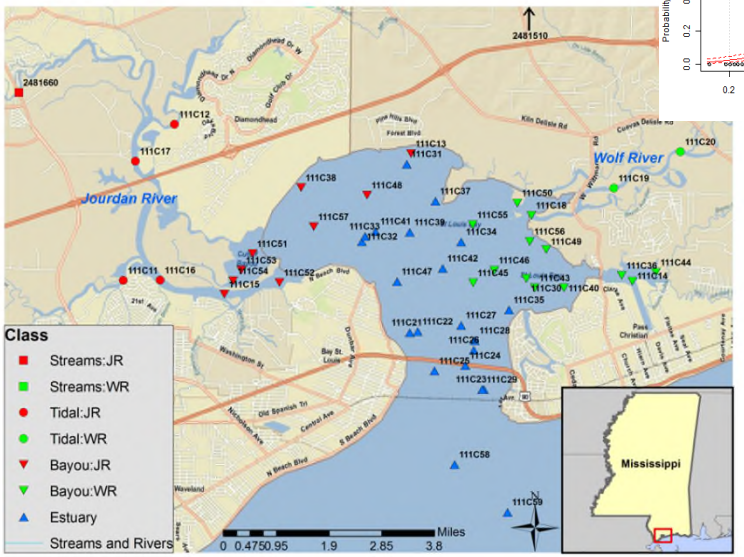
- Bay St. Louis, MS: Nutrient Sources, Fate, Transport, and Effects Study
  - Funded by the USEPA Gulf of Mexico Program
  - Part of several case studies through the Gulf of Mexico Alliance (FL, TX, AL)
  - Comprehensive estuarine water quality model with field calibration/validation

