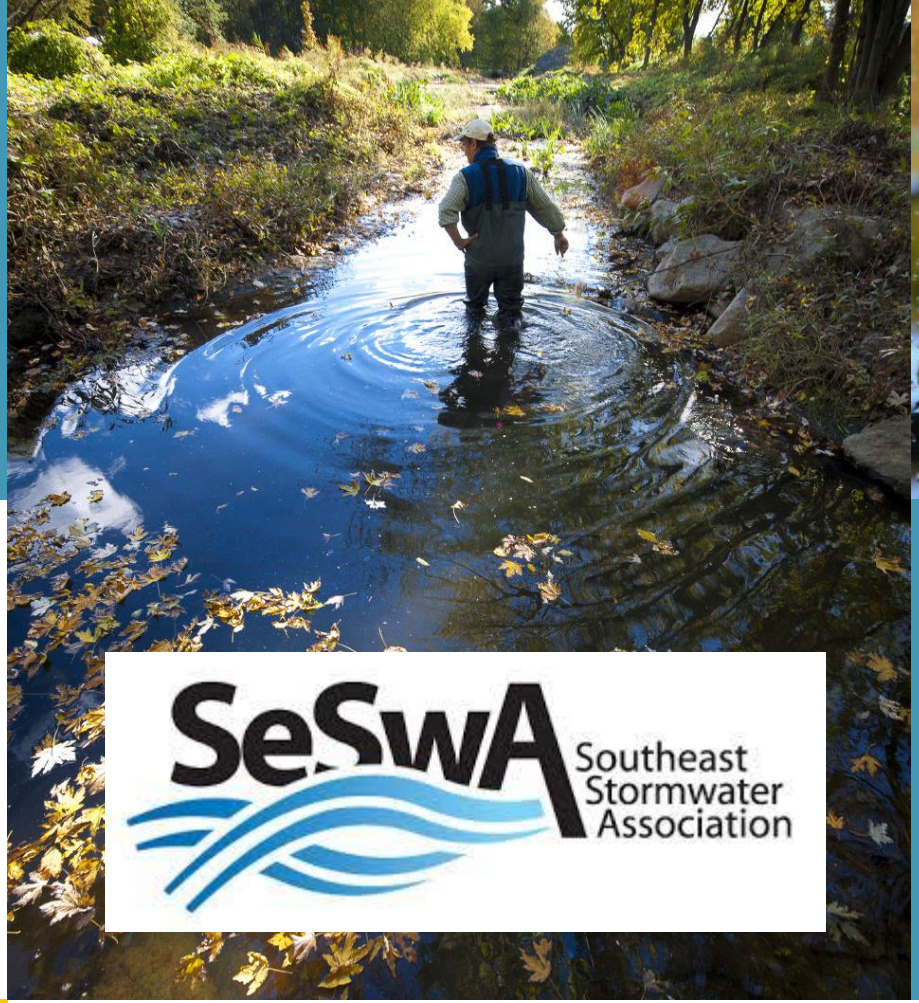
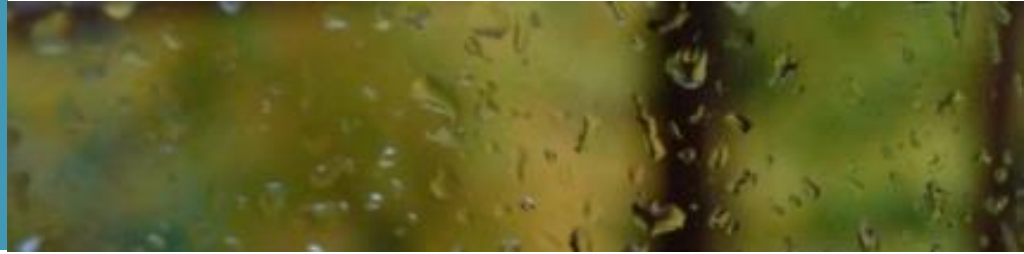
MS4 MONITORING AND REPORTING REQUIREMENTS



MS4 permit holders must report on the status of compliance with permit conditions, including a summary of any information (including monitoring data) collected and analyzed during the permit year. The session will compare requirements for Phase 1 and Phase 2 permit holders, and the trend in practices that are emerging for both.



ORIGINS OF MONITORING AND REPORTING REQUIREMENTS IN THE CWA

- Section 402(b)(2)(B) To inspect, monitor, enter, and require reports to at least the same extent as required in section 308 of this ACT

MONITORING REQUIREMENTS

- Section 308(a)(4)(A) the Administrator shall require the owner or operator of any point source to
  - (i) establish and maintain such records,
  - (ii) make such reports,
  - (iii) install, use, and maintain such monitoring equipment or methods (including where appropriate, biological monitoring methods),
  - (iv) sample such effluents (in accordance with such methods, at such locations, at such intervals, and in such manner as the Administrator shall prescribe), and
  - (v) provide such other information as he may reasonably require; and

REPORTING REQUIREMENTS

- Section 402 (a)(2) The Administrator shall prescribe conditions for such permits to assure compliance with the requirements of paragraph (1) of this subsection, including conditions on data and information collection, reporting, and such other requirements as he deems appropriate.

LARGE AND MEDIUM MS4 MONITORING

- Requirement for Field Screening of Outfalls
  - Subsequent program for representative data collection
- Permit Conditions
  - Inspection and entry – monitoring for permit compliance
  - Annual reporting
- Landfills, Hazardous Waste Treatment Storage and Disposal Facilities (TSDF), and Industrial Facilities
  - Identifying priorities and procedures for inspection and implementing controls for discharges

SMALL MS4 MONITORING

- Requirement for Field Screening of Outfalls
  - Sampling of Dry Weather Discharges
- Permit Conditions
  - Inspection and entry – monitoring for permit compliance
  - Annual reporting
- Reporting for permit compliance, appropriateness BMPs and progress toward meeting measurable goals
  - Monitoring data to be reported, if any prepared

REASONS FOR MONITORING AND REPORTING IN PERMITS

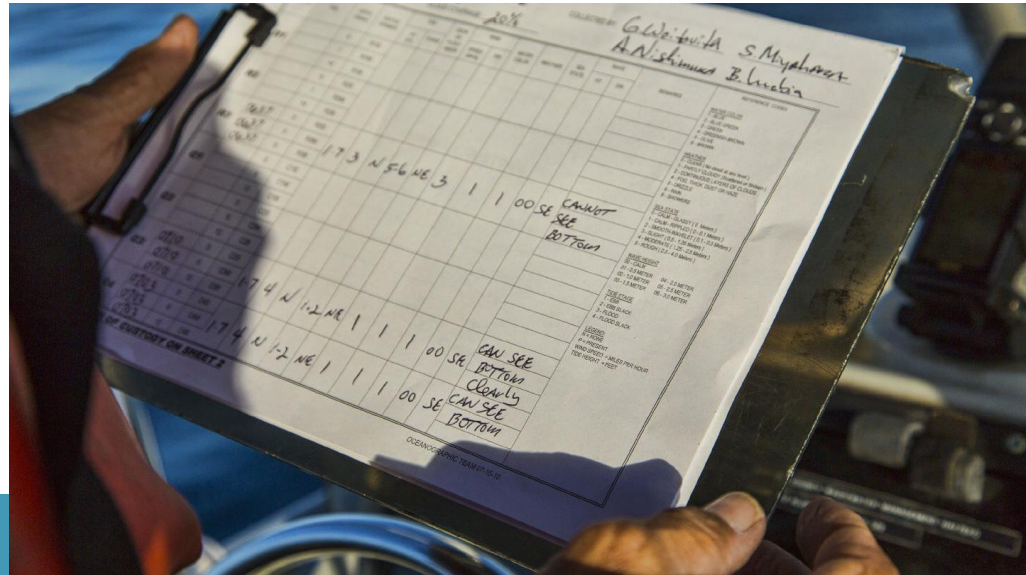
- Problem Assessment
- Compliance Tracking
- Effectiveness Evaluation
- TMDL Compliance
- Annual Reporting

PROBLEM ASSESSMENT

- Water Quality Assessment and Monitoring Plan (NC – Ph. I)
  - Requirement - Maintain and implement the Plan
  - Objective - Evaluate impacts on water quality
  - Include a schedule for assessment and monitoring activities
  - No submittal of results, only make available upon request
  - Waiver for exemption if stormwater control measures are adequate
- Wet Weather (TN – Ph I.)
  - Requirement – Maintain and conduct/perform monitoring
  - Objective – Assess program compliance, determine effectiveness of BMPs, and improve impaired waters
  - Parameters listed in permit, varies between MS4 but there are core parameters
  - Provision to provide seasonal pollutant loads (SPL) and event mean concentrations (EMC)

COMPLIANCE TRACKING

- Sampling of Non-Stormwater Discharges (various Ph. II)
- Monitoring program for industrial and high risk loading areas (TN – Ph. I)
  - Pollutants with ELGs
  - Pollutants in existing NPDES permit
  - Other pollutants considered to have substantial loading to MS4
- Monitoring program for industrial and high risk loading areas (NC – Ph. I)
  - Requirement for program but monitoring details in plan



EFFECTIVENESS EVALUATION

- In-Stream Monitoring Program (TN – Ph I.)
- Biological Monitoring Program (TN – Ph I.)
  - Annual or Semi-annual sample collection
  - Two urban streams not meeting classified uses
- Fish and macroinvertebrate sampling habitat assessments (KY – Ph I.)
- MS4 Monitoring Requirements – one of the following options (KY - Ph. II)
  - Effluent monitoring of representative outfalls before and after implementation activities
  - Long-term monitoring of pollutants and conditions in receiving waters, upstream and downstream of discharges
  - In-stream biological monitoring to demonstrate recovery after implementation activities
  - Other methods to demonstrate effectiveness

TMDL COMPLIANCE

- No TMDL Monitoring Currently in Rule Making (FL)
- Development and Implementation of Monitoring Plan within 6 months for POC (NC – Ph. II)
- Monitoring Plan Requirements (SC – Ph. II)
  - Frequency statistically significant to determine seasonal pollutant load
  - Duration a minimum of 2 – years
  - Samples and measurements shall be
    - Representative of MS4 discharges
    - Reasonably distributed in time
    - Consider the rate of discharge
    - Expressed in terms of the Wasteload Allocation units and measurement
  - Option for in-stream monitoring versus outfall monitoring
  - Guidance on selection of monitoring locations
  - Requires only a summary of the monitoring efforts

TMDL COMPLIANCE

- Impaired Waterbodies Monitoring Plan Guidance (TN - Ph. II)
  - EPA Approved TMDLs and Impaired Streams where MS4 an identified source
  - Siltation and Habitat Alteration Impaired Streams
    - One sample per stream segment per permit cycle
    - Semi-Quantitative Single Habitat Method
  - Pathogens Impaired Streams
    - Five samples and corresponding flow with 30-days (geometric mean method) during summer
    - All stream segments sampled in permit cycle
  - Other TMDL parameters
    - MS4 perform analytical monitoring as prescribed in the TMDL
  - Non-analytical monitoring
    - Visual Stream Surveys and Impairment Inventories
    - Performed upstream and downstream of MS4 outfalls
    - Objective – Identify and prioritize MS4 sources

ANNUAL REPORTING

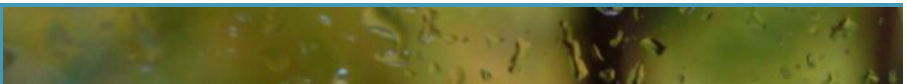
- Typical for all Phase I and II Permits
  - Summary of activities conducted during current year of permit
  - Progress towards achieving measurable goals
  - Compliance with implementation schedule
  - Proposed activities in the upcoming year
  - Summary of inspections and enforcement
  - Modifications or revisions to BMPs and/or SWMP
- NCDENR offers online reporting through SMPA on BIMS system (NC – Ph II)
- Status of expenditures and budgets for past and present years (KY – Ph I.)
- Separate monitoring annual report with raw data, trend analysis, seasonal pollutant loads, and event mean concentrations

MONITORING AND REPORTING TRENDS OBSERVED

- Trend 1 – Data Use Beyond MS4
- Trend 2 – Lack of Data Analysis Being Performed
- Trend 3 – Monitoring Upside/Downside

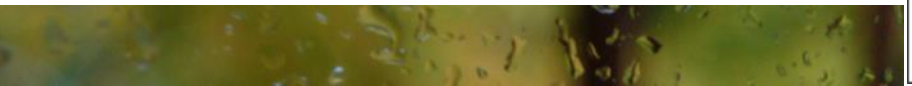
DATA USE BEYOND MS4

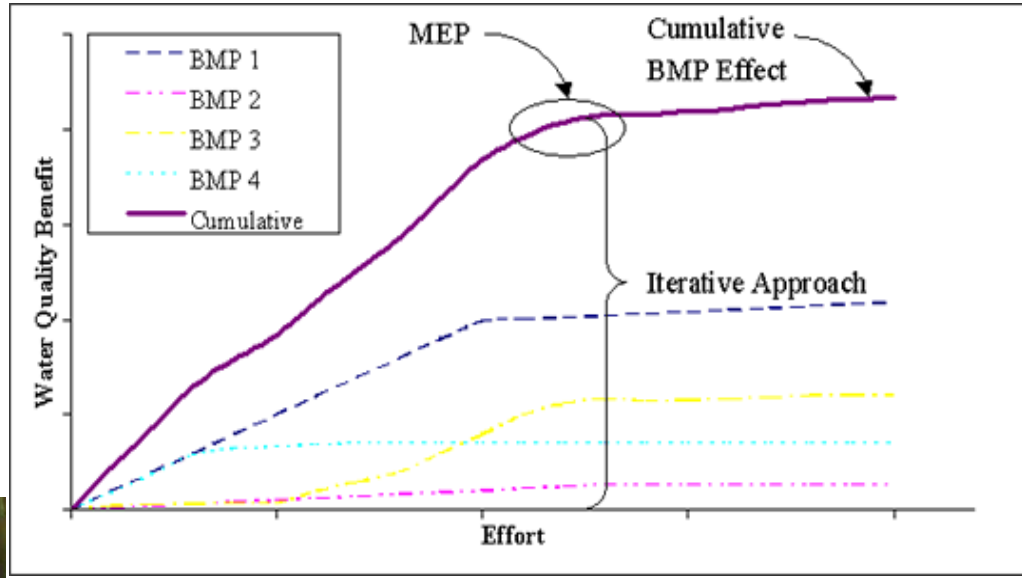
- Hesitancy in sharing data beyond minimum requirements (i.e. summaries)
- States not resourced to evaluate data and compile findings
- States encourage MS4s to work with stakeholders directly
- Smaller communities need exposure to what larger communities doing
- Early in the process for States to evaluate data use and sharing



QUALITY OF DATA ANALYSIS

- Monitoring being performed but no analysis provided
  - Need for more data assessment guidance and training
  - More detail on monitoring procedures has been helpful in some states
- In-stream monitoring for effectiveness not also definitive





MONITORING UPSIDE

- Above and beyond for grants – funding access – Motivator
- 319 funding requires Management Plan with Monitoring Plan

MONITORING DOWN SIDE

- Economics is not a consideration of meeting permit, but economics plays a role in enforcement
- Staff consistency affects monitoring program and implementation

DISCUSSION

- How can communities come together to share monitoring results as it relates to implementation success?

DISCUSSION

- What training is available or needed for the MS4 in order to make best use of monitoring?