Modeling Efforts – Bay Saint Louis

- Field sampling – calibration, validation, empirical modeling

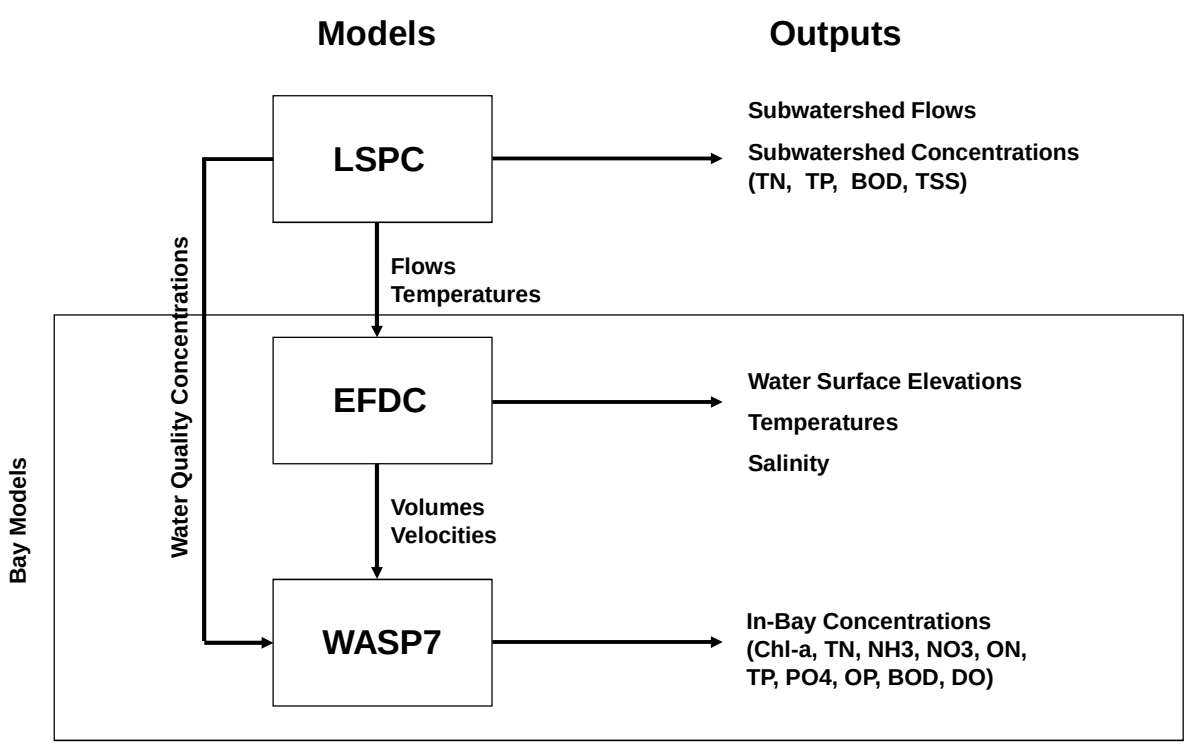


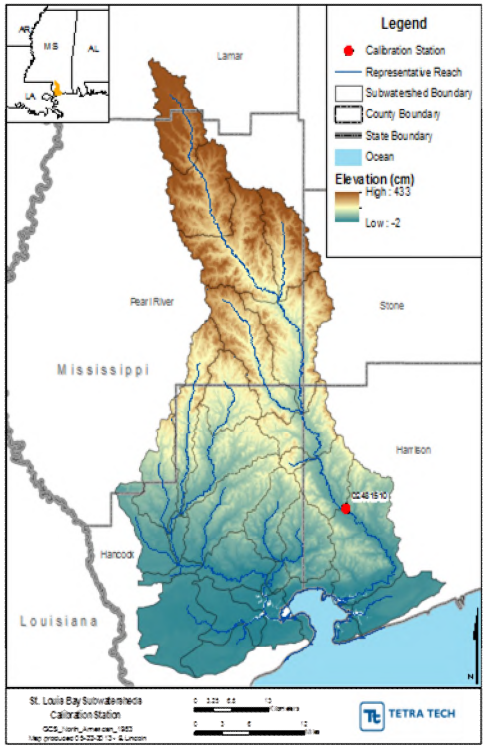




Modeling Efforts – Bay Saint Louis

- Linked watershed loading (LSPC) - hydrodynamic (EFDC) - water quality (WASP7) models





Coastal Empirical Analysis

- Using coastal/estuarine/tidal water quality data
- Classification
  - Open sound, estuaries, and tidal waters were defensible
- Literature
  - MS Coastal Region generally medium-low eutrophication
- Reference (Existing Condition)
  - Based on identifying and using existing conditions to set criteria
- Stressor-response modeling
  - Developing nutrient-response models for different classes

Coastal/Estuarine/Tidal

SLB Study reinforced current numeric ranges

- Magnitude:
  - Ranges from multiple analyses to date (SLB)
    - Chl a: 6 – 15 ug/L (10 – 20 ug/L)
    - TN: 0.60 – 1.0 mg/L (0.6 – 0.8 mg/L)
    - TP: 0.05 – 0.20 mg/L (0.06 – 0.08 mg/L)
- Duration: Seasonal (June-October) Geometric Means
- Frequency: Not to be exceeded more than 2/5 years
- Implementation: Same options as for other waters
  - Single numeric
  - Range with combined criteria/site specific option

Coastal Efforts

- Completing Revised Technical Reports on Coastal Estuarine Numeric Thresholds – January 2015
- TAG review early 2015
- Will complete range recommendations by Spring/Summer 2015

Implementation Planning

Beyond the Number: Implementation Planning

- Many questions surround implementation both internally and from our stakeholders
- MDEQ Interdivisional Implementation Workgroup formed to work through issues identified by MDEQ staff, partners, and stakeholders
  - Permitting implications
    - Compliance Schedules
    - Variances/Mixing Zones/Others
  - Assessment implications
  - TMDLs/WLAs

Implementation Workgroup

- Workgroup developed a list of implementation questions such as
  - How will the number be written into our standards?
  - How will we monitor/assess for nutrients?
  - How will we incorporate this number into permits?
  - How long will it be before facilities see nutrient limits in their permits?
  - How long will facilities have to comply with new permit limits?

- Survey was sent out to stakeholders asking for feedback on the questions as well as issue prioritization

Stakeholder Survey

- Survey was sent out on January 27, 2014 to stakeholders asking for feedback on the prioritization of implementation issues covering topics within categories including:
  - Nutrient Criteria Development
  - Monitoring and Assessment
  - Permitting
  - Total Maximum Daily Loads, Waste Load Allocations (WLAs), and Modeling
  - Watershed Planning
  - Miscellaneous Issues (other states' efforts, funding sources, etc)

- Additional opportunity at the end of the survey for stakeholders to express other comments and concerns regarding implementation