CASE STUDY

- Birmingham Water Quality Monitoring
  - CWA Requirements
  - City's NPDES Permit Requirements
  - The Birmingham Story; A Paradigm Shift
  - Benefits of New Direction

CITY OF BIRMINGHAM
A PHASE I MONITORING CASE STUDY

Thomas H. Miller

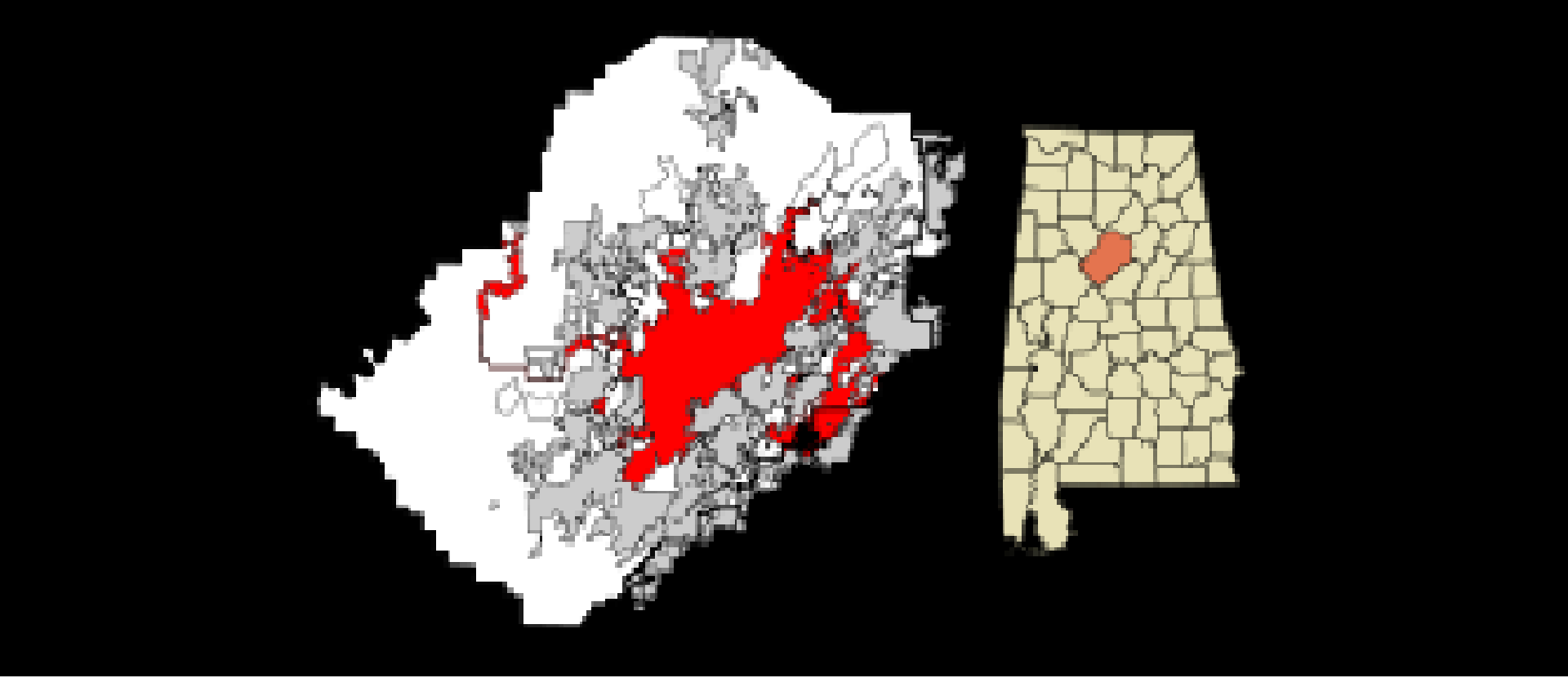
Stormwater Administrator

FEDERAL MONITORING REQUIREMENT

- **QUANTITY:** Shall include a requirement to **effectively** prohibit non-stormwater discharges into the storm sewers; and

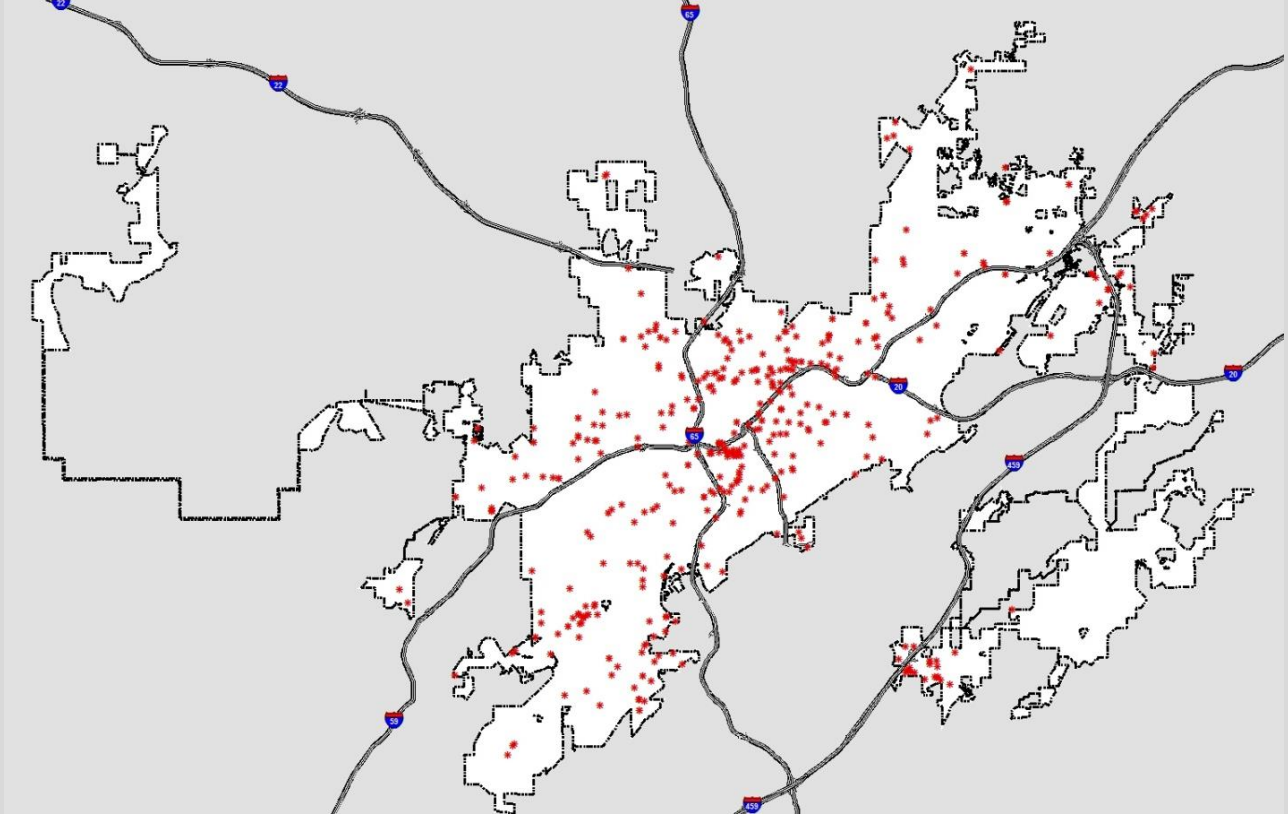
  Section 402(p)(2)(B)

- **QUALITY:** Shall require controls to **reduce** the discharge of **pollutants** to the maximum extent practicable



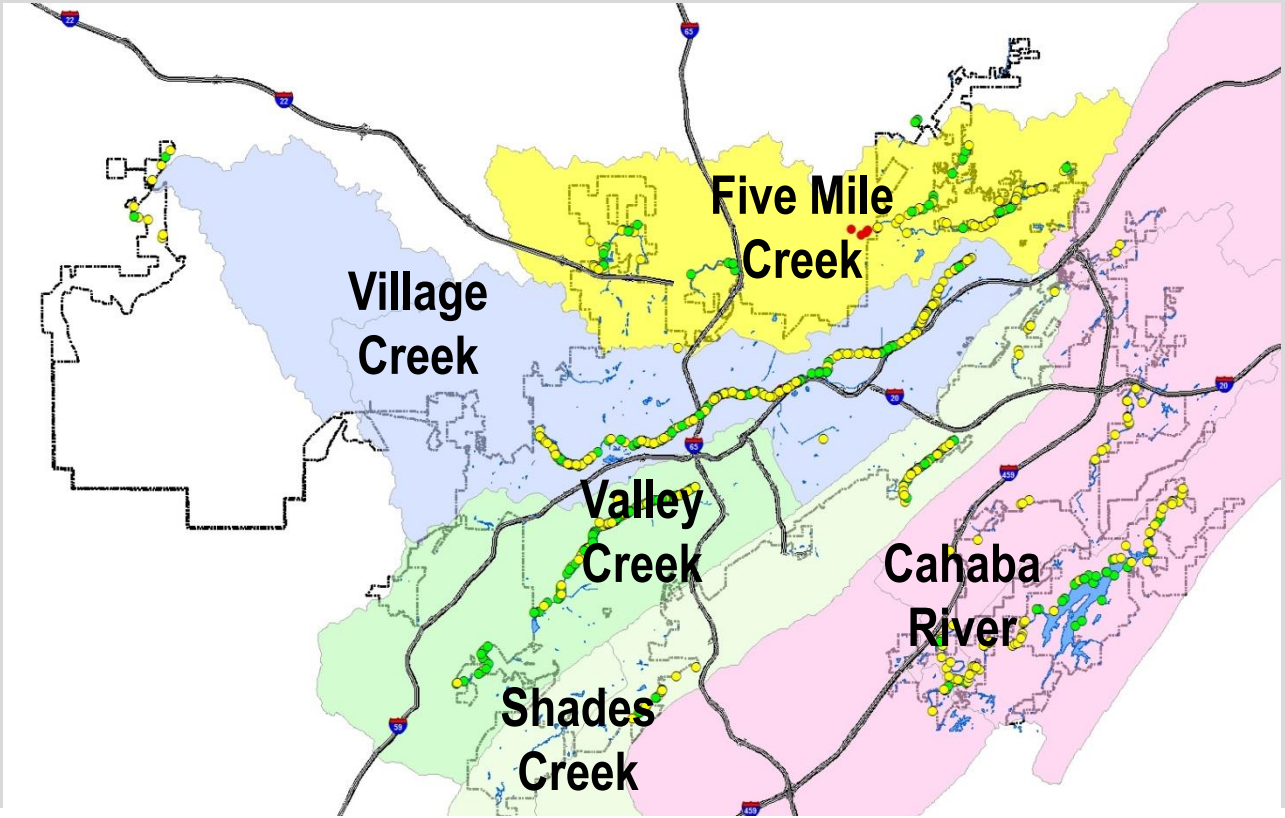
Birmingham Story: A Paradigm Shift

City of Birmingham, AL
148.5 miles^2



Birmingham Story: A Paradigm Shift

430 NPDES Industrial Permit



BIRMINGHAM STORY: A PARADIGM SHIFT

5 – Watersheds
815 - Outfalls

CITY NPDES PHASE I PERMIT

Industrial and High Risk Runoff:

- **IDDE Program: Is prevention focused for MS4**
  - Illicit discharges prioritized & dry weather screened at least once every 5-yrs
  - Unpermitted sanitary sewer dry & wet weather screened
- **Establish procedures for monitoring, reporting, & controlling pollutants to MS4**
  - “Reasonable steps” to eliminate pollutant discharges, a shared process with ADEM
- **Establish legal authority to control discharges to and from MS4**

CITY NPDES PHASE I PERMIT

Water Quality Monitoring

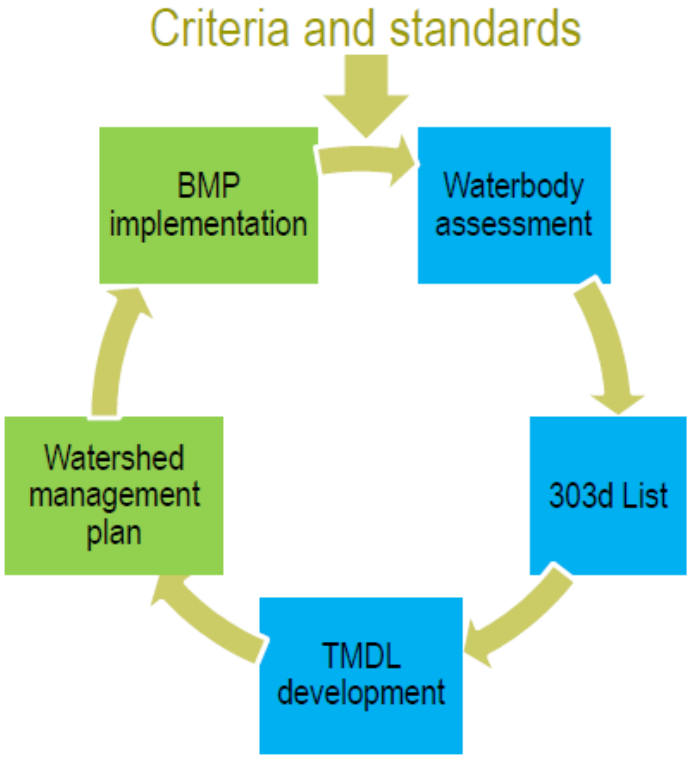
- **Dry Weather Screening (1/5)**
  - Screening sites (quarterly)
  - Instream (quarterly)
  - Outfall reconnaissance (flow after 72-hours dry, quarterly)
  - Program design need not conform to federal guidelines
- **Storm Event Monitoring (Wet Weather)**
  - Estimate annual cumulative pollutant loads from MS4
  - Estimate EMC & seasonal pollutant discharge from outfalls
  - Identify water quality improvements or degradation
  - Instream/Screening/Outfall reconnaissance

Overall:

Assess the effectiveness & adequacy of program controls

REASONS FOR CHANGE

- Anti-Degradation Rule
- Below Limits of Detections
- Data Limitations (1-Sample)
- Inherent Data Bias (Wet/Dry)
- Inappropriate Locations
- Significant No. of Outfalls
- Safety
- Cost
- Confirmed Impairment
- Existing TMDLs
- No Watershed Plans
- Required BMP Implementation



WATER QUALITY CONSTITUENTS

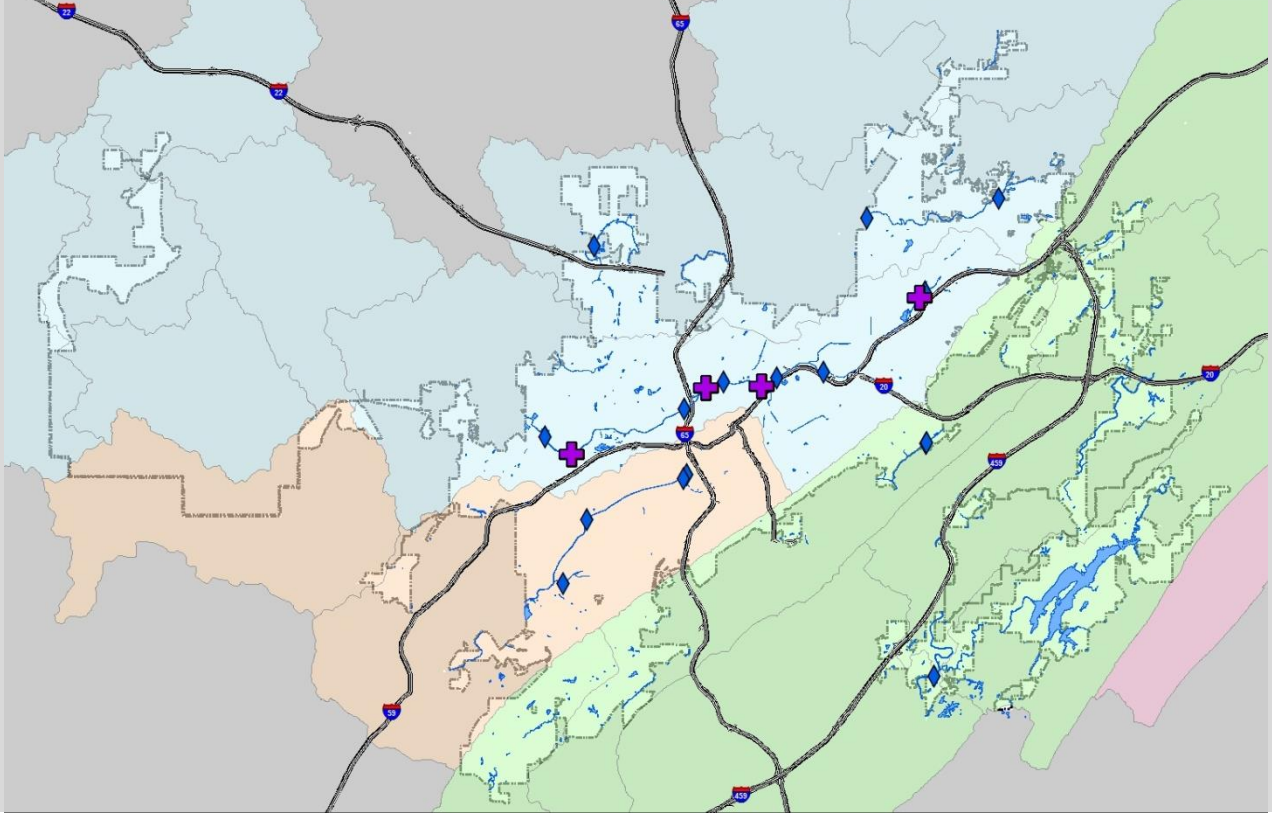
Dropped

- COD
- Oil & Grease
- Cyanide
- Chromium's
- Fecal Coliform
- Mercury
- Dieldrin