Stakeholder Survey Results

- Rate topics in each of the six categories based on the level of importance to them as a Stakeholder
  - 1 being less important, 5 being extremely important
- Answers ranged from 3.40-4.63 indicating at least a moderate interest in all topics
- Out of the 249 people surveyed we received 43 responses for a response rate of 17%

Stakeholder Survey Results – High Interest

- The consideration of nonpoint sources
  - Permitting category
    - "Discretion or Flexibility Regarding the Required Nutrient Treatment Limits where the Point Sources are a Minor Fraction of the Total Nutrient Load" received a score of 4.51
  - Watershed Planning category
    - "Considering Nonpoint Sources and Point Sources when Implementing Nutrient Criteria" was rated a 4.63
  - Six of the typed responses inquired about the treatment of nonpoint sources

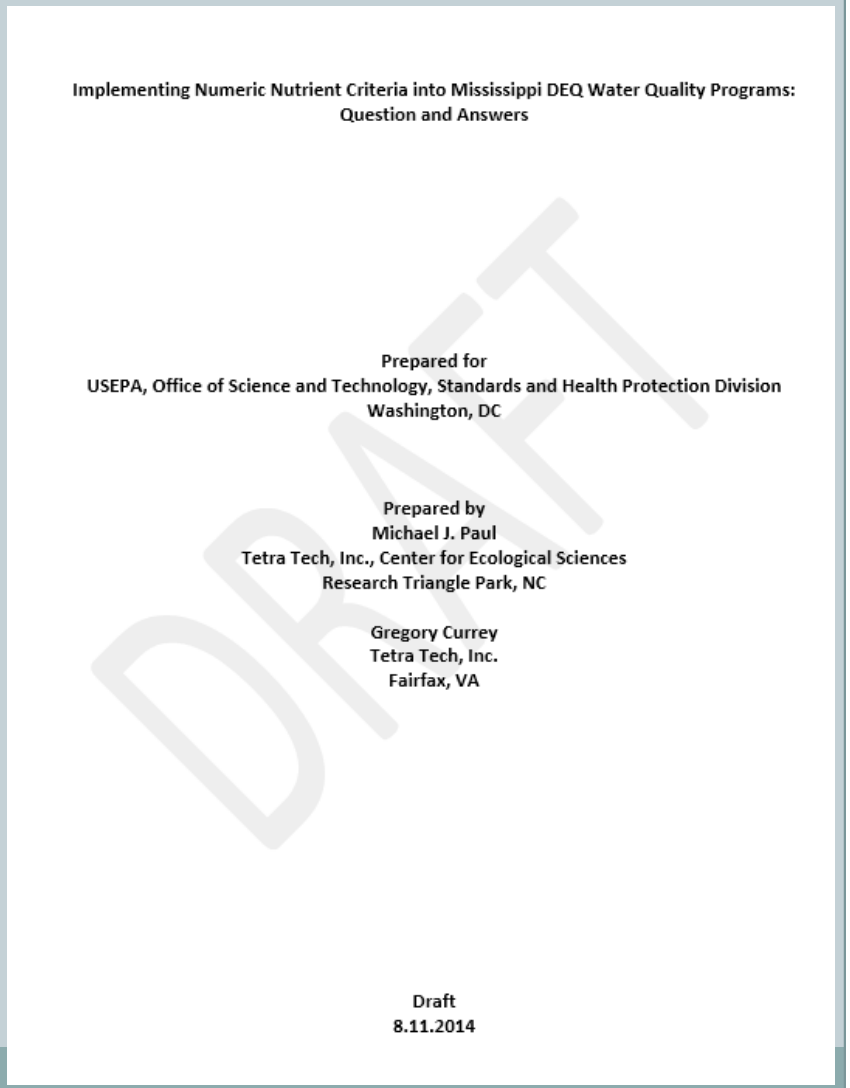
Stakeholder Survey Results – Additional Comments

- Final question allowed stakeholders to voice their comments and concerns regarding implementation
- 16 comments were left
  - MDEQ took steps to address all of these additional comments

- We appreciate your input
- Thank you for taking the time to provide us with your thoughts

Draft Implementation Plan

- Subcommittees developed draft responses questions
- Responses became part of draft implementation plan
- Sections on:
  - Criteria Options
  - Standards
  - Assessment and Monitoring
  - TMDLs/WLA/NPDES
- Next Steps
  - Iteration with management to inform option selection
  - Will refine implementation plan accordingly