Added

- Detergents
- Copper
- Chlorine
- Alkalinity
- Ortho Phosphorus

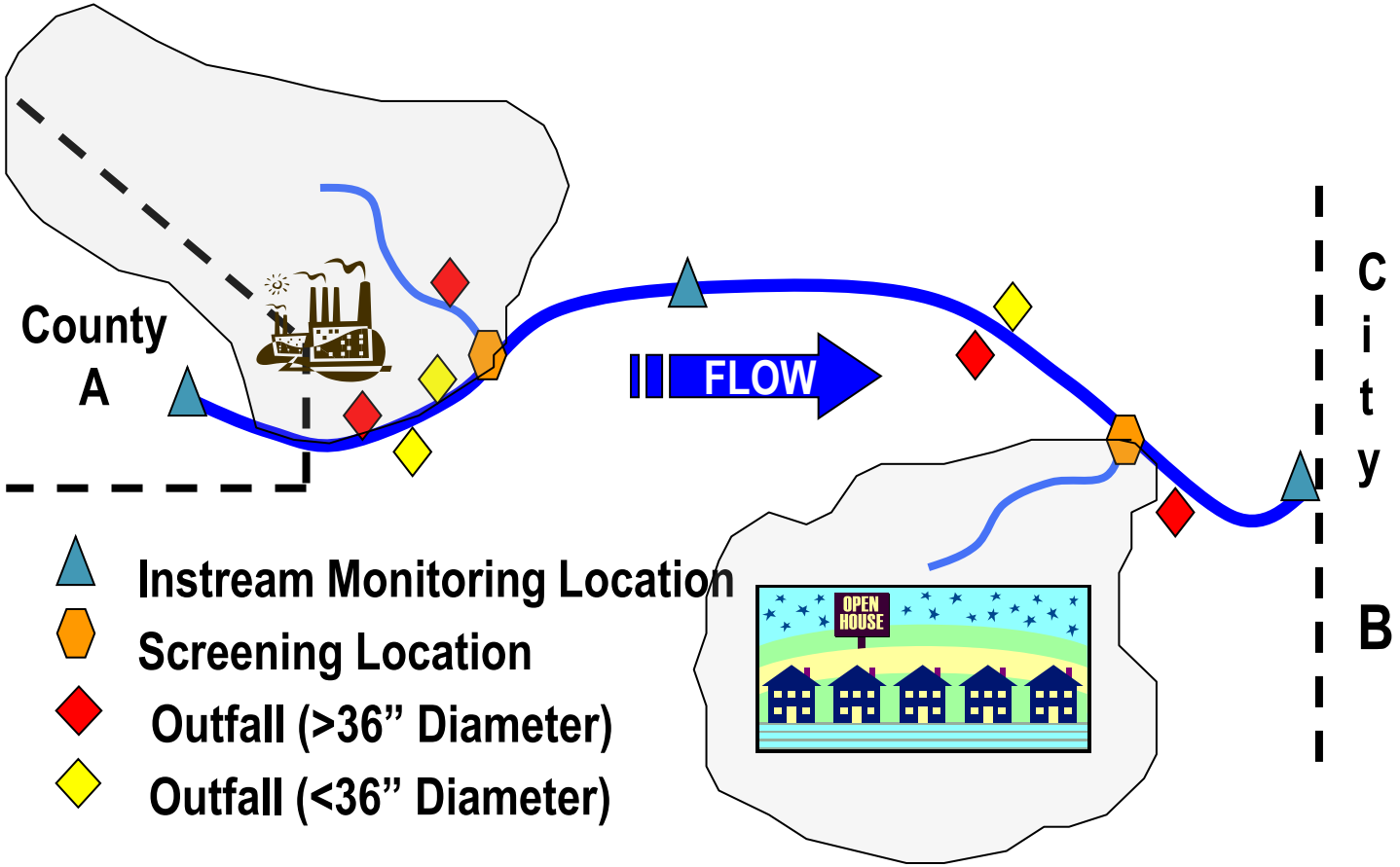
	Existing Program		Previous Program	
Parameters	In-Lab	In-Field	In-Lab	In-Field
BOD	●		●	
TSS	●		●	
TDS	●		●	
Dissolved P			●	
Ammonia		●		●
TKN	●		●	
Total N	●		●	
Total P	●		●	
Turbidity		●		●
E-Coli	●		●	
Hardness		●	●	
Temperature		●		●
pH		●		●
D.O.		●		●
Conductivity				●
Phenols		●	●	
NO2/NO3		●	●	



Birmingham Story: A Paradigm Shift

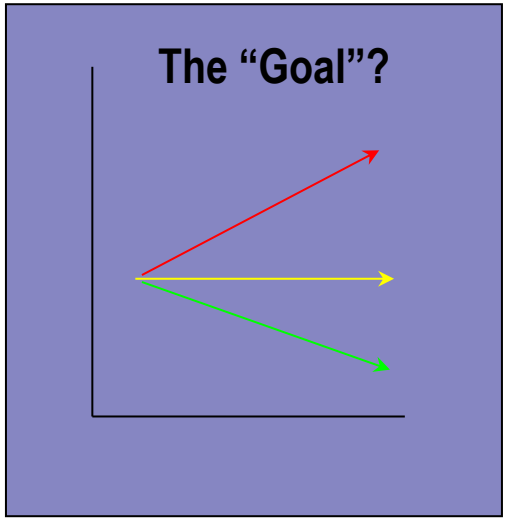
26/14 – Stream Monitoring Stations (O/N)
4/5 – Screening Stations (O/N)
0/4 – USGS Stations (O/N) Village Creek

OUTFALL MONITORING STRATEGY

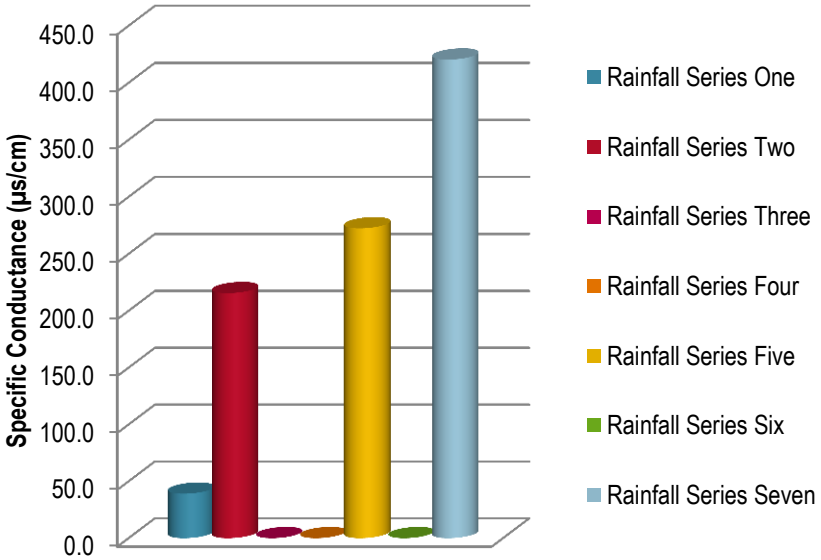


STREAM LOCATION & MONITORING STRATEGY

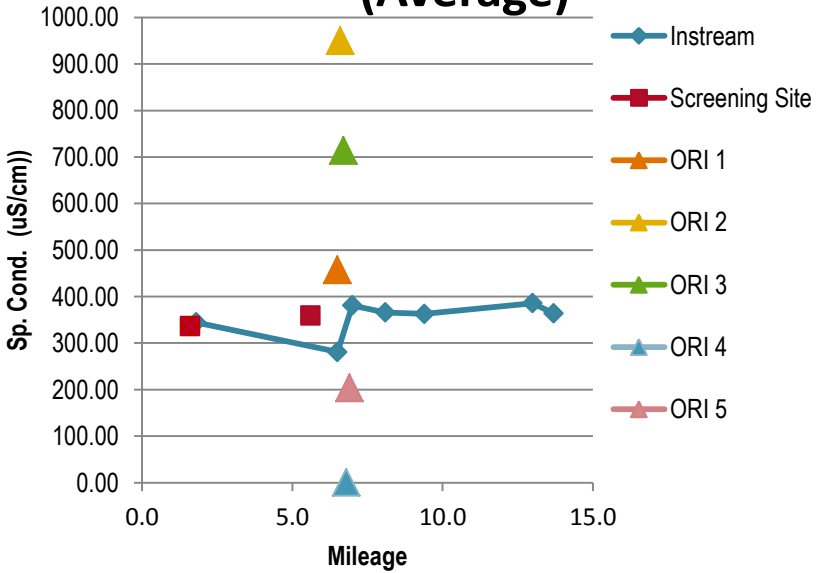
- More Proactive Approach
- More Focused Approach
  - Greater than 36” or box culvert
  - Dry period with flow
  - Conductivity and visual
- Multiple Team Approach
- Eliminate illicit connections and discharges to improve in-stream water quality