Implementing Numeric Nutrient Criteria into Mississippi DEQ Water Quality Programs: Question and Answers

Prepared for
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Draft
8.11.2014

DRAFT

Moving Forward in MS

- Revised Nutrient Criteria Development Plan and Timeline by Dec 31, 2014
- MDEQ continuing criteria development process with TAG support and Stakeholder input
  - Complete Coastal
  - Planning for Delta
- MDEQ will continue to work on Implementation Planning

Moving Forward in MS

- Stakeholder Outreach an MDEQ Priority
  - MDEQ will continue regular Stakeholder Update Sessions
  - Continue to provide the opportunity for stakeholders to stay informed and also express their comments and/or concerns regarding both the criteria development efforts and plans for implementation of those criteria
    - Technical concerns/suggestions may be relayed back to DEQ
    - Policy concerns can be relayed to MDEQ upper management
- We are not currently in the formal comment period – that will come later
  - The sooner we know about your concerns, questions, suggestions, etc. the better…MDEQ can start looking at those now

EPA Region 4 Workshop

Atlanta, GA

August 2014

Agenda

- State Updates
- EPA Modules
  - Assessment Endpoints, Classification, Analysis Approaches, Duration and Frequency, Combined Criteria, Downstream Protection
- Implementation Issues
- Impressions:
  - Combined Criteria extent (or lack thereof)
    - Algal/plant measure focus (will invertebrates be sufficient?)
  - Timelines
    - MS one of only 2 states without some criteria
      - Mostly waterbody specific numeric
    - Criteria development ongoing in all states
      - Various timelines bracketing MS

MDEQ – EPA Region 4/HQ Discussion

- Status
- Sequencing
- Combined Criteria Options
  - Lakes vs Streams
- Natural Conditions and Refined Use Scoping Documents
- Delta
- Funding
- Implementation

Questions?

MDEQ Priority Framework

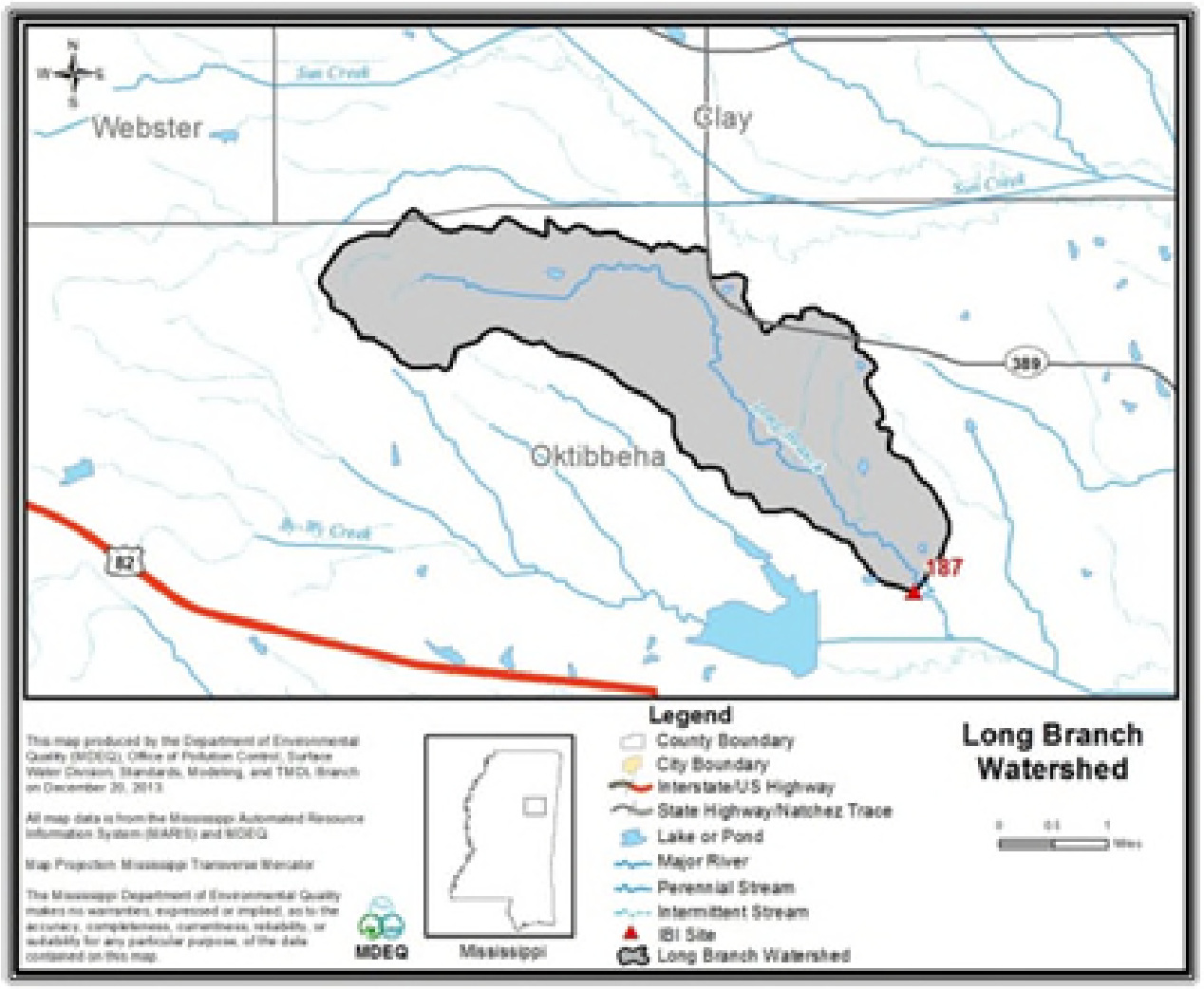
Establishing MDEQ's Priority Watersheds

November 20, 2014

MDEQ Priority Framework

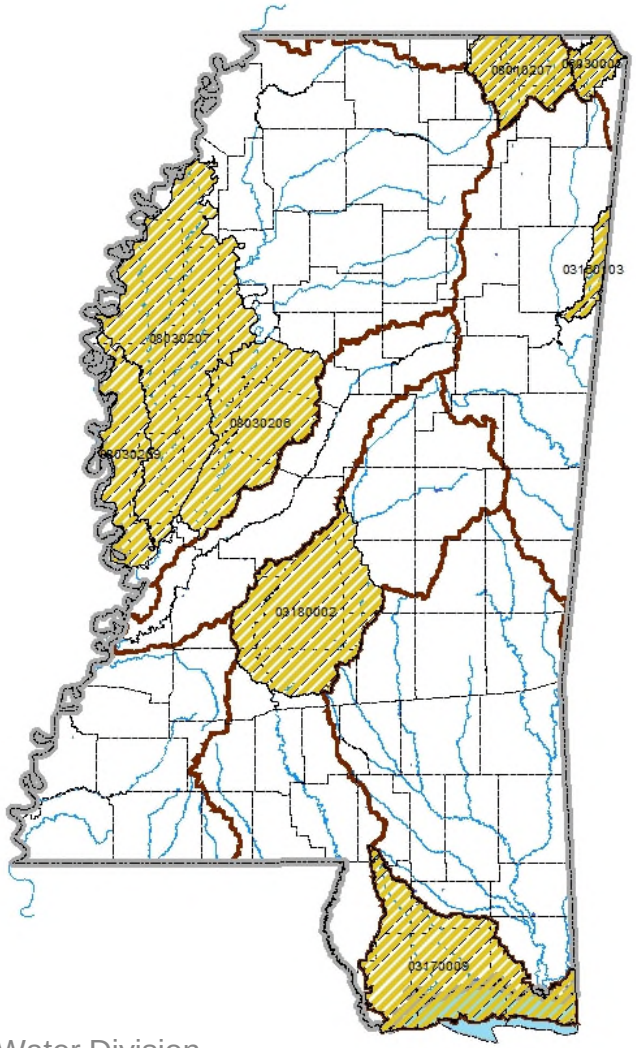
- Comprehensive Water Program review of MDEQ Priorities
- Select Priority Watersheds for the next decade
- Part of the New EPA 303(d) Vision
- TMDL Federal Grant Work Plan Requirement
- Public Review and Engagement
- Good Idea to review why we are selecting where we are working

What is a Water Shed?