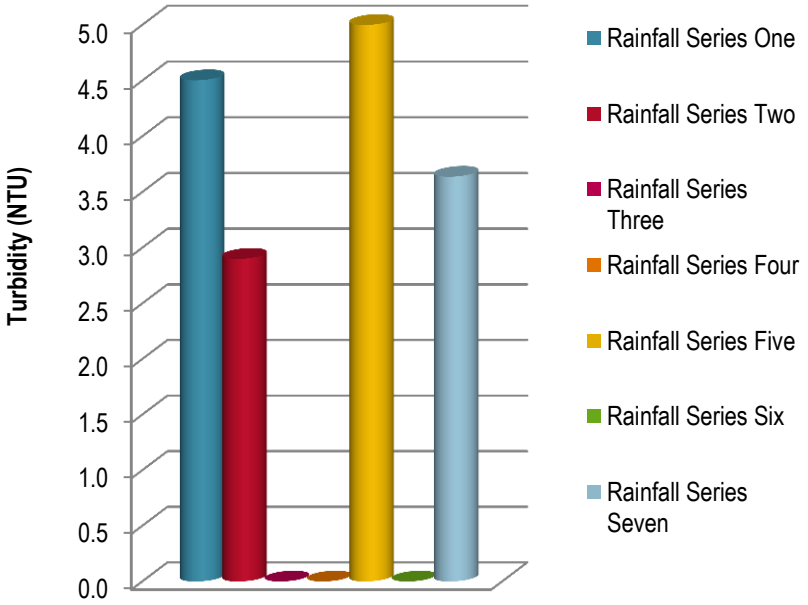
Village Creek Sp. Conductivity (vs. Rainfall)



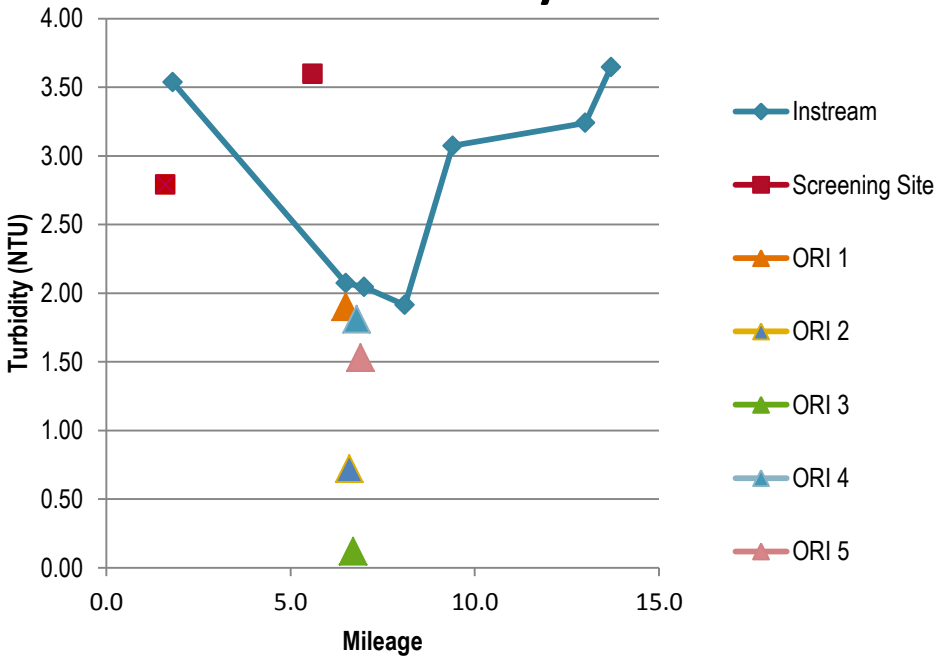
Village Creek Sp. Conductivity (Average)