MDEQ Current Priority Watersheds

- Selected in early 2000's
- Not recently updated
- Emphasis on Nonpoint Source Programs



The New 303(d) Vision

- The Vision encourages states to develop **ten year watershed priority restoration plans** and to explore **tools beyond TMDLs** to attain water quality restoration and protection
- 303(d) – List of Impaired Waters
- TMDLs – Total Maximum Daily Load

Prioritization

Assessment

Protection

Alternatives

Engagement

Integration

303(d) Vision cont'd

- **Prioritization**: For the 2016 integrated reporting cycle and beyond, States review, systematically prioritize, and report priority watersheds or waters for restoration and protection in their biennial integrated reports to facilitate State strategic planning for achieving water quality goals.
- **Assessment**: By 2020, States identify the extent of healthy and CWA Section 303(d) impaired waters in each State's priority watersheds or waters through site-specific assessments.
- **Protection**: For the 2016 reporting cycle and beyond, in addition to the traditional TMDL development priorities and schedules for waters in need of restoration, States identify protection planning priorities and approaches along with schedules to help prevent impairments in healthy waters, in a manner consistent with each State's systematic prioritization.
- **Alternatives**: By 2018, States use alternative approaches, in addition to TMDLs, that incorporate adaptive management and are tailored to specific circumstances where such approaches are better suited to implement priority watershed or water actions that achieve the water quality goals of each state, including identifying and reducing nonpoint sources of pollution.

303(d) Vision cont'd

- **Engagement**: By 2014, EPA and the States actively engage the public and other stakeholders to improve and protect water quality, as demonstrated by documented, inclusive, transparent, and consistent communication; requesting and sharing feedback on proposed approaches; and enhanced understanding of program objectives.
- **Integration**: By 2016, EPA and the States identify and coordinate implementation of key point source and nonpoint source control actions that foster effective integration across CWA programs, other statutory programs (e.g., CERCLA, RCRA, SDWA, CAA), and the water quality efforts of other Federal departments and agencies (e.g., Agriculture, Interior, Commerce) to achieve the water quality goals of each state

Why Prioritize?

- Targeted Funding Available
- Emphasis on Where We Are Working
- EPA Renewed Emphasis – Resource Limitations
- Multiple Programs Adopting Prioritization Emphasis
- Important To Do This Process Well

EPA Region 4 - 2015 Workplan for 303(d)/TMDL Program

- Regional Priorities
  - Controlling Nutrient Pollution
  - Source Water Protection
  - Effluent Dominated Water Bodies
- Community Engagement

Greg's Take on EPA

Other States Priorities

- Nutrients
- Non Point Sources
- Pollutants
- Designated Uses
  - Drinking Water Protection
  - Chesapeake Bay
  - Great Lakes
- Specific Land Use
  - Coal Mines / Ash Ponds

MDEQ Focus Areas

1. Protect Human Health and the Environment
2. Source Water Protection
3. Legacy Work Areas
4. Stakeholder Interest and Involvement, Community Engagement
5. Regulatory Drivers
6. Numeric Nutrient Criteria

Introduction to the Framework

- Regulatory Basis
- Watershed Protection Focus
- Process of Development
- Vision, Goals, and Objectives

State of Things

- Historic Prioritization
- Needs and Motivations
- Existing Tools
  - MS Watershed Characterization & Ranking Tool (MWCRT)
  - Recovery Potential Tools
  - EJView – (Environmental Justice Identification Maps)
- Lessons Learned from Previous Processes
- Visions of Beneficial Elements

Roles and Responsibilities

- Steering Committee
- Community Engagement
- Public Relations
- Data Integration

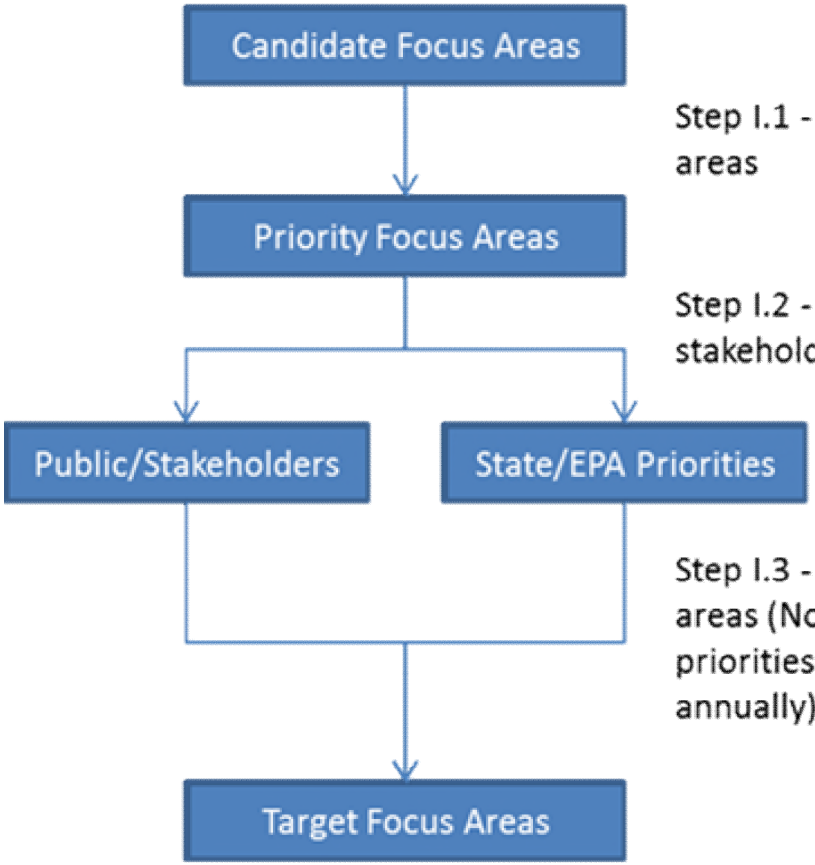
MDEQ Water Programs

- Office of Pollution Control
- Surface Water
  - TMDLs and Modeling, Nonpoint Source, Water Quality Standards, State Revolving Fund, Coastal Grants (Katrina and Oil Spill)
- Environmental Permits
  - NPDES Permits, 404 Permits (Wetlands)
- Environmental Compliance & Enforcement
- Field Services
- Data Integration Division

MDEQ Water Programs

- Office of Pollution Control
- Office of Land and Water
  - Source Water Assessment
- Office of Community Engagement

Phase I: Identifying Target Water Quality Focus Areas



Step I.1 - Steering Committee identifies 5-10y priority focus areas

Step I.2 - Steering Committee vets focus areas with public and stakeholders as well as with State and EPA priorities

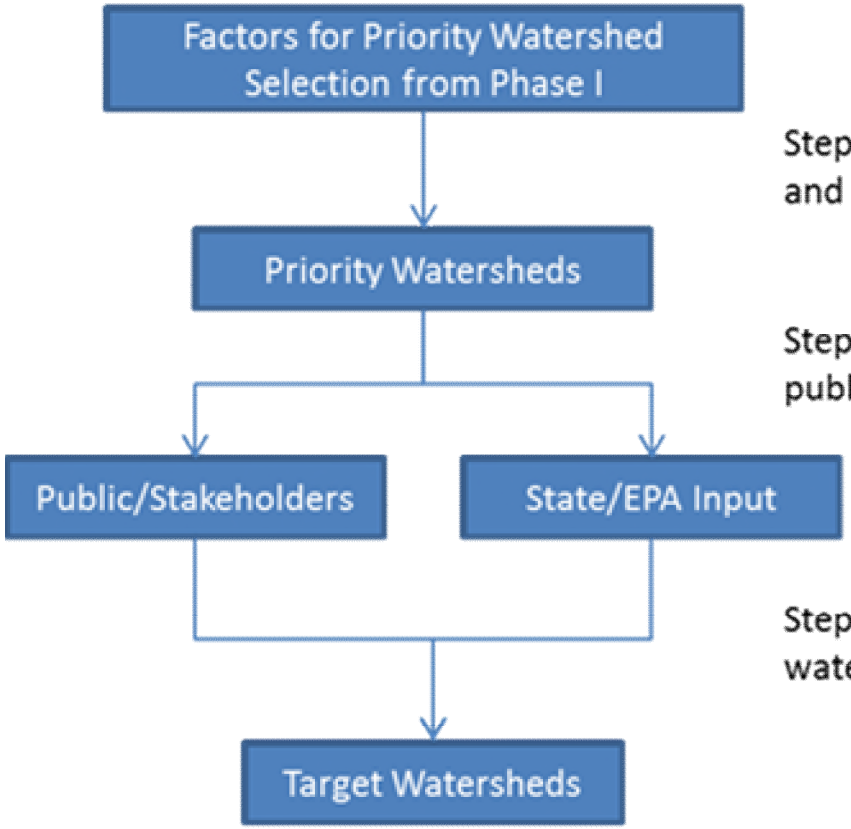
Step I.3 - Steering Committee identifies 5-10y targeted focus areas (Note: State/EPA Priorities may change targeted priorities on shorter timescales and should be visited annually) and reports back to public