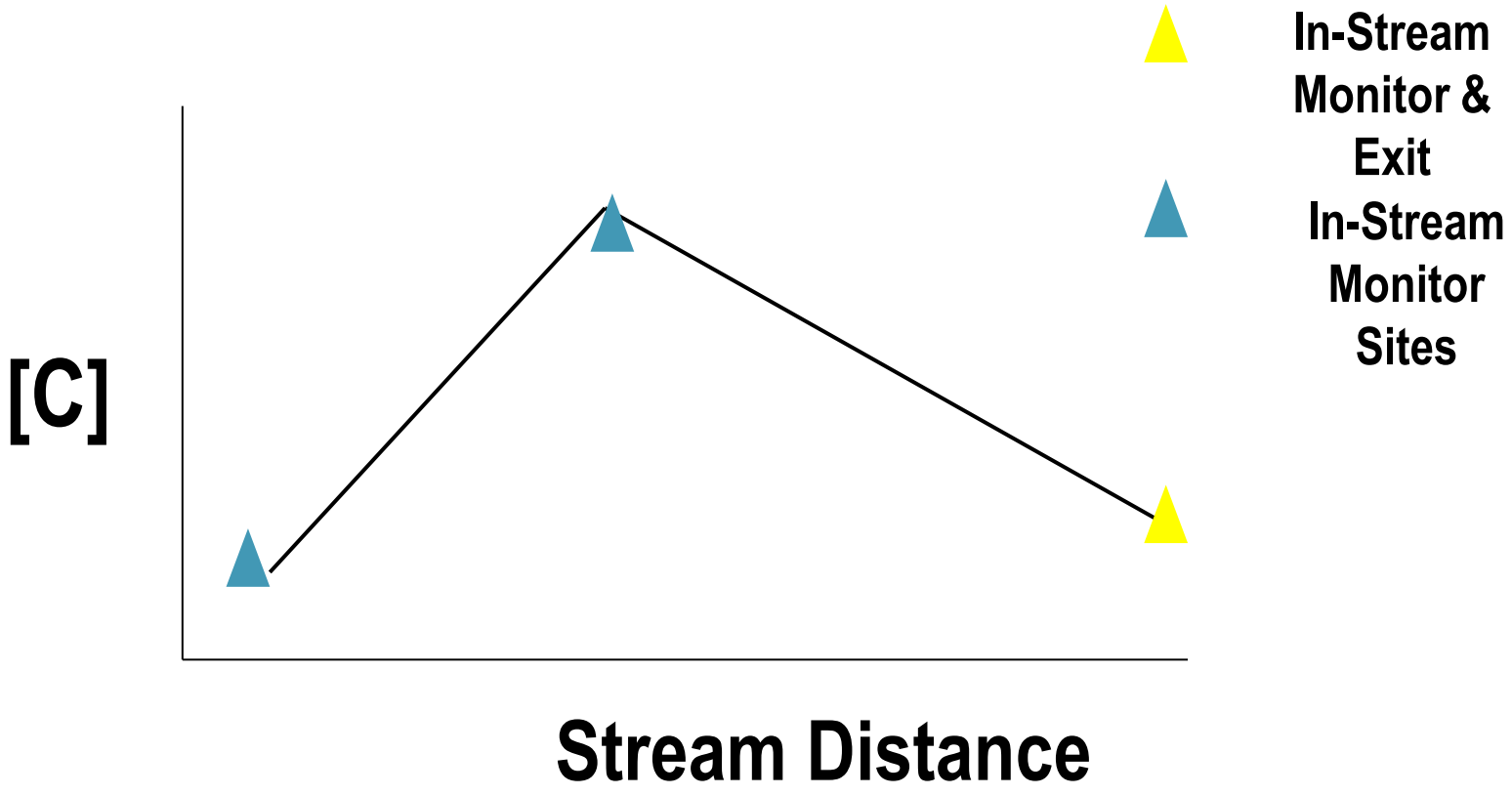
Village Creek Average Annual Turbidity



Village Creek Average Annual Turbidity



PERFORMANCE MEASURE OF SUCCESS



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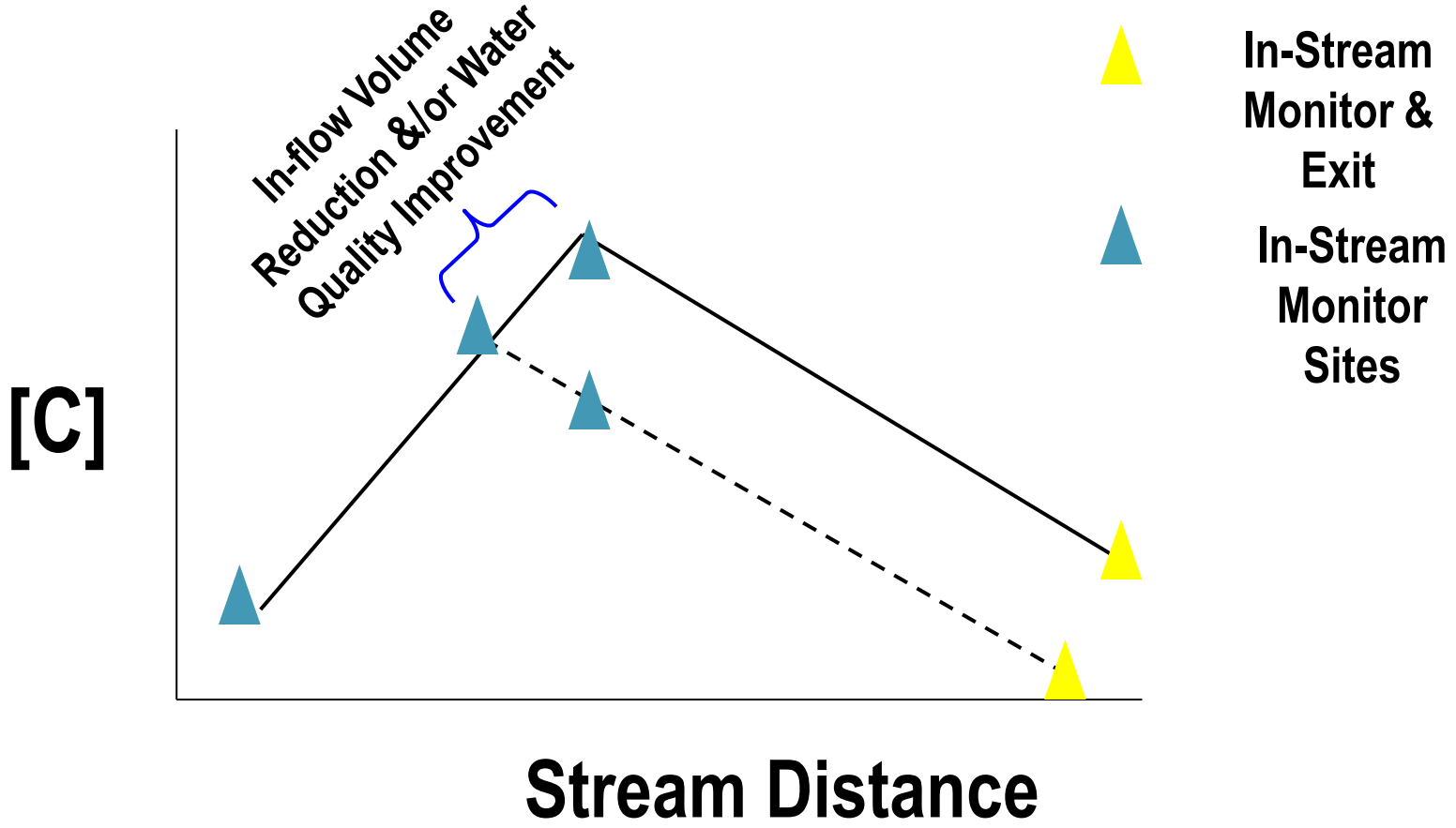
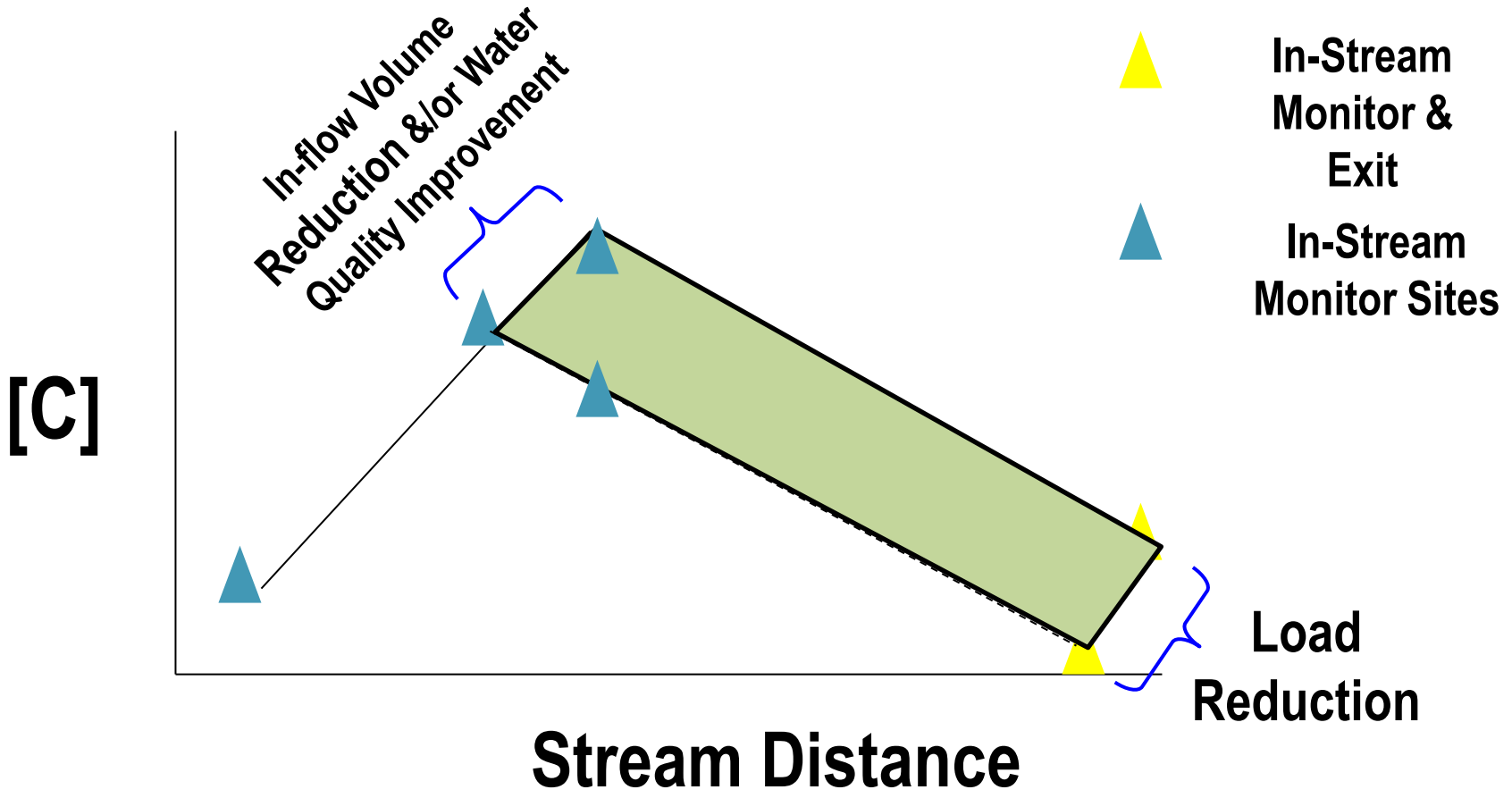