Step I.4 - Steering Committee generates *factor profiles* based on the targeted focus areas. These will be used to screen and identify targeted watersheds. (e.g., If nutrients are a targeted focus area, SPARROW loads may be an important factor)

Responsibilities and tools involved in identifying target focus areas (Phase I)		
Step	**Who is Involved**	**Tools**
I.1 Priority Focus Areas	SC	Professional Judgment
I.2 Vetting	CE, PR, OPC-M	Public Meetings, Website, Social Media, Presentations and Fact Sheets
I.3 Target Focus Areas	SC	Professional Judgment, Website, Social Media
I.4 Factor Profiles	SC	Professional Judgment

SC – Steering Committee, CE – Community Engagement, PR – Public Relations, OPC-M – Office of Pollution Control Management

Phase II: Identifying Target Basins/Watersheds



Step II.1 – Develop priority watershed list based on factor profile and screening scenarios

Step II.2 - Steering Committee vets priority list with public/stakeholders as well as with State/EPA interests

Step II.3 - Steering Committee identifies annual targeted watershed list and reports back to public

Responsibilities and tools involved in identifying target watersheds (Phase II)		
Step	**Who is Involved**	**Tools**
II.1 Priority Watersheds	SC	MCWRT, RPS, EJView
II.2 Vetting	CE, PR, OPC-M	Public Meetings, Website, Social Media, Presentations and Fact Sheets
II.3 Target Watersheds	SC	Professional Judgment, Website, Social Media

SC – Steering Committee, CE – Community Engagement, PR – Public Relations, OPC-M – Office of Pollution Control Management

Proposed Schedule of Activities. SC – Steering Committee		
Year	**Month**	**Activities**
FFY2015 (Year 0)	April 2015	SC identifies priority focus areas
	May – June	Public/Stakeholder engagement to solicit priority focus area feedback
	June	Identify target focus areas and selection factors for 5 year strategy
	July	SC identifies priority watersheds
	August - September	Public/Stakeholder engagement to solicit priority watershed feedback
	October 2015	Identify targeted watersheds for Year 1 (FFY2016)
FFY2016 (Year 1)	October 2015	SC revisits targeted focus areas and revises selection factors
	November - December	SC identifies priority watersheds for Year 2 (FFY2017)
	January to May	Public/Stakeholder engagement to solicit priority watershed feedback
	June – July 2016	Identify targeted watersheds for Year 2 (FFY2017)
FFY2017 (Year 2)	October 2016	SC revisits targeted focus areas and revises selection factors
	November - December	SC identifies priority watersheds for Year 3 (FFY2018)
	January to May	Public/Stakeholder engagement to solicit priority watershed feedback
	June – July 2017	Identify targeted watersheds for Year 3 (FFY2018)
FFY2018 (Year 3)	October 2017	SC revisits targeted focus areas and revises selection factors
	November - December	SC identifies priority watersheds for Year 4 (FFY2019)
	January to May	Public/Stakeholder engagement to solicit priority watershed feedback
	June – July 2018	Identify targeted watersheds for Year 4 (FFY2019)
FFY2019 (Year 4)	October 2018	SC revisits targeted focus areas and revises selection factors
	November - December	SC identifies priority watersheds for Year 5 (FFY2020) SC Identifies targeted focus areas for next five year cycle
	January to May	Public/Stakeholder engagement to solicit priority watershed feedback Public/Stakeholder engagement to solicit priority focus area feedback for next five year cycle
	June – July 2019	Identify targeted watersheds for Year 5 (FFY2020) Identify targeted focus areas for FFY2021-FFY2025
FFY2020 (Year 5)	October 2019	SC revisits targeted focus areas and revises selection factors
	November - December	SC identifies priority watersheds for Year 1 (FFY2021)
	January to May	Public/Stakeholder engagement to solicit priority watershed feedback
	June – July 2020	Identify targeted watersheds for Year 1 (FFY2021)

In Review

- Priority Framework in Development
- Prioritized Watersheds Due in 2016
- Public Process
- Ongoing Questioning of our Priorities
- Future Refinement of the selections

Questions and Contact Info

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