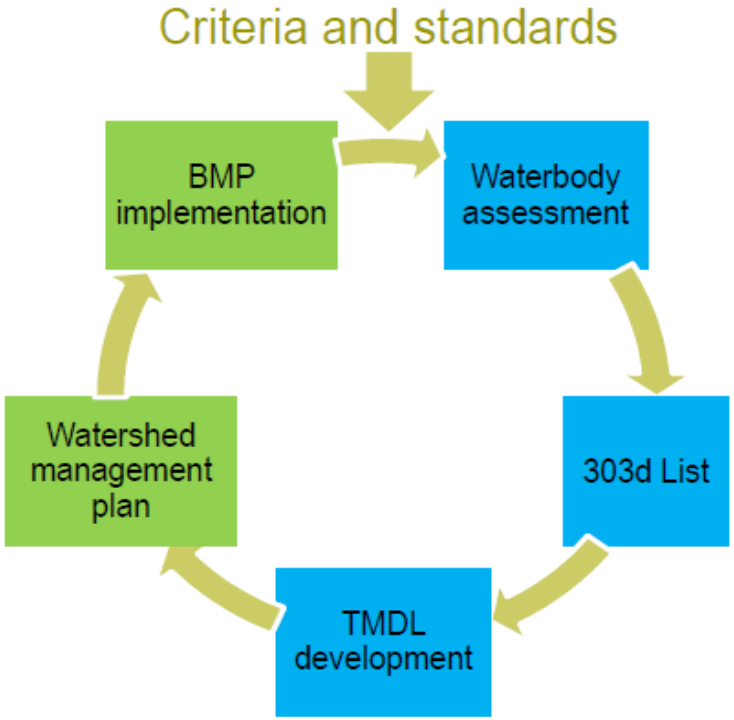
PERFORMANCE MEASURE OF SUCCESS



COMPREHENSIVE SYSTEM STRATEGY FOR EFFECTIVENESS

- Outfall monitoring focus
- Stream locations and monitoring coverage
- Add USGS Stream Gaging
- Measure of performance
- Implement Watershed Planning

WATERSHED MANAGEMENT APPROACH



WATERSHED MANAGEMENT APPROACH

Watershed Data Management

- Natural resources data Inventory
- Pollution sources
- Land use information
- Creek water quality
- Watershed issues
- Stakeholders input

Assessment

- Watershed water quality model
- Creek floodplain model
- Projected l& use change scenario
- Identify problem extents
- Descriptive mapping

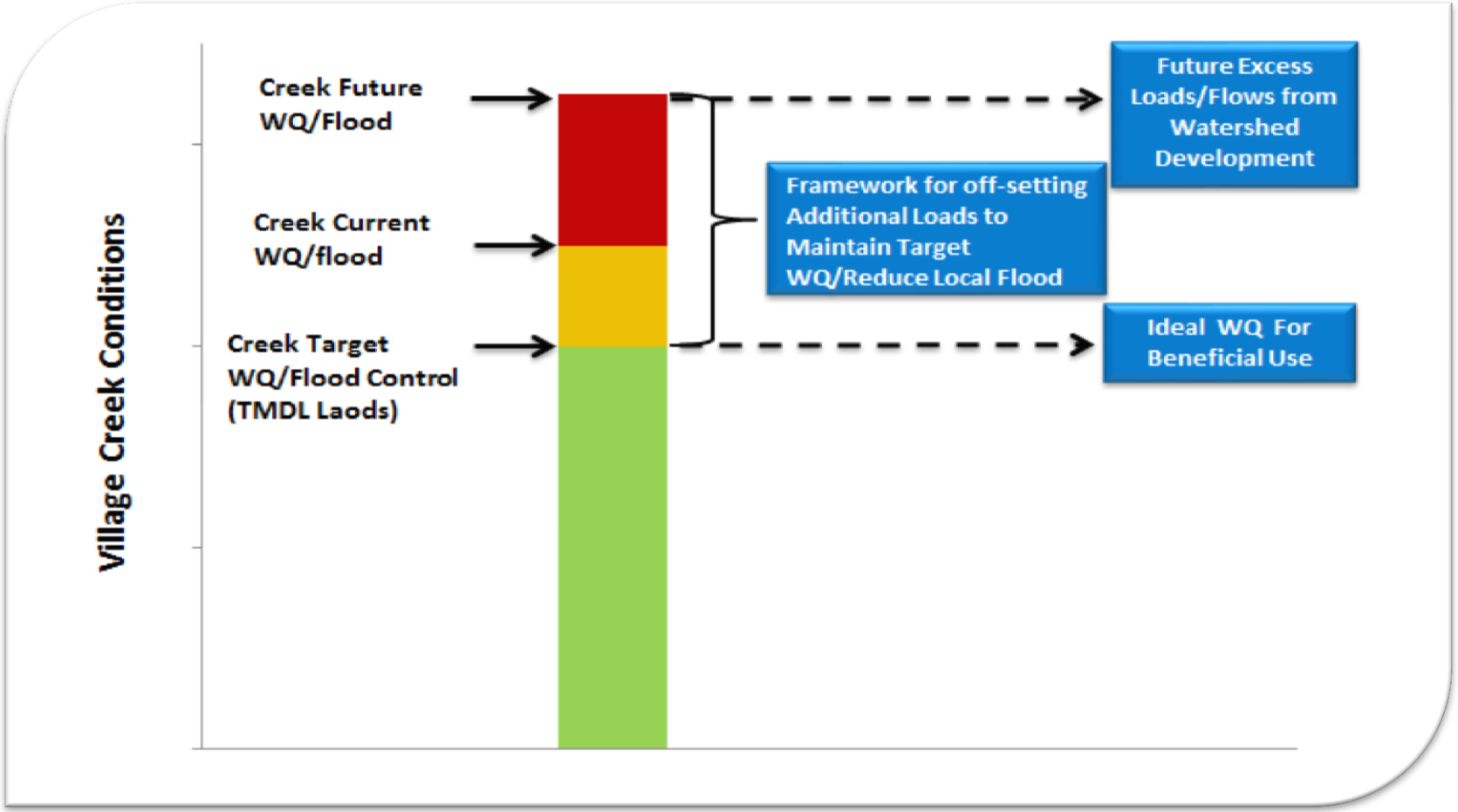
Planning

- Decision-making & management efforts planning
- Review applicability of in-house plans
- Review effectiveness of local policies & controls
- Recommendations matrix for LID/CD projects

Implementation

- Through local, state & federal programs
- City Comprehensive Plan
- Infrastructure upgrade
- Seek external funding support (e.g. 319 (h))

WHAT IS THE GOAL?



POTENTIAL SOLUTIONS EVALUATED

- Policy & Management Strategies
- Use of low impact develop/green infrastructure approaches
- Structural Solutions
  - Inlet redesign
  - Improved maintenance
- Update FEMA maps through model improvements (CRS)
- Public Engagement Processes
- Increased stream flow gauging & informed flood management

INTENDED OUTCOME

- Village Creek restoration: Off 303(d) List of Impairments
- Complements & coordinates activities
- Close cooperation of stakeholders & entities
- Improved focus on permitted controls
- Greater efficiency of resources
- Water quality focus
- Improved decision-making in TMDLs
- Increased public involvement
- Improved flood protection & reduced property damage
- Potential for increased revenues & job opportunities
- Focal point for Citywide green infrastructure
- Opportunity to leverage City funds

TRIPLE BOTTOM LINE DECISIONS

Environmental

- **Policy**
  - Adopted new stormwater ordinance
  - Review site runoff volume control
- **Structural**
  - Encourage use of LID/GI approaches
- **Other management strategies**
  - Public engagement
  - Review & revise the City operations (street sweeping, maintenance, parks services, etc)
- **Indicator based watershed water quality monitoring**
  - Periodic review water quality trends and revise monitoring strategy
- **Desired outcomes**
  - Improve watershed water quality to meet Village Creek beneficial uses

TRIPLE BOTTOM LINE DECISIONS

- Flood Reduction (e.g. tailwater effects, regional retention/neighborhood lakes, etc.)
- Trash and Dumping Management
- Odor Mitigation
- Passive and Active Parks Planning
- Trails
- Streetscape

Social

TRIPLE BOTTOM LINE DECISIONS

- **Birmingham Comprehensive Plan – Green Systems to Bring New Economic Opportunities**
- **North Birmingham Growth Framework Planning**
- **Other Management Strategies (e.g. entrepreneurial business enterprise opportunities)**
- **Desired Outcomes**
  - Attract new business in LID/CD technology
  - Improve property values through improved watershed aesthetics

THE ACTION PLAN

- Established New Monitoring Locations and Frequency
- Modified Water Quality Monitoring Constituents
- Added USGS Flow, Stage, Water Quality Sites
- New Stormwater Protection Ordinance to Achieve Legal Authority Certainty
- Prepare Watershed Management for Village Creek Watershed

DISCUSSION

- How can communities come together to share monitoring results as it relates to implementation success?

DISCUSSION

- What training is available or needed for the MS4 in order to make best use of monitoring?

CLOSING THOUGHTS

